COMMENTARY

WILEY

Overstaying our welcome: On the rise of women's seniority in the academy

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Abstract

Issues surrounding gender equality are—and should be—front and centre in the water resources community, and other science, technology, engineering and mathematics (STEM) fields. Very necessarily, the focus tends to be on recruitment, offering support for students and early career academics. The leaky pipeline concept used to describe the incremental loss of women from STEM fields with career duration describes a disproportionate loss of senior women, creating a parallel problem where highly qualified, top tier academics are lost from the system after significant financial and personnel investment by institutions. Ultimately, the leaky pipeline undermines the extensive investment of the hydrology and other STEM communities in equity, diversity, inclusion and accessibility (EDIA) recruitment and retention programmes by cutting short career ambitions and the trajectories of diverse top performing individuals, resulting in no net benefit of EDIA policy investments and a lack of diversity with seniority. Addressing this critical gender gap requires the attention and support of the hydrology community of practice with specific focus on generating opportunities for advancement, confronting systemic and structural biases and improving education around allyship. Institutions