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Implicit bias in academia:

A challenge to the meritocratic principle and to women's careers – And what to do about it

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Acknowledgements

About LERU

LERU was founded in 2002 as an association of research-intensive universities sharing the values of high-quality teaching in an environment of internationally competitive research. The League is committed to: education through an awareness of the frontiers of human understanding; the creation of new knowledge through basic research, which is the ultimate source of innovation in society; the promotion of research across a broad front, which creates a unique capacity to reconfigure activities in response to new opportunities and problems. The purpose of the League is to advocate these values, to influence policy in Europe and to develop best practice through mutual exchange of experience.

Executive summary

Aims of the paper

This paper examines the mechanisms behind the loss of female talent in academia. It is well known and amply documented that in Europe and elsewhere a significantly larger number of women than men do not reach the higher echelons and leadership positions in academia when compared to the number of entrants into the profession (usually doctoral graduates). Moreover, this situation is generally not improving at a satisfactory rate, although good efforts are undertaken. In a 2012 paper LERU argued that the "leaky pipeline", as the phenomenon is sometimes called, undermines the quality of research and represents an unacceptable loss for academia, the economy and society. The paper showed what LERU and other universities are and should be doing to address gender imbalances.

Looking at the question of what hampers women's progression in academic careers, the current paper focuses on the phenomenon of bias. A large body of research points to implicit bias as a significant impediment to women's advancement in an academic career. Reviewing available evidence, the paper shows how implicit bias plays a role in processes where important career impacting decisions are made, i.e. in academic recruitment, retention and advancement, as well as in the allocation of research funding. The paper sets out possible actions to counter implicit bias. It is targeted at all those responsible for good governance at universities, at research funding organisations at national and European levels, at leaders, policy makers and all other members of the scientific community and society at large.

What is implicit bias?

Bias is a cognitive process which can be defined as skewed information processing under the influence of context and accumulated experience. Broadly speaking, we act on the basis of internalised schemas, which we use to make the task of processing information efficient and manageable. However, these useful, cognitive "short-cuts" can also mislead us, because they tend to make us pay more attention to information that confirms our expectations and less attention to disconfirming information, thus introducing biases. Bias is at play in many everyday situations, it affects all of us, and there are many issues that are in specific situations influenced by bias, among them ethnic and regional identity, race, age, sexual and religious orientation and gender effects, for which intersectionality effects may occur.

In this paper the term implicit bias is used to mean that human beings are not neutral in their judgement and behaviour but instead have experience-based associations and preferences (or aversions) without being consciously aware of them.

In as far as bias plays a role in assessment procedures, e.g. in recruitment, promotion or funding decisions, it is a challenge to prevailing meritocratic principles in academia. Meritocracy dictates that access to power and resources be granted to those who deserve it: academics get tenure, secure scarce research funding, and publish in prestigious journals through rigorous competition which should naturally drive the most excellent to the top. The idea that the recognition of excellence solely on the basis of pure merit does not always work well in practice and that academic excellence is not always gender-neutral is not an easy subject in the academic world. LERU believes it is crucial to recognise that the rules of meritocracy can be inadvertently circumvented, but also that true commitment can help to avoid a discrepancy between idealised meritocratic beliefs and the *de facto* functioning of assessment procedures.

The impact of implicit gender bias

There is ample evidence that implicit gender bias plays a role in academia in several ways (as it does in other organisations and in society at large). This paper analyses how it operates in working conditions, in recruitment processes and in funding situations.

1. **Bias in working conditions**
   Firstly, bias is a factor contributing to vertical segregation, i.e. the fact that women do not reach the most senior and leading positions at universities in the same proportions as men do. It also helps to explain other inequalities, namely the fact that the statistically demonstrated gender pay gap in academia, which is larger than in the labour market in general, persists, and the fact that academic women hold more part-time jobs and more precarious contracts, which tends to be influenced by implicit bias assumptions related to stereotypical male-female notions about commitment to the job, parenting roles, etc.

2. **Bias in recruitment and career advancement processes**
   There is an undeniable body of evidence showing that bias against women operates in recruitment and selection processes already for early-career female researchers. Bias can creep in when advertising positions, in the composition and working methods of selection committees and in the language itself of evaluations.

3. **Bias in funding situations**
   EU statistics show higher male applicants' success rates in funding competitions (about 4% as an average across Europe) and some studies point to male applicants receiving higher quality evaluations of *researcher*, although not higher quality of *proposal*, in funding competitions.

Key areas for countering bias

Universities can take action to mitigate and eliminate gender bias in their organisations. LERU proposes that there are three key areas for action. Examples are given in the paper to illustrate what LERU universities are doing on these three fronts.

1. **Showing leadership, vision and strategy**
   Bias, as an issue which is likely to generate some resistance to change within the university and the research community at large, must be tackled by the university leadership as a way of changing culture. Leaders are better placed than anyone else to explain why change is necessary and to support change, while upholding the principles of meritocracy. It is important that current and future university leaders are trained in leadership in general. Leadership training should also include aspects of how to overcome bias and bias-related resistance to change and universities should pay attention to implicit bias in their efforts to increase the number of women leaders in their institutions.

2. **Implementing structural measures**
   Universities do and should provide both individually and structurally targeted measures to help debias the organisation. Measures can be directed at such areas as vertical segregation and advancement, gender pay gap, part-time positions and precarious contracts. Actions by LERU universities include conducting university-wide reviews of job advertisements, appointing gender "vanguards" in all academic staff evaluation and selection committees, developing guidelines to make selection procedures transparent, using external evaluators, briefing evaluation committees immediately before the assessment, providing mandatory or voluntary training on bias to various staff categories (and also to undergraduate students), developing fact sheets, online resources and other information tools to increase knowledge about bias, and more.

3. **Ensuring effective implementation across the institution**
   Transparency, accountability and monitoring ensure the effective implementation of actions. Measures to debias a process involve creating contexts in which actors make themselves accountable for outcomes, and creating conditions that heighten decision makers' ability to act responsibly. In complex and multi-layered organisations such as universities, accountability must be given and taken at all organisational levels. At some LERU universities, for example, deans of faculties are held accountable for lack of progress. Monitoring can happen in the context of successive multi-annual gender action plans and through annual reporting, both of which are the case at many LERU universities.

Conclusions and recommendations

There is ample evidence that implicit bias is a (if not the) major cause of less favourable assessment of women's academic capacities in research, teaching and leadership. This bias is present in access to power and to resources, including salaries and research funding. However, bias, when properly understood and recognised, can be mitigated and should be overcome. It is an obligation of institutions and their leaders to act against bias at all levels and foster an institutional culture in which bias is clearly understood as a breach of the principle of meritocracy.

The ideas developed in this paper, grounded in a thorough consultation among the LERU universities and strengthened by the examples of actions at LERU universities, lead us to formulate nine recommendations for universities and other stakeholders, primarily research performers, funders and policy makers, listed in the box on page 5.

LERU's key recommendations on how to counter implicit bias

R1. Universities and other research institutions need to have regular **monitoring** in place to examine whether their organisational structures and processes are susceptible to a potentially biased access to resources that cannot be justified by the meritocratic principle. If so, they should develop and implement a plan to mitigate any identified bias. It is crucial that the university's leadership commits to this plan, sees it through with appropriate encouragement, support and initiatives, throughout the organisation. Clear **accountability** should be assigned, with final responsibility for action resting with the President/Rector and the governing body.

R2. Universities and other research institutions should examine crucial areas of potential bias and define **measures** for countering bias. Progress needs to be monitored and, if necessary, measures re-examined and adjusted.

R3. Universities and other research institutions should gather expertise and organise **gender bias training** in various formats, including the possibility of anonymous training. There is no shortage of national and international resources which organisations can use.

R4. **Recruitment** and/or **funding** processes should be as open and transparent as possible and be genuinely merit-based. This includes measures such as briefing selection committees about bias pitfalls, deciding on clear selection criteria at the outset, letting **external observers** monitor the selection process and involving external evaluators.

R5. There should be close monitoring of potential **bias in language** used in recruitment processes.

