

AN OPEN PATH FOR GENDER EQUALITY IN RESEARCH

WHEN FEMALE SCIENTISTS QUESTION THE STATE OF SCIENCE AND INSTITUTIONS EMBRACE THE CRITICISM

ANA SÁNCHEZ, TERESA SAMPER-GRAS, MARCELA JABBAZ AND CAPITOLINA DÍAZ

The institutionalisation of equality policy in science, both at the national and the European scale, should facilitate progress towards equality in a space that wants to consider itself merit (and ability) driven. But discriminatory practices, both conscious and unconscious, direct or indirect, leave women out of many of the positions that they should occupy according to their accomplishments and capabilities. Many scientific institutions and their professionals still do not understand that if gender equality is only formally achieved and actual compliance is not monitored, they will lose part of the talent they are trying to cultivate.

Keywords: feminist theory, Horizon 2020, research, gender studies, androcentrism.

While the presence of women in science in the early twentieth century was merely testimonial, today their incorporation into the science and education system is significant. According to the *She Figures 2015* report (European Commission [EC], 2016b, p. 5-6), women obtain 47 % of PhDs in the EU, yet they only hold 33 % of research positions and 21 % of higher research positions. As we just pointed out, the slow but substantial increase in the number of women in different scientific fields at the beginning of the twenty-first century, as well as the increasing value of science in current societies and economies (EC, 2016a), has opened up the way for what María Ángeles Durán considers the science of the future:

If science did not build itself, but rather, it was given a physical base and organisation by human groups, this same social mediation can be understood as a push for freedom, as a new call without limits or exclusions [to individuals]. Therefore, as one of groups historically excluded from science, today's women must tackle science for what it can be, what it should be: the utopian science of the future.

(Durán, 1981, p. 9)

«SIMPLY INCORPORATING WOMEN INTO THE SCIENTIFIC ENVIRONMENT IS NOT ENOUGH, IF THE ONLY GOAL OF THESE RECRUITMENTS IS TO MEET THE FORMAL REQUIREMENTS»

Indeed, the science of the future might already be under construction today, and thus, this paper will set out two of the mainstays that help move it towards progress. In the first section, we will show how critique of positivist and sexist science by feminist fields, among others, has progressively changed the way we see both the object and the subject of science and, consequently, its epistemological approach. In the second section, we will observe how the institutionalisation of gender equality in European scientific policy acknowledges these transformations. Lastly, we will address resistance to these changes from scientific and technological systems.

■ TOWARDS A NEW SCIENTIFIC PRACTICE

When analysing the interactions between science and gender, «we realise that delving into the role of women in science is not possible without reconsidering the bases and concept of science itself» (Barral, Magallón, Miqueo, & Sánchez, 1999, p. 7). The science we are starting to build by applying

gender or feminism-based perspectives leans on the critique of modern science posed in the 1970s by several authors, but especially in *The structure of scientific revolutions*, by Thomas Kuhn (1962/2013). The book incorporated the social and historical dimension of science and changed the cognising subject, from individual researchers to scientific communities. For Kuhn, the education of scientists is a process of socialisation where they learn to work and do science within the dominant scientific paradigm, which determines what questions and what methods are valid.

Neither the previous process, carried out by isolated scientific researchers, nor the new process, carried out within a scientific community, incorporated women spontaneously. In general terms, women were kept out of scientific tasks related to the production of knowledge, and, while the effects of universal mixed education have favoured a progressive but slow increase in the number of female scientists, according to Kuhn's terminology, they have done so within the same dominant paradigm as their male colleagues. A dominant paradigm supported