R6. Universities should undertake action towards eliminating the **pay gap** and monitor progress, examining bias as a contributing factor to pay gap.

R7. Employees should be compensated for **parental leave**, making sure the process is bias-free, for example by extending fixed-term positions or calculating the leave administratively as active service, yet exempt from publication expectations.

R8. Universities and other research institutions should monitor **precarious contracts** and **part-time positions** for any gender-based differences and correct any inequalities. Universities should examine conditions for part-time positions for professors and their gendered division.

R9. Universities and other research institutions should undertake **positive action** towards a proper representation of women in all leading positions, making sure that leadership and processes around leadership are free from bias.

Aims of the paper

1. Academia and society at large proclaim to function in accordance with the principle of meritocracy, meaning that access to resources and power is granted to those who deserve it. In the context of universities, meritocracy is translated into academic excellence: attracting the best students, capable of becoming the best researchers and teachers, who remain and advance in the academic system, with some of them reaching its apex. However, the data show a different picture. All over Europe and beyond, a significant part of female talent vanishes from academia at various stages (Box 1). This represents an unacceptable loss for academia, the economy and society (LERU, 2012). In this paper, LERU looks at the issue of implicit bias as an important mechanism to explain this phenomenon and proposes solutions.

2. The crucial question addressed is: what hampers women's progression in academic careers? A large body of research points to one significant problem: women's and men's academic achievements and potential are often unintentionally evaluated differently. This phenomenon is known as bias, and can be defined as a mechanism of skewed information processing, under the influence of context and accumulated experience. It is bias ('implicit bias', also referred to as 'unconscious bias') that makes us act on assumptions about groups (women as a group, men as a group) rather than on the basis of actual evidence or information about individual women and men.

3. The paper is targeted at all those responsible for good governance at universities and research funding organisations, at national and European levels. This includes administrative leaders and policy makers and all other members of the scientific community and society at large, since we all contribute, collectively and individually, to fairness and meritocracy and share responsibility for counteracting bias.

4. The paper identifies the mechanisms behind the loss of female talent at universities specifically related to implicit bias. It sets out actions to mitigate and eliminate implicit bias. Bias is particularly detrimental in processes of academic recruitment, retention and advancement up the career ladder, as well as in the allocation of research funding. These processes are key to building an academic career, and they involve elements of evaluation. This is where biases with respect to gender or any other dimension of diversity can work counter to meritocracy.

5. Box 1 shows that the disproportionate loss of female talent in academia is evident and systematic. Since women demonstrate scholarly excellence to the same degree as men, we must conclude that something stops women on their way to the top in academia, and we seek to explain this phenomenon with reference to implicit bias. Valian (1998) identified the pattern of women scholars facing specific, numerous, often quite small, bias-induced challenges ("mole hills") that build up to become mountains which stand in the way of women's careers. LERU is convinced that this is detrimental to research and innovation, and adversely affects the European economy and society. Moreover, the loss of human talent is in direct conflict with the European Commission's declared goals for research and development, notably in the European Research Area (ERA) policy, which seeks to promote gender equality.

6. This paper has the following structure: firstly, it outlines the phenomenon of implicit bias, which is assumed to underlie vertical segregation in academic careers; there are significantly fewer women in top positions, gender pay gaps persist, and part-time and precarious positions are more often held by women than men. Secondly, the paper explores how bias operates in recruitment

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1. This definition coincides in part with Kahnemann (2012), Rice (2016). ECU (2014: 1) states: "Unconscious bias is a term used to describe the associations that we hold which, despite being outside our conscious awareness, can have a significant influence on our attitudes and behaviour."
2. Unconscious bias hinges on cultural and social norms acquired in one's youth. Implicit bias is, more generally speaking, a mechanism of distorted perception regarding all the information that does not fit the internalised norms and schemas.
3. https://royalsociety.org/topics-policy/publications/2015/unconscious-bias/
4. Stereotypes are fixed core beliefs that cause biased perception of information consistent with a core belief and dismissal of information that is inconsistent with a core belief. In this sense, bias results from core beliefs.
5. Positive action can mitigate gender bias. For example, Ceci & Williams (2011) found no proof of bias against women in math-intensive STEM fields at 89 US universities (with 12% of applicants, but 20% of hired women). However, this cannot be generalised to other fields.

processes, as well as in the allocation of research funding. It then identifies three key areas for countering implicit bias: leadership and strategy, structural measures, and effective implementation, with illustrated examples of

what LERU universities are doing. The paper ends with LERU's conclusions and recommendations to universities and other stakeholders on how to recognise, mitigate and eliminate bias.

Box 1: Male and female academic career progression

The pattern whereby women in academic careers are significantly less likely to reach the top than men is referred to as the 'leaky pipeline or the 'vanish box'.[6]

Figure 1: The 'leaky pipeline' or 'vanish box' negatively affects women in academic careers across Europe [7] [8]
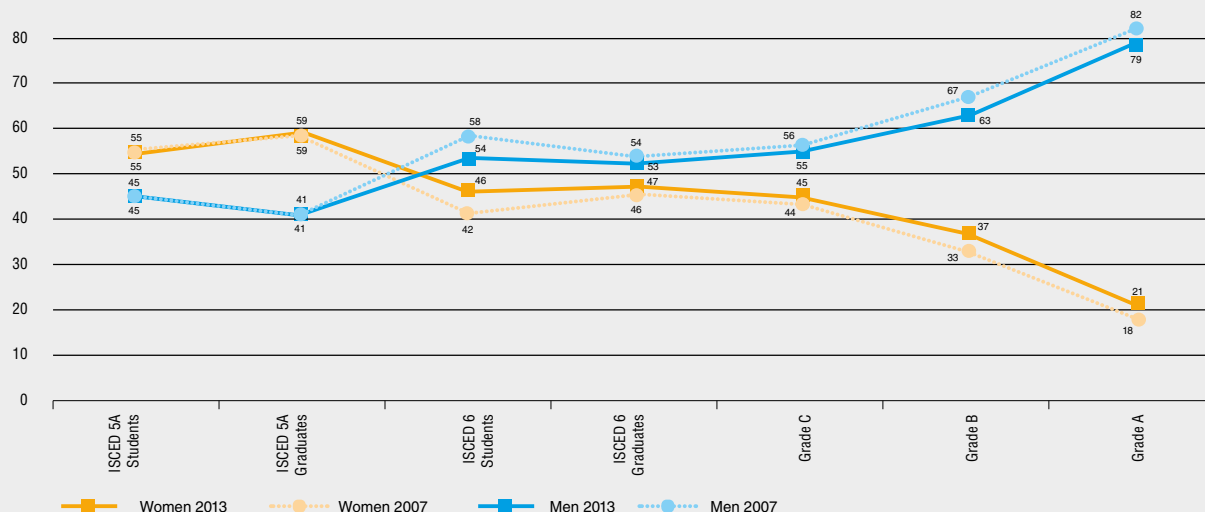
As Figure 1 shows, 59% of graduates but only 21% of (Grade A) professors[9] are female, whereas 41% of graduates and 79% of professors are male.

The graph also shows that progress between 2007 and 2013 has been minimal.[10] Overall growth in the proportion of women grade A academics is slow at about half a percentage point annually. The number of women employed as heads of universities or institutions entitled to deliver PhD degrees is 15% (EU-28 average, 2014) showing a similar growth rate to that of women grade A academics (*She Figures* 2015, p. 142, table 6.4.).[11]

6. The image of the magician's 'vanish box' (Etzkowitz and Ranga, 2011) is used to make the point that, although women leaving an academic career may be lost to academia, they often reappear in other science-related careers and at the intersection of science and business or other sectors. In other words, women are not opting out of the job market, but out of academia, and reappear in other jobs "in which their value may be realised, and possibly capitalised upon, to an even greater extent than in the original context from which they were made redundant" (Etzkowitz and Ranga, 2011).

7. Data from the *She Figures* 2015, p. 127, figure 6.1. Source: Women in Science database, DG Research & Innovation and Eurostat.

8. ISCED 6 refers to PhD programmes.

9. Grade A "corresponds to the rank of full professor in the majority of the countries, or otherwise represents the highest post at which research is normally conducted" (*She Figures* 2015, p.130).

10. Currently (i.e. in 2017), *She Figures* 2015 gives the most up-to-date large-scale data.

11. *She Figures* 2015 (page 142, concerning 2014).

Implicit bias

7. Human beings process information all the time and have strategies to make this task manageable. The chief strategy is to rely on patterns that we learn to recognise over time. The patterns teach us what to expect as well as what constitutes an exception, something unusual or remarkable. These patterns serve us well as cognitive short-cuts. However, like games of optical illusions they also mislead us when we presume to see what is in front of our eyes and fail to recognise the effect of the illusion. Biases cause us to fall for the illusion.[12] This happens because while striving to make the cognitive information process manageable, we generally pay primary attention to information that aligns with our expectations, while discounting counter-information. There is virtually no limit to the range of issues about which one can be biased (such as ethnicity, race, sexual orientation, religion, age, disability), including intersectionality effects. Here we discuss the most frequently affected dimension of diversity, gender, but wish to point out that the other dimensions require special attention, too. A well-known online tool to test one's bias(es) is the Harvard implicit association test (Box 2).

8. It is clear that biases have the potential to impair rather than improve the quality of decisions. As the ECU report (2013: 4) states: "while methods for measuring and predicting implicit biases may not be perfect, there is little doubt that it does exist and also has the potential to affect our actions and decision making".[13] Biases are also systematically related to notions of power. We are used to associating certain demographics with certain roles (e.g. women as nurses and men as fire fighters) and begin to assume that these demographics have innate qualities that make them more suitable than others for "their" roles. Given that men have a history of being more present than women in the public sphere and in prominent and powerful positions, it follows that our gender biases work against women's ascent to power. In other words, not only do we have a tendency to "see" what we expect to see, we also frequently judge or question nonconforming behaviour, choices, roles, etc.

9. The implications for this paper are clear: academia is still a predominantly male domain, in which women represent a challenge to traditional expectations.[14] This cuts to the core of the prevalent understanding of what academia is, as expressed in Merton's (1973) principles of science (or, more broadly, academia). One of the four principles is universalism, meaning that the validity of a scientific truth claim is independent of the participants' personal attributes, social or political status etc.[15] Global academia aspires to function according to this principle: resources such as tenure, prestigious funding opportunities and peer-review publications draw their legitimacy from rewarding excellence. A failure to recognise excellence, due to bias, is in breach of this principle. Biases negatively affect minorities generally, and particularly the female half of the population that becomes a minority up the career ladder.[16] It follows that improving gender equality in academia is about safeguarding standards of meritocracy, not about lowering the bar for women academics.

Box 2: Implicit association tests (IATs)

Researchers have designed tests that make implicit biases visible. Project Implicit at Harvard University is one such famous example. It consists of numerous online tests (implicit association tests or IATs) that measure how long it takes for someone to associate concepts, such as woman/man and natural sciences/liberal arts. IATS are powerful because they go beyond what we claim about ourselves; they can disclose preconceived in-group preferences and implicit evaluation biases.[17] Participants find out immediately after the test if they have any stronger (or weaker) associations between certain concepts and how they compare to the global body of other test participants.[18]

All tests are available at: https://implicit.harvard.edu/implicit/takeatest.html

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12. Curt Rice blog (e.g. 2015), http://curt-rice.com/2015/03/08/eve-evidence-research-tells-us-gender-equality
13. http://www.ecu.ac.uk/wp-content/uploads/2014/07/unconscious-bias-and-higher-education.pdf
14. The term "masculine mixity" is proposed by Chaponnière & Chaponnière (2006) to denote the kind of 'mixed-ness' prevailing at universities with male-based traditions.
15. The other three principles are communalism, disinterestedness and organised scepticism (Merton, 1973).
16. The effect of bias on diversity needs a separate discussion, which is, however, beyond the scope of this paper.
17. For instance, when Dutch respondents were tested on positive and negative associations with Dutch and Moroccan names, respectively, there were stronger positive associations with the Dutch names. The test was also carried out with Dutch and Finnish names, with the same result. However, when the test was repeated with Moroccan and Finnish names, these names did not correlate with negative associations (van Ravenzwaaij, van der Maas & Wagenmakers, 2011).
18. Berg (2017) reports about advising editors at the journal Science to take these tests.

Bias in working conditions

A. Vertical segregation[19]

10. Female scholars are disproportionally less likely to be retained in universities. They are less likely to obtain high-profile or even (monetarily) equally valued positions (this is referred to as "vertical segregation" and "horizontal segregation", respectively); in the end female scholars more often leave the university. The 'leaky pipeline' or 'vanish box', as explained in Box 1 (Etzkowitz & Ranga, 2011), is an obvious indicator of universities not reacting adequately to the scholarly capacities of women scholars. Why do organisations (not only universities) tend to have fewer women at the top than at the bottom of their hierarchies? A commonly held gender bias is that men are agentic (risk-taking, strategic, goal-oriented) whereas women are communal (caring, thoughtful, group-oriented). Stereotypically male qualities are qualities that we also associate with leadership. This bias presents an implicit barrier to women proceeding to high-ranking positions.

11. Although there is evidence that male and female researchers do equally well under comparable circumstances and given equivalent resources (Faniko, Ellemers & Derks, 2016), there are differences caused by the type of institution, teaching load (typically higher for women scholars), funding, and research assistance (Ceci & Williams, 2010). All these factors have an impact on research productivity and affect women's career prospects. However, these factors cannot fully explain the fact that such a high proportion of women leaves the university or stays at junior grades within the university. The additional factor is the expectation that male researchers are more fit to be leaders, a bias deeply rooted in cultural traditions, although empirical research shows a different picture of female leading capacities (cf. § 42).

B. Gender pay gap

12. Gender pay gap refers to differences in pay for the same or similar work that cannot be explained by anything other than employees' gender, taking into account relevant factors such as levels of education/qualification, years of experience, responsibility, etc. The gender pay gap may be an overall gap caused by an uneven distribution of positions or functions in an organisation, or a specific gap in remuneration for the same or similar work. In both instances, the gender pay gap results from the same factors as those responsible for vertical and horizontal gender segregation: there is an implicit assumption that women, both academics and non-academics, may deliver less to the organisation due to their family duties.

13. Alternatively, there might be an assumption that women are not breadwinners for their families and thus do not need to earn as much as a man. Recent research on remuneration of Italian medical personnel (Gaiaschi, 2017) shows that married women with two or more children undergo a salary penalty of about 15%, whereas fathers acquire a premium of about 15% starting from the first child. Graduate professions that are female-connotated, such as nursing or elementary school teaching, are known to be poorly paid (regardless of gender), because such "natural" activities are associated with home duties that need not be fully remunerated to reflect the extent of the responsibilities they carry (Andreoni & Petrie, 2008; Valian, 1998).[20] Due to prevalent selection patterns in academia, women more often get lower positions with less research money leading to less productivity and visibility. This causes coupled vicious circles and strengthens gender bias (Van den Besselaar & Sandström, 2017).

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19. This section discusses particularly vertical gender segregation (which in turn presupposes horizontal segregation). Vertical segregation is understood as the situation where people do not (or are less likely to) get jobs above a particular rank in organisations due to their race, age or sex (or any other non-academic property). Horizontal segregation refers to an unequal division of jobs on the same level.
Cf. also http://dictionary.cambridge.org/us/dictionary/english/vertical-segregation

20. Gaiaschi (2017) shows that Italian physicians experience a systematic 15% salary premium for fathers, but a 15% salary penalty for married women starting from the second child.

14. On the overall level, there is a persistent and statistically demonstrated gender pay gap in Europe and beyond, within and outside academia. In the EU–28 countries, women earn almost a fifth less than men in academia.[21] European countries with strong research traditions are no exception.[22] Some countries such as Belgium, the Netherlands and Scandinavian countries have taken positive action; the UK has introduced mandatory pay gap reporting; in Switzerland the federal law is currently under review with a view to putting the onus on employers to ensure salary equity.