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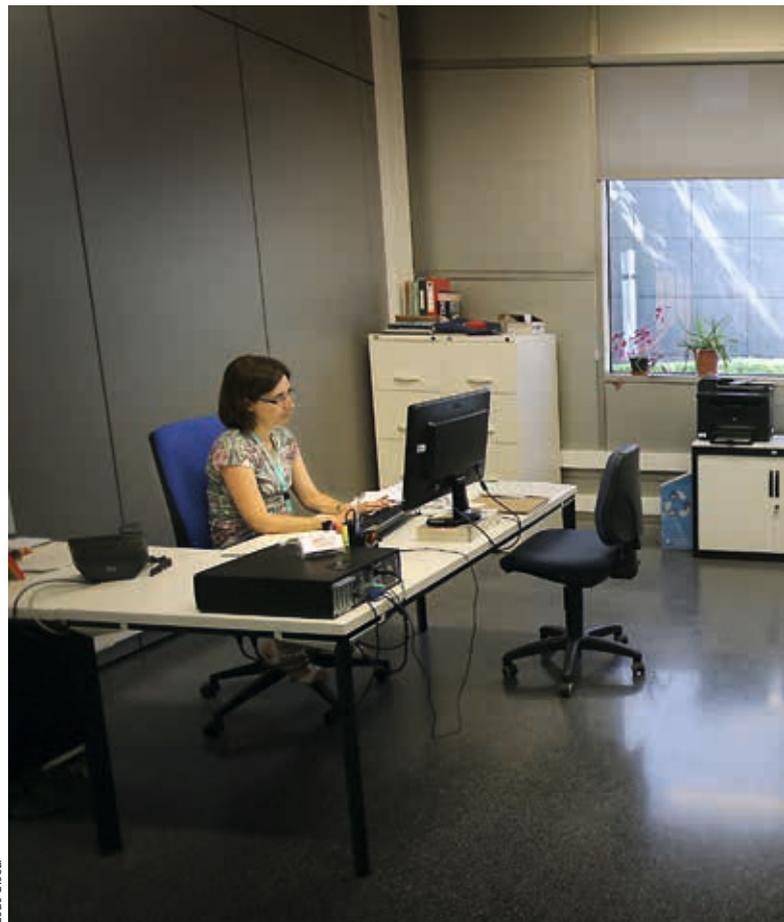
by an *androcentric* scientific model (made by males with men serving as the human model) still dictated what methods and theoretical models were valid in a discriminatory way, and so the real inclusion of women into science requires more than just the addition of numbers.

Three factors converged in the late decades of the twentieth century and contributed to the science of the future getting closer to what María Ángeles Durán, in the quote at the beginning of this text, described as «utopian». We refer to the combination of theories that criticised the positivist scientific paradigm (work by authors including Karl Popper, Imre Lakatos, Paul Feyerabend, Edgar Morin, or Jürgen Habermas), the development of significant feminist theory (Fausto-Sterling, 2000; Haraway, 1991; Harding, 1991 and 1986/1996; Keller, 2002; Longino, 1993), and an increase in the number of women in science (CE, 2016b).



Jesus Ciscar

While almost half of the people who obtain a PhD in the European Union are women, only 33% hold research job positions, and just 21% reach the highest levels in research careers.



Jesus Ciscar



Criticisms, initially from philosophy of science and then from more recent approaches such as Morin's theory of complex systems, do not only change the cognising subject, but also the construction of the scientific object and its mutual interconnections. In this context, feminist scientists understand that women have the potential to add a new perspective to scientific work when they are involved in the production of knowledge. The methodological change, derived from this perspective, favours the emergence of non-visible elements from exclusive perspectives.

This new approach leads to a critique of the androcentric view that predominates in most scientific disciplines. Hence, for example, in primatology, researchers' approach was questioned and central categories and theories in the discipline were even refuted (Pérez Sedeño & Canales Serrano, 2013; Sánchez, 1993). For instance, abandoning the exclusive monitoring of male

primates demolished unverified assumptions such as the sexual passivity of female primates. The new approach did not only expand and refine our knowledge about primates, but also introduced a new way of discovering, a new epistemology including what Donna Haraway (1991) defines as «situated knowledge». Haraway argues that theoretical frameworks are not the only aspects that educate our way of looking: another is the social position from which we formulate, because no knowledge is disconnected from its context or independent from the subjectivity of the cognisor. We know that, fundamentally, science has always been in the hands

(or in the intellect) of white middle or upper-class western men. The experiences of women (their lack of power in the world and in the scientific apparatus) can, and do, affect their scientific findings. As indicated by the biologists Maturana and Varela in their book *El árbol del conocimiento* ("The tree of knowledge", 2007), «everything

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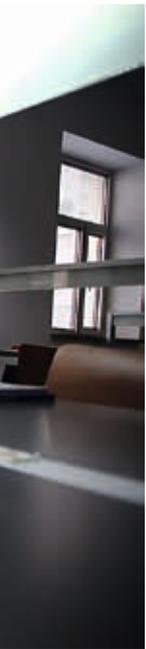
said is said by someone», and that someone lies within a web of social relationships that conditions what they see, where they look and what they say, even if they rigorously apply the scientific method.