15. It is a cause for grave concern to LERU that the gender pay gap in academia is larger than in the labour market generally (*She Figures* 2015: 108), meaning that redress is urgently needed within academia, regardless of any specific legal obligations on individual universities. Universities can, and should, lead by example to ensure there is no gender pay gap in academia. This includes countering pension gaps that follow from gender pay gaps.

C. Part-time positions

16. Part-time positions can be temporary or permanent; they can be complemented by other gainful employment or by other duties; some "female-connoted" jobs are offered part-time only. At the same time, women in academia often work part-time for personal reasons (e.g. child or family care), whereas men in academia work "part-time" for professional reasons (e.g. having an additional, usually financially lucrative, job). Some part-time positions are specific teaching or research contracts, which do not reflect the full range of academic activities and are unlikely to launch an academic career. In the higher education sector, women are more often employed part-time than men, especially in lower academic positions.[23]

17. Working part-time in academia typically carries a certain stigma because excellence in academia is understood as requiring complete immersion into the academic discipline of choice to the extent that there may be no room for other commitments or responsibilities beyond the academic calling. Periods of parenting leave, returning to work part-time after pregnancy and birth or any care-related part-time employment are clearly female-connoted career patterns and are frequently thought to indicate a lower degree of career commitment. The assumption that only women will (or should) concern themselves with care responsibilities frequently goes hand in hand with the assumption that appointing women might turn out to be a liability for an organisation.

18. Simultaneously, a woman who does conform to the expectations of academic excellence as a calling violates the norm of being a "real" woman and may be faced with bias as a consequence. Schematically, her behaviour might be a perfect copy of a male colleague's behaviour, but due to implicit cultural bias about womanhood, other persons' impressions of her may be significantly less positive than their impressions of the male colleague, since he does not violate the norm for being a "real" man. At the same time, men who take on caring duties may be stigmatised for not fulfilling the male stereotype (this is evidenced especially by fathers returning from parental leave). In this sense, there is a general bias about combining career with family duties that has a particular effect on women because they are expected to have careers without giving up family duties.

D. Precarious contracts

19. Precarious working contracts include contracts of less than a year, student contracts, hourly-paid teaching or research contracts for non-students, among others. It is the short duration combined with the corresponding uncertainty about extension that makes such contracts precarious. Most research contracts have a longer duration, but still contain an element of precariousness. Unfortunately, there is an increasing tendency to prolong periods of successive precarious and other short-term contracts, despite legal regulations to counteract such insecure forms of employment in academia and in other

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21. *She Figures* 2015 (p.110), reference year 2010.
22. For example, there is a gender pay gap in the 'scientific research & development' domain of 19.3% in Germany and 24.8% in the UK, compared to an EU-28 average of 17.9%, according to the *She Figures* 2015 (p.109), reference year 2010.
23. The EU-28 average is 13.5% part-time employment for women researchers in the higher education sector and 8.5% for men, out of the total researcher population, according to the *She Figures* 2015 (p.102), reference year 2012.

sectors. Precarious and other short-term contracts are a major source of uncertainty for early-stage researchers (LERU, 2010), and this can be especially problematic when it coincides with the decision of young researchers (of any gender) to become parents. For women, this implies a longer period of absence from research than for men, thus increasing the risk to their careers.[24] The higher percentage of precarious contracts held by women may in this context reflect the implicit assumption that women's commitment to their careers may be ambivalent.

20. The discrepancy between male and female researchers on precarious contracts in Europe combines with other disadvantages women face to become part of a larger problem.[25] The symbolic effect of this discrepancy (presumably caused by the bias about women lacking a full commitment to career), however small, cannot be overlooked. Precarious contracts contribute to a feeling of uncertainty and of not being valued, which is especially detrimental to early-career women academics who have to decide whether to continue in academia during their reproductive years.

21. There may be push and pull factors at work simultaneously: women require more career certainty and commitment at an earlier point in their careers than academia provides, and thus they may decide to work in non-academic roles. As a result, the idea of women as less committed to their academic careers persists within academia.

Bias in recruitment processes

22. There is a large body of available experimental and observational research showing that women are, on average, considered less fit for scholarly positions than men.[26] Therefore, women usually have to perform better to be judged as equally qualified to men. For women to be deemed equivalently hireable, competent, or worthy of promotion in male gender-typed professions, they must demonstrate a higher level of achievement than identically qualified men (Heilman & Haynes, 2008; Kaatz et al., 2014). Research shows that female psychologists (Steinpreis et al., 1999) and female natural scientists in science, technology, engineering, mathematics and medicine (STEMM) departments (Moss-Racusin et al., 2012) are just as likely to discriminate against female candidates as their male counterparts (when assessing CVs with randomised female versus male names). Steinpreis et al. (1999) show that negative bias especially affected women at the early-career stages. Particularly in evaluations of early-stage researchers, in-group loyalty and academic networks plays a major role (cf. Zogmaister et al., 2008). The problem is, however, that loyalty in academia includes the existing structures and scholarly paradigms, that are still mainly male-dominated.

23. Recent empirical research based on professorial appointments indicates that many mechanisms prevalent in recruitment and appointment practices of professors are disadvantageous to the careers of academic women (Van den Brink, 2011; Van den Brink & Benschop, 2011). Those mechanisms include academic networks that are predominantly male and the way in which scientific excellence is defined. Van den Brink & Benschop challenge the view that the assessment of academic excellence and meritocracy are gender neutral and show that gender bias exists in many types or phases of an academic career. Evaluation bias becomes visible in

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24. Uncertain career prospects of young researchers were described by Max Weber as early as 1917 as a "wild hazard" (at least in Germany).

25. Female researchers hold 10.8%, male researchers 7.3%, of precarious working contracts in the higher education sector, out of the total researcher population in the EU-28, according to the *She Figures* 2015 (p.104), reference year 2012, where the definition of 'precarious working contracts' includes fixed-term contracts of one year or less, no contract, or a type of contract described as 'other' and associated with student status.

26. This is also a more general cultural phenomenon, and women have shared this general attitude about themselves as well (discussed by Simone de Beauvoir already in 1949).

recruitment and evaluation processes of professors, but it may be even more detrimental for young researchers in dependent roles. In 2015, the Steering Group of Human Resources and Mobility (SGHRM) set up by the European Commission issued a report on open, transparent and merit-based recruitment (OTM-R) of researchers. The report contains principles and guidelines on OTM-R, as well as a self-assessment checklist and a step-by-step toolkit for organisations. However, it does not systematically address issues of gender and bias.

24. Many studies have been carried out into women's under-representation in leading positions in science (NRC, 2010). A major factor is the definition of 'capable' in searches for academic positions: the less transparent the definition is, the more likely men are chosen over women. Research suggests that the lower the percentage of women on selection committees is and the less transparent the criteria for application and selection are, the fewer women are appointed.

25. Recruitment and selection processes depend on national and organisational regulations, and many of them offer enough space for internal policies and processes to secure preselected candidates in spite of officially adopted rules of transparency (cf. Nielsen, 2016; Van den Brink, 2010; Husu, 2000). It is crucial to recognise that the rules of meritocracy can be circumvented by a myriad of factors, and only true commitment can help to avoid a discrepancy between the institutionalised beliefs in meritocracy among managers and the *de facto* functioning of the recruitment procedures.

26. LERU is convinced that it is possible to design organisational processes and structures with the potential to further modify the traditional gender schemas (i.e. hypotheses about gender differences playing a role in social contexts, including career prospects)[27] and interrupt bias. Introducing trained observers to identify and subsequently mitigate any bias in selection processes appears to be a necessary first step, as shown for example by the universities of Geneva and Leuven (cf. appendix). The European LIBRA project offers good examples of best practice in recruitment processes.[28]

A. Advertising positions

27. It is important to advertise positions in widely accessible media and by using transparent formulations so that all potential candidates feel addressed and encouraged to apply. Research shows that the percentage of applicants of the underrepresented group matters and Isaac et al. (2009) report that a presence of (at least) 25% women in the applicants' pool diminishes bias against female applicants. This fits into the general picture of the inverse relation between the percentage of women in science and stereotypical association of science with men (Miller et al., 2014).

28. Job advertisements using potentially ambiguous language (such as using the male form for a profession open to both sexes, although the language allows both male and female forms) may tip the scales against applications by women. Moreover, unclear formulations about the expected qualifications are less likely to attract female applicants, who typically consider very carefully and critically whether they meet all requirements before they decide to apply.[29]

B. Selection committees

29. Selection committees may also be subject to the same biases. Bias on the part of selection committees should be understood and acted upon. In-depth investigation shows a complex set of factors. First, evaluators tend to favour in-group candidates (Moss-Racusin et al., 2012) who belong to their own academic network (Zinovyeva & Bagues, 2010). Senior evaluators are less likely to exhibit gender preferences than junior evaluators (especially female junior evaluators tend to prefer opposite-sex candidates from the same institution, thereby showing a dependent attitude). In a randomised double-blind study by Moss-Racusin et al. (2012), research staff from science faculties of research-intensive US universities evaluated CVs randomly assigned to male or female names applying for a position of laboratory manager. The results were clearly biased, favouring men. Male applicants (based on CVs assigned to male names)

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27. Cf. Valian (1998: 2 etc.).
28. http://www.eu-libra.eu/events/best-practice-gender-inclusive-recruitment-processes-libra-workshop
http://www.eu-libra.eu/sites/default/files/article-files/libra_recruitment_handbook.pdf
29. Some research indicates that women's attitudes and lack of confidence to succeed often leads to making decisions that affect their career prospects (Sonnert & Holton, 1995; Blanch, Hall & Roter, 2008; Sax, 2008).

were rated as significantly more capable and hireable than their (identical) female counterparts. Moreover, male applicants were assigned a higher starting salary and offered more career mentoring than female applicants (Moss-Racusin, 2012: 16475). This pattern of bias against women applicants was even stronger among female evaluators (Moss-Racusin, 2012: 16476). Hence, having female members on selection committees does not guarantee a bias-free procedure. What is needed is *informed* evaluators capable of avoiding the bias trap. In addition, one needs *informed* bias observers, who do not participate in the decision process, but whose unique role is to monitor for (and point out) bias-led behaviour that should subsequently be acted upon.

C. Assessment methods

30. Evidence suggests that academic assessment systems have traditionally ignored factors that particularly affect women. For instance, men often produce more publications, and assessment protocols have traditionally tended to value quantity over quality (Wennerås & Wold, 1997).[30] Recent research shows that among beginning researchers there are no significant gendered differences in productivity, but ten years later in scientific careers, male researchers produce more publications, yet the citation indices remain roughly the same (cf. van den Besselaar & Sandström, 2016). The conclusion is clear: what should count in assessment procedures is quality, which is not necessarily achieved through quantity. In addition, broad research (more often found with male researchers) is by itself no guarantee for quality compared to specific research. Both approaches mix up quantity and quality, with a predominantly negative effect for female researchers. In an attempt to counter such effects, the UK research evaluation system Research Excellence Framework (REF), through which research funds are distributed to universities, explicitly allows for discounts in the number of publications relative to the time available, to cover circumstances such as career breaks, parental leave etc. Similar rules are applied in Germany.

31. Studies show that papers, ostensibly authored by males, acquire higher scores on quality than papers ostensibly authored by females (Maliniak et al., 2013, West et al., 2013). Knobloch-Weserwich et al. (2013) conducted an experiment with 234 young communication experts showing that not only do conference abstracts with male author names score higher on quality, they also score higher on desirability for cooperation. Furthermore, students' evaluation of the quality of teaching (relevant for the teachers' career prospects) is often gender-biased. In an online experiment, teachers with an ascribed male identity were systematically rated higher than female teachers (McNeal et al., 2014), although their actual performance was the same.[31]

D. Bias in the language of evaluations

32. Research shows that qualitative assessment can be heavily gender-biased. For example, recommendation letter writers tend to use stronger language of praise when describing men versus women. Women are commonly described as more communal and less agentic than men, and communal characteristics have a negative correlation with hiring decisions in academia (Madera et al., 2009). Recommendation letters for men tend to be longer and depict them as researchers and professionals, whereas recommendation letters for women more often refer to their teaching. Moreover, recommendation letters for women contain a significantly higher percentage of negative language, including doubt raisers, potentially negative and unexplained statements as well as faint praise (Trix & Psenka, 2003: 203). An MIT report (2011, p.14) also pointed out that for women "the proportion [of a letter] devoted to intellectual brilliance compared to temperament is much less than for men". The report goes on to say: "it is essential to describe clearly the need to eliminate bias, while at the same time emphasising that the same high standards of excellence apply to the hiring and promotion of men and women" (MIT, 2011: 15).

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30. In contrast to Wennerås & Wold (1997), Ceci & Williams (2011, 2015) found no assessment bias in selected STEM and non-STEM (psychology and bio-sciences) fields, but their research methodology was heavily criticised (https://othersociologist.com/2015/04/16/myth-about-women-in-science/).

31. This gender ascription was probably conceptualised as so-called cisgender; comparison to transgender was not at issue.

Bias in research funding

33. Early careers in academia strongly depend on third-party research funding as a sign of excellence and confidence in a scientific career. Unfortunately, female researchers are less likely to secure funding. Over the years 2007-2016, 26% of ERC applicants were female, but only 23% of the grants went to women. This effect was the strongest for starting grants (2007-2016), which had 31% of female applicants, but only 27% of female grantees.[32] Currently, intensified efforts are being undertaken to improve the success rate of female ERC applicants.

34. In spite of recent efforts to monitor and evaluate selection procedures of research funding, a subtle, but demonstrable bias persists. Van der Lee & Ellemers (2015) examined the application and review materials of three calls by the Netherlands Organisation of Scientific research (NWO) and found clear evidence of bias in evaluation and success rates (by 4% favouring male applicants), as well as biased language use in instructions and evaluation sheets. Male applicants scored significantly higher on "quality of researcher" evaluations, and this gave them better success rates, although they did not score higher on "quality of proposal" evaluations. Similar effects were found in Sweden (Ahlqvist et al., 2015). The *She figures* 2015 revealed a Europe-wide tendency for male research applicants to score around 4% better in applications for national research funds.[33] In order to gain a better understanding of how implicit gender bias intervenes in evaluation and how it can be addressed in the EU's research funding framework programme Horizon 2020, the European Commission organised a workshop and issued a workshop report in 2017 (European Commission, 2017).

Summary: bias in assessment processes

35. The evidence shows that assessment procedures in academia, which proclaim to be based on meritocracy, are in fact biased and disadvantageous to female scientists. This bias rests on a number of preconceived assumptions about science and leadership that are deeply rooted in traditional cultures that determine the distribution of academic resources, including the gender pay gap. Unless countered, this bias inevitably leads to a perverted application of meritocracy[34] by which women actually have less chance of achieving a leading position in academia than equally qualified men. Networks and preservation of organisational continuity are frequent factors that benefit internal (usually male) candidates in selection procedures (Nielsen, 2016). Clearly, more talent at the top, including female talent, would improve the quality of research.

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32. https://erc.europa.eu/sites/default/files/document/file/Gender_statistics_Dec_2016.pdf
33. *She figures* 2015, data for 2013: the male success rate was 31.8% compared to 27.4% for female applicants.
34. Curt Rice (2012) on the paradox of meritocracy: preferring men and paying them more.

Key areas for countering bias

36. In a previous paper (LERU, 2012), the challenges that universities face regarding retaining female talent were presented along four dimensions:[35]

   - The leaky pipeline: the proportion of women declines with each consecutive step in an institution's hierarchy;[36]

   - Many molehills make a mountain: women progressing in an academic career encounter numerous disadvantages. Each small disadvantage may not be insurmountable, but the cumulative effect is evident in the leaky pipeline;[37]

   - Money talks: resources such as research funding, but also equal pay, matter;

   - Sex/gender needs to be considered in the content and process of research.