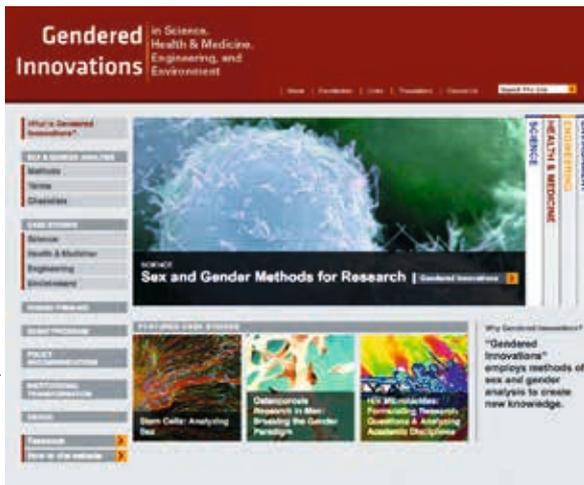
The innovations achieved by female (and male) scientists in a particular field often end up being isolated extensions of knowledge, but sometimes a critical mass of female scientists is reached in the same field, in such a way that their knowledge synergises and generates new epistemologies that can change the dominant paradigm of their respective disciplines. This is a standard phenomenon in the advancement of scientific knowledge (be it made by women or men), but what we want to emphasise here is the fact that, in some cases, when women carry out research, advancements often include experiences, relationships, and effects that had previously been rendered invisible, such as the aforementioned example in primatology.

■ **FEMINISM IN EUROPEAN SCIENTIFIC POLICY**

In an economic environment that is increasingly dependent on scientific and technological knowledge,

The inclusion of women as managers and decision-makers in scientific institutions is one of the priorities of European programmes for the promotion of research (like those included in the European Commission's Horizon 2020 framework).





The goal of the *Gendered Innovations* project, founded by Londa Schiebinger, is to include sex and gender perspectives in scientific research, and to take advantage of their potential as a source of innovation and discovery.

feminist criticism of conventional science, together with the presence of more female scientists, has generated the emergence of institutional proposals for the inclusion of women and gendered studies into science, both in specific and in transdisciplinary studies. In Europe, the sixth, seventh, and especially the eighth Framework Programme, known as Horizon 2020, worked as policy vehicles to incorporate women into science as scientists, managers, decision-makers and the object of study.

Although the European Union's current objective of achieving more gender equality in science is still only a promise (CE, 2016b), the course is firm. As testament to that fact, in 2011, after several initiatives implemented since the beginning of the millennium, the European Commission (Schiebinger, 2013) joined the *Gendered Innovations* project at Stanford University, which has been led by Londa Schiebinger since 2009. In 2012, promotion of equality and gender transversality in research was established as one of the European Research Area's five priorities, and in 2014, the Helsinki Group on Women and Science (Lipinsky, 2014) highlighted some achievements in gender policy for European public research with a study in 31 countries. However, the leaders of all these projects recognise that these changes are coming at a very slow pace.

Within the framework of Horizon 2020, and of these theoretical experiences and contributions, the

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OF WOMEN INTO SCIENCE
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Miguel Lorenzo

European Commission has been encouraging gender equality in science, establishing the need to reach: a) gender equality in research teams; b) gender equality in decision-making; c) the integration of sex/gender analysis in the content of research and innovation; and d) gender equality in monitoring and evaluation.

Real change in women's position as the subject and object of science in Europe requires modifications in all four of these objectives, although the pace of change for each might differ. Thus, for example, simply incorporating women into the scientific environment is not enough, if the only goal of these recruitments is to meet the formal requirements. The same might happen with their



The objective of the Equality Unit at the University of Valencia is to promote sensitivity to gender issues within the educational community, which still shows low levels of awareness on these issues. Above, attendees at the conference on «Gender gaps: Wage, care and time management inequality», held in May 2016. On the right, a poster for the conference «Inclusion of gender equality in scientific research», also organised by the University of Valencia in 2015.

incorporation into decision-making, for example, in a context where the existing scientific directors reproduce and perpetuate sexist roles. In addition, sex and gender analysis might be introduced only cosmetically. That is, including the sex variable, but not gender perspectives, in analyses. In spite of all of the aforementioned, even if changes are only quantitative or cosmetic, the cracks are starting to show in scientific practice.