37. LERU (2015) examined the fourth dimension, Gendered Research and Innovation (GRI), in detail as different from female career advancement. Sex and gender are biological and cultural research parameters, respectively, that should be taken into account in research design, implementation and application of research findings whenever appropriate. Research institutions have the responsibility to stimulate this approach. Research on sex and gender has yielded essential insights about bias generally and specifically in knowledge (re)production. However, dealing with bias in university careers is in itself independent of the GRI dimension, calling for separate action and monitoring.

38. Another GRI dimension important to reducing bias in organisations are gender-mixed research groups. They should be a major priority, since they establish new socio-cultural norms for science and society at large, by which men and women can contribute equally to creativity and innovation, and participate in the same networks. Moreover, research points to gender-mixed research teams producing more interdisciplinary publications and, on average, acquiring higher citation rates.[38] Mixed teams bring diverse perspectives that have the capacity to bring higher quality research.

39. Implicit bias is a cross-cutting issue underlying all of these priority areas. In these, access to recognition, resources and power is in part hindered by biased expectations.

40. LERU's four priority areas remain relevant. To best address implicit bias within each of them, the factors and key functions capable of changing the effect of bias require: a) leadership, vision and strategy; b) structural measures; and c) effective implementation.

A. Leadership, vision and strategy

41. Countering bias is a leadership question, and it is up to university leaders to act on any possible bias in their organisation's culture and structures. Leadership is key to reducing bias in an institution and its processes, since change almost always generates resistance. Resistance to change is especially strong when central norms, beliefs, attitudes, or values are at stake. Similarly, a fear of losing status or comfort will generate resistance (Dent & Goldberg, 1999; Benschop & Verloo 2006, 2011; Morley, 2013). Gender action typically redefines the rules of the power game. Leaders are better placed than anyone else to explain why change is necessary, invoke acceptance for change despite fears of loss, and provide incentives for supporting change while upholding and safe-guarding academic excellence.

42. Meritocracy, requiring that competing ideas or hypotheses must be evaluated solely in terms of their merit, is a deeply

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35. https://www.leru.org/files/Women-Research-and-Universities-Excellence-without-Gender-Bias-Full-paper.pdf
36. Referred to as the 'vanish box' by Etzkowitz and Ranga (2011), cf. Box 1.
37. Rosser (2012) on micro-inequalities that accumulate.
38. Elsevier (2015) Mapping Gender in the German Research Area.

engrained value in the academic world. It follows that meritocracy also determines individual academic career prospects and ultimately also universities' standing in the scientific community. However, meritocracy is a matter of evaluation and there is evidence showing that organisations with an explicit commitment to meritocracy are particularly susceptible to bias (Castilla & Benard, 2010). Meritocracy is also supposed to provide the basis for leadership. If there are flaws in the application of the meritocratic principle, then leadership positions will not be equally accessible to all who would deserve it. The empirical evidence presented above shows that female researchers are often underrated and are not assumed to fit the traditional model of leadership.

43. Leadership is still largely understood as a decision-making competence and a responsibility across a broad spectrum of issues without clear limits on demands, leading to exceedingly long hours or even a culture of constant availability. Traditionally, this was considered a poor fit for women in view of higher demands on them for care-taking and household chores. However, research data on 7,280 leaders of companies and organisations exhibit a very different picture: female leaders score higher on almost all the prototypical leader functions. Female leaders are better at: taking initiative, practicing self-development, exhibiting high integrity and honesty, driving for results, developing and motivating others, organising team work, establishing stretch goals, championing change, solving problems, communicating powerfully and prolifically, connecting the group to the outside world, innovating, and in professional expertise, whereas male leaders outscore (to a much smaller extent) female leaders *only* on strategic thinking (Zenger & Folkman, 2012).[39] These results fit with McKinsey's recent concept of the next generation of women leaders capable of developing and implementing creative solutions, creating new approaches, products, services and technologies, having very good problem solving skills, and fostering effective teamwork to drive results.[40]

44. Leadership skills are not simply derived from professional skills, they involve an understanding of a multitude of social and organisational matters that can be acquired in various ways. Leadership hinges on assigning and taking responsibility at central as well as local institutional levels. As universities, LERU members are committed

to a strong belief in the potential of learning that can help leaders to understand and reduce any potential bias in their institution and thereby safeguard academic excellence.

45. Given the link to meritocracy, knowledge about implicit bias and how to mitigate or prevent it, should be an integral part of leadership training. LERU universities offer good examples of such training, particularly available to university leadership and administration, as well as researchers. The training should be offered in various formats, including anonymous training and written instructions. Universities should decide what works best for them.

B. Structural measures

46. LERU universities are committed to monitoring the developments of their organisations at regular intervals, reviewing the figures, and acting upon the outcomes. This involves both quantitative and qualitative evaluation. LERU sees a primary role for the structural level of the university as a whole and its leadership in fostering systemic change, by formulating goals, monitoring effects and engaging in processes to bring about an institutional climate with optimal chances for all.

47. At a structural level, the university requires mentoring programmes and training courses of different kinds. Training courses for leadership and committee members should demonstrate how intended and unintended inclusions and exclusions follow from established practices. Young researchers benefit from mentoring and training for successfully entering academic careers. Mentoring for women, and similar actions, makes female scholars more competitive in the university system while contributing to structural changes.

48. Awareness about potential bias is the crucial first step towards reducing bias in individuals and organisations. Further training is required in order to address the multitude of perspectives involved in any bias in the structural context (Bohnet, 2016). Training can take different forms (written, multimedia, interactive) and target different audiences (either gender-differentiated or gender-blind). It can be designed to fit individual or

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39. https://hbr.org/2012/03/a-study-in-leadership-women-do
40. https://next-generation-women.mckinsey.com/what-we-look

specific organisational needs. Awareness raising can act as a catalyst to change. For example, at the University of Oxford, implicit bias training with the senior management team prompted a complete overhaul of recruitment procedures for statutory professorships. Evaluation and selection procedures are key areas to be addressed by training, since recruitment, retention and promotion, that create and maintain the core of the organisation, hinge on these procedures.

49. Organisations can mitigate bias by eliminating the factors which contribute to bias, for instance, by providing practical support measures to enable researchers to reconcile careers with their private responsibilities. Institutional measures might include bias-minimising recruitment (OTM-R project at the University of Zurich, cf. appendix), retention and evaluation/promotion/tenure processes. Practical support measures might address temporary leave or part-time policies and, in settings without state-supported childcare, in-house daycare infrastructure. In principle, women and men alike benefit from this, but due to historically evolved gender roles women are likely to benefit more strongly.[41]

C. Effective implementation and data collection

50. Transparency, accountability and monitoring can ensure the effective implementation of actions: transparency is how we hold each other and ourselves accountable; monitoring is how an institution determines if it is on course to reach its goals, or whether adjustments are necessary. Measures to debias a process involve creating contexts in which actors make themselves accountable for outcomes, and create conditions that heighten decision makers' ability to act responsibly.

51. Obvious areas for action are gendered pay gaps and precarious working conditions.[42] The institution has a responsibility to make sure that salaries are gender-

equal; this requires internal analysis and monitoring with an institutional readiness to act. In addition, contract negotiation training should be made available generally, with the expectation that it may particularly help female applicants who tend to ask for less in terms of salary and other employment conditions. Another area of core importance is that of precarious work contracts. These should be especially monitored and mechanisms put in place for correcting inequalities. Publication output of part-time academic and research staff should be evaluated and reflect *pro rata* working time. This is especially important in selection and promotion procedures.

52. If universities are to increase the proportion of senior women, i.e. in professorships and other leading positions, they must start even before graduation. It is at this stage that female students can either be encouraged or, adversely, discouraged from pursuing an academic career. Encouragement should be both individual and structural, the latter in the sense of improved career prospects. Support should continue at each career stage, to retain the level of female representation from the preceding stage.[43] Stage by stage, the representation of women in science will increase and so will the applicant pool for the next stage.