Of the four abovementioned goals, the newest and probably the most difficult to implement is the inclusion of sex/gender analysis in science. When

defining sex/gender analysis, Londa Schiebinger (2013) explains that sex is an important variable when research priorities are established, when hypotheses are developed, and studies are designed; gender takes on relevance when cultural attitudes are important in a project in at least three cases: when the prejudice of researchers affects the research proposal, when they draw from preconceived ideas about the needs or behaviours of people included in a study, and because of the gender relationships between researchers/innovators and the people who will use those innovations.

The European Parliament has also joined the efforts of European Commission's Horizon 2020 project; thus, on 9 September 2015, they passed a Resolution on the women's careers in science and universities, and glass ceilings encountered, which states that, if there is no equality, apart from ignoring a fundamental right, the insufficient use of human capital decreases the potential for advantages in research and innovation-related business and in overall economic development. Among many other recitals, it also argues that «the reasons for this situation are numerous and complex, including negative stereotypes and prejudices and conscious and unconscious bias».

Among the general measures, the resolution proposes that all statistics should be gender-disaggregated for all academic and scientific activity; the quest for gender balance in professional associations and the rotation of positions; monitoring selection and promotion procedures, concession of sabbaticals, project funding, grants, etc., as well as promoting the proactive selection of women. Another measure is offering training courses on gender transversality for selection boards, as well as systematic accountability of equality-related advancements. The importance of these recommendations lies in the fact that, once they pass, they become legal arguments to fight at different political levels – from university administrations to national governments.

■ RESISTANCE TO GENDER PERSPECTIVES IN SCIENCE

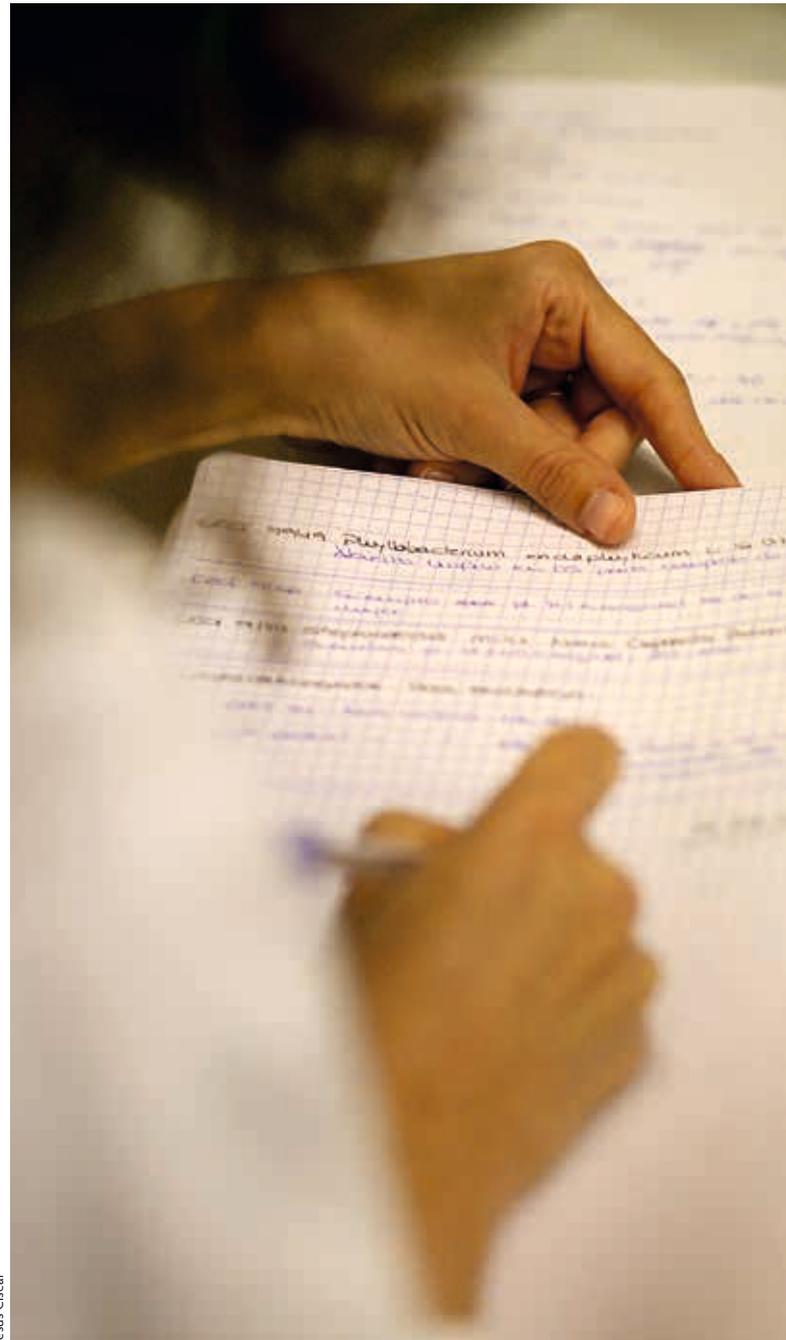
Despite the proposals to reach gender equality (numerical and in research content) stated in European Framework Programmes, the Spanish Science Act (Law 14/2011, 1 June, on Science, Technology, and Innovation) and the (modified) Universities Act (Law 4/2007, 12 April, on

Universities), many researchers still consider the lack of women in research teams and leadership tasks natural. Indeed, we observed as much in the conference about the inclusion of equality in scientific research organised by the signatories of this paper at the University of Valencia. This work was developed during the 2014-2015 school year, in collaboration with the University's Equality Unit. It primarily comprised four workshops (one for each campus/ knowledge field) on the inclusion of gender equality in scientific research, and had a twofold objective. On the one hand, informing researchers (principal investigators and their research team members in every professional category) about the requirements of the European Horizon 2020 programme; on the other, collecting written and oral information (through self-administered questionnaires coordinated by one of this paper's co-authors) about the perception or absence of gender equality in research projects and teams.

Analysis of the collected results show the dominance of a legitimating and naturalising discourse regarding the lack of women in research teams. It is supported with sentences such as «there aren't any women trained in my research field» or «in my experience, female scientists were not available or willing to be included in the research team», «having to make additional effort in order to achieve equality in the team is not logical», «I choose people according to merit and ability, sex is irrelevant to me», «I do not discriminate, I would love to have female scientists in the team, but it just did not happen». Even acknowledging that team creation routinely omits women that are equally, or more, valuable than the men who are invited, and that such practices may make it difficult for women to find support in creating and leading their own teams. Comments such as the aforementioned show that researchers harbouring these opinions are far from comprehending women's value as team members or leaders.

Research groups exclusively comprising women also exist because self-segregation is a strategy against the difficulties encountered in mixed teams, especially in excessively masculinised knowledge fields.

In our research, in addition to questions about the presence or absence of women, we also asked about the positions held by women in research teams. Explanations of why so many women occupy subordinate positions in these teams included their youth, lack of direct relevance of their discipline to the team, and training purposes (theory/



Jesus Ciscar

Both male and female researchers consider the low presence of women in research teams as natural. This vision is framed within a legitimising discourse supported by ideas such as the low availability of female scientists or the complete absence of women in some research fields.

**«PROMOTION OF EQUALITY AND GENDER
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practice). When we find a correlation between sex and these other variables, we tend to think, like Londa Schiebinger and Martina Schraudner (2011), that gender discrimination is behind some of the covariances between people's attributes and the social space they occupy. The concept of covariance allows us to identify the presence of gender inequality justifications derived from the fact that some apparently explanatory variables are presented along with sex as explanations.

What Michel Foucault called the «microphysics of power» might come into play: invisible filters and discriminations are established in order for particular positions to be occupied by some and not others.

This resistance to more advanced public policy in academic practice worries us, because public policy, as we know, constitutes unstable systems. Ilya Prigogine, the father of chaos theory, taught us that determinism has no place in unstable systems, so we cannot predict where gender equality will go in science. But these systems are sensitive to their initial conditions, so they can be explained statistically, in terms of probability. Extrapolating this uncertainty principle to European equality policy, we can foresee that the initial conditions, set in 2016, have a high probability that advancement towards gender equality in science will accelerate in the future. Institutions (the European Commission, Council, and Parliament, as well as Spanish law) have paved the road towards equality in science. Will we, female and male scientists, be able to keep up with this enterprise? ☺

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