53. In addition to general measures conceived, implemented and monitored by the university on the central level, discipline-specific measures should be conceived by the decentral units (faculties or departments) to take into account the specific situation of an academic field. Systematic, comprehensive action plans will be necessary for complex, multi-actor and/or multilevel processes, such as recruitment or evaluation.[44]

54. Accountability is fundamental to achieving successful implementation at all organisational levels, and it is closely connected with monitoring. Each unit should be held accountable for decisions in its power, and bear consequences if no progress is achieved. Some LERU

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41. Cf. https://observatoriosociallacaixa.org/en/-/los-permisos-parentales-como-instrumentos-para-la-igualdad-de-genero

42. In all European countries women earn less than men, and the pay gap is bigger in academia than in the economy at large. Specifically, women's gross hourly earnings in research and development in the EU-28 (*She figures* 2015: 108f., data for 2010) were 17.9% lower than those of men, compared to 16.6% in the entire economy.

43. The term "cascade model" is used to refer to a model to increase the number of women in top academic positions. It has been supported in Germany by the main scientific bodies. Since 2012 German universities and research institutes have been required to implement a gender quota according to this approach (*Gemeinsame Wissenschaftskonferenz*, 2013).

44. In line with the recommendations of the European Commission (2012).

universities are already applying this principle, e.g. by holding deans of faculties responsible for lack of progress.

55. Gender action plans are strategic plans that contain accountable measures to ensure adequate evaluation and access to resources to both genders in a clear time perspective. It is crucial that such plans be monitored. Monitoring needs to accompany and steer any processes on objective and arguable grounds. LERU recommends monitoring on a regular basis. Clear accountability should be assigned for dealing with the results of monitoring, for example by the University's Senate. This implies regular analysis of gender-disaggregated data on a par with reporting results at all levels, as shown by experiences at German and Swedish universities.

56. Some concrete tools that organisations may have in their "toolbox" to debias selection processes are:

- Making application and selection procedures fully transparent, with the relevant criteria determined at the outset, independently of the individual applicants;

- Critically reviewing letters of recommendation and evaluation for the use of language and any possible bias;

- Prioritising research quality (by criteria such as innovation, originality and methodological rigour, not just bibliometrical data) over quantity or broadness of topic in selection criteria;

- Using partially anonymised CV evaluation in two rounds: a first round listing formal qualifications and properties of specialisation, and a second round of qualitative evaluation (e.g. innovativeness, originality of publications etc., which cannot be fully anonymised in academia);

- Briefing selection committees about bias pitfalls immediately before the assessment;

- Including external observers and evaluators in these processes;

- Evaluating all selection and promotion procedures before appointments are completed.

57. Some LERU universities have positive experiences with external observers in evaluation and selection processes. It is important that they be informed observers, capable of discerning any bias. The independent status of these observers is also crucial. They should be members of different faculties or departments and report on any potential bias in the selection process. In addition, a gender-equality officer should monitor and report on the processes, ensuring full independence.

58. LERU recommends targeted briefing and trainings. Good examples are online resources for briefing developed by the UK Royal Society and Harvard University[45], and targeted trainings, as developed and administered at Edinburgh University (cf. example in the appendix), Heidelberg University and others. They provide an important and necessary first step towards fighting gender bias in the university culture and structure.

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45. See https://royalsociety.org/~/media/policy/Publications/2015/unconscious-bias-briefing-2015.pdf and http://wappp.hks.harvard.edu/whatworks.

Conclusions and recommendations

59. There is ample evidence that implicit bias is a (if not the) major cause of less favourable assessment of women's academic capacities in research, teaching and leadership. This bias is present in access to resources, especially research funding and salaries, and positions of power. However, bias, when properly understood and recognised, can be mitigated and should be overcome. It is an obligation of institutions and their leaders to act against bias at all levels and foster an institutional culture in which bias is clearly understood to breach the rules of meritocracy.

60. LERU is convinced that assessment processes can be improved if selection committees are gender-balanced, well informed about potential biases and include bias observers. It is also important that the selection criteria are defined and published using inclusive language, the reviewing process is data-driven, and the interviews structured, to avoid bias. Positive action can be used to eliminate vertical segregation and the pay gap, and ensure equal access to the governing bodies.[46]

61. The ideas developed in this paper, grounded in a thorough consultation among the LERU universities and strengthened by the examples of actions that already exist at LERU universities, lead us to formulate the following recommendations for universities and other research institutions.

High-level recommendations to universities and other research institutions, including research performers, funders and policy makers

R1. Universities and other research institutions need to have regular **monitoring** in place to examine whether their organisational structures and processes are susceptible to a potentially biased access to resources that cannot be justified by the meritocratic principle. If so, they should develop and implement a plan to mitigate any identified bias. It is crucial that the university's leadership commits to this plan, sees it through with appropriate encouragement, support and initiatives, throughout the organisation. Clear **accountability** should be assigned, with final responsibility for action resting with the President/Rector and the governing body.

R2. Universities and other research institutions should examine crucial areas of potential bias and define **measures** for countering bias. Progress needs to be monitored and, if necessary, measures re-examined and adjusted.

R3. Universities and other research institutions should gather expertise and organise **gender bias training** in various formats, including the possibility of anonymous training. There is no shortage of national and international resources which organisations can use.

R4. **Recruitment** and/or **funding** processes should be as open and transparent as possible and be genuinely merit-based. This includes measures such as briefing selection committees about bias pitfalls, deciding on clear selection criteria at the outset, letting external observers monitor the selection process and involving external evaluators.

R5. There should be close monitoring of potential **bias in language** used in recruitment processes.

R6. Universities should undertake action towards eliminating the **pay gap** and monitor progress.

R7. Employees should be compensated for **parental leave** by extending fixed-term positions or calculating the leave administratively as active service, yet exempt from publication expectations.

R8. Universities and other research institutions should monitor **precarious contracts** and **part-time positions** for any gender-based differences and correct any inequalities. Universities should examine conditions for part-time positions for professors and their gendered division.

R9. Universities and other research institutions should undertake **positive action** towards a proper representation of women in all leading positions, making sure that leadership and processes around leadership are free from bias.

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46. Positive action is legally defined as action to make education or employment (etc.) available to members of groups who have traditionally been treated unfairly.

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Links to relevant websites

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https://royalsociety.org/~/media/policy/Publications/2015/unconscious-bias-briefing-2015.pdf

http://wappp.hks.harvard.edu/whatworks

https://www.sciencedaily.com/releases/2015/03/150305125401.htm

https://www.cairn.info/revue-internationale-de-psychologie-sociale-2009-1-page-107.htm

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https://www.athenasangels.nl/en/

https://web.stanford.edu/dept/HPS/schiebinger.html

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http://curt-rice.com/2015/03/08/eve-evidence-research-tells-us-gender-equality/

Appendix - Practice at LERU universities

This section identifies current, emerging or evolving practice at LERU universities with regard to how implicit bias is addressed in the areas of: recruitment and selection; job advertisements; awareness raising and communication; training; learning and teaching; institutional leadership; and monitoring and evaluating.

Recruitment and selection

Heidelberg University has selection and evaluation **guidelines for professorial appointments** that make all procedures transparent to help evaluate research, teaching and administration competences in the perspective of active and internationally open research careers. These guidelines have additional questions about care-related times of absence. They prescribe conditions for active recruitment of female applicants. Each selection procedure has two **external evaluators** (one of them reporting to the Senate) **and a gender equality expert** (also reporting to the Senate). **Bias training** is offered to committee members.[47] Heidelberg University **monitors progress** in the faculties (responsible for proposing professors to be appointed) in yearly reports, providing the basis for policy adjustments or revisions.

KU Leuven uses **gender vanguards in each evaluation and selection committee** for academic staff to safeguard the gender sensitivity of evaluation and selection procedures. These gender vanguards are full professors – men and women – who are **trained on gender bias** in special sessions. Also in the general information and training sessions for new members of evaluation and selection committees, gender bias is mainstreamed as a transversal topic.

The policy at **KU Leuven** has made a shift towards a **more qualitative assessment** in selection and advancement, where the number of publications no longer prevails. The academic dossier now also considers non-academic experiences, such as parental leave, and focusses on the quality of publications instead of quantity. Gender vanguards make sure the assessment is not gender-biased.

At **Imperial College London** a **reminder about unconscious bias** is sent out by HR with all paper work regarding recruitment, selection, promotion.

Lund University has a regulated, comprehensive and transparent process for professorial appointments (Lund University Appointment Rules).[48] The process includes the demand for **equal representation in the recruitment committees as well as regarding external experts**. The **Vice Chancellor requires that all professorial appointments have qualified applicants from both sexes**; recruitments not fulfilling this requirement will be interrupted. In addition, the documents on which the final decision is made are public and can be requested by applicants or others when the decision has been made (transparency policy for government employment).

The **University of Zurich**'s second gender equality action plan arose from the Swiss universities' programme "Equal opportunity and university development 2017-2020" and runs from 1 January 2017 till 31 December 2020. The programme aims to embed gender equality more deeply in the core processes and development of institutions of higher education. As part of the University's gender action plan, the project "**Open, Transparent and Merit-Based Recruitment of Researchers**" (OTM-R) focuses on professorial appointment procedures.

The **University of Zurich** works with the OTM-R toolkit, which is a component of the HR Strategy for Researchers (HRS4R) issued by the European Commission (European Research Area, ERA) to increase the proportion of women professors. In cooperation with several faculties, the project aims to review and revise the recruitment policy and practices with regard to the basic principles of openness, transparency and merit. Furthermore, the toolkit – a step-by-step guide to improve OTM-R practices – will be implemented. Special emphasis is being put on **creating awareness of (potential) implicit gender bias in all phases of the recruitment process.**

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47. https://www.uni-heidelberg.de/gleichstellungsbeauftragte/karriere/onlinetutorial_genderbias.html
48. http://www.staff.lu.se/sites/staff.lu.se/files/lund-university-appointment-rules.pdf

Job advertisements

The **University of Freiburg**, as per decision of the rectorate in March 2017, is undertaking a general process to **revise job advertisements in a gender-and-diversity-sensitive way**.

The **Lund University** **Appointment Rules** state that "Systematic attention to gender equality is an essential instrument for achieving an even gender balance among University staff", as well as the fact that all teaching and research vacancies should be advertised with a broadly defined subject specialisation. It is regulated in Sweden that all governmental vacancies must be advertised, as part of the Swedish transparency policy.

Awareness and communication

At **Imperial College London**: The Provost's Envoy for Gender Equality sends an **annual letter to Heads of Department** about the danger of unconscious bias in affecting judgements about candidates for promotion. Also, a proposal to commission a series of **cartoons about unconscious bias** to keep the message fresh and unthreatening is under development.

At **Lund University** enhancement of awareness regarding gender equality and bias, e.g. by means of a **class on competency-based recruitment** (by Malin Lindelöw), is held biannually and is free of cost for managers and others involved in the recruitment process. A part of the review of the current recruitment process involves discussing bias with the members of the different recruitment committees at the university, in an effort to spread good practice.

Training

Trinity College Dublin's Living Equality and Diversity (LEAD) online training programme is an innovative learning resource, developed by the Irish Universities Equality Network and used at Trinity. LEAD[49] aims to provide staff with an **awareness of the key equality and diversity issues in a university context**. By using this **interactive and multimedia resource**, staff have the opportunity to consider and **reflect on the part they play in building an inclusive culture across the university sector**. Completion of the LEAD programme is a requirement for any staff member in Trinity College who participates in the recruitment process. Given the importance of unconscious bias awareness in institutional transformation an online video training tool[50] was produced by WiSER.[51]

The **University of Edinburgh**, in addition to training senior staff in a face-to-face training session (see below), has made an **on-line training programme** available. To date, over 2000 people have completed the training. An external social scientist was hired to determine pre-post differences in equality and diversity related perceptions, attitudes, and motivations at the face-to-face training session. Out of the 66 senior staff who were trained, 39 (20 men, 19 women) participated in **pre- and post-evaluation of the scheme**. Overall, 25 well-validated outcome measures determined impact (cf. monitoring and evaluating).

At the **University of Freiburg** **diversity training, including bias training**, is being implemented for all target groups, namely students, doctoral researchers, postdoctoral researchers, professors and administration.

Learning and teaching

At **Imperial College London**, unconscious bias **training is given to first-year students** in some engineering departments. Also, a project **exploring teaching evaluations by gender, grade and ethnicity** is underway.

Lund University has **centres for educational development that include different aspects of equality and bias in**

49. https://www.tcd.ie/equality/training/lead-online-training/
50. http://www.dailymotion.com/video/k5Q6R02b3EirG6c8kpZ
51. www.tcd.ie/tcgel

their programmes. For a lecturer to be appointed she/he must have completed at least five weeks of training in higher education teaching and learning, or the equivalent knowledge by other means.

The **University of Milan** organised three crash **courses on the impact of gender stereotypes on career paths and research**, between 2012 and 2015, in the framework of the FP7 Project STAGES – Structural Transformation to Achieve Gender Equality in Science. The courses **addressed the top management of the entire university** (Management Board, Academic Senate, Heads of Department, Heads of Administrative Office) and of selected Faculties. The courses, held by national and international experts in the field, focused in particular on gender stereotypes in evaluation, career progression and decision-making.

Institutional leadership

At **Trinity College Dublin**, in order to embed gender equality into the governance of Trinity College and spark a downward cascade of dissemination, the first exposure to unconscious bias training was conducted with the **Executive Officer Group** (comprising the Provost, Vice Provosts, Faculty Deans and Dean of Research, Treasurer, Bursar and College Secretary) in 2013.[52] This helped to pave the way for the next phase of unconscious bias training for Fellows and members of Promotion Committees. In 2015 ALL members of ALL promotions committees were required to attend one of two sessions, and the Provost attended in person, along with the Vice Provost, Deans and College Officers. The long-term objective is for these to cascade via faculties to Schools/Disciplines throughout College.

For the **University of Edinburgh**, **endorsement by the Principal** (Vice-Chancellor) was key to getting engagement for training senior staff. Initially a session was held at a **senior staff** meeting, exploring concepts of equality and unconscious bias. Six months later **three-hour face-to-face training sessions** on how to minimise unconscious bias, for around 20 staff at a time, were given. The training was led by an expert in the field, who was well placed to answer detailed questions about the literature on unconscious bias. The sessions were by invitation and voluntary, but all who were invited attended at least one session.

At the **University of Freiburg leadership training for all leadership positions** in the administration is available.

Monitoring and evaluating

The **University of Heidelberg monitors progress** in the faculties (responsible for proposing professors to be appointed) in yearly reports, providing the basis for policy adjustments or revisions (cf. recruitment).

The **University of Edinburgh measured the impact of training** (cf. training), showing major improvements in unconscious bias knowledge, and pro-equality efficacy, and a decrease in family versus career stereotyping for women. Perhaps not surprisingly, there was no impact on unconscious bias itself, although many reported feeling more confident in minimising the adverse effect of unconscious bias on decision making.

At **Lund University**, the **faculties report their progress on equality every year** in the Annual Report of the University. In Sweden it is mandatory to continuously work with active measures to prevent discrimination, as stated in the Discrimination Act. The Faculties must document the four-steps process/cycle:
1- review risks of discrimination,
2- analyse the root/cause of the issue,
3- attend to the issue,
4- follow up.
The work is monitored by the Swedish Discrimination Ombudsman. The University-wide management group for gender equality and equal opportunities is a network and a strategic arena for the faculties' representatives to share experiences and support.

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52. An unconscious bias fact sheet was designed for briefing TCD top level decision makers (Executive Officers Group), adapted from materials developed for the Equality Challenge Unit (UK) - http://www.ecu.ac.uk/publications/unconscious-bias-colleges-he-training-pack/

LERU publications

LERU publishes its views on research and higher education in several types of publications, including position papers, advice papers, briefing papers and notes.

Advice papers provide targeted, practical and detailed analyses of research and higher education matters. They anticipate developing or respond to ongoing issues of concern across a broad area of policy matters or research topics. Advice papers usually provide concrete recommendations for action to certain stakeholders at European, national or other levels.

LERU publications are freely available in print and online at www.leru.org.

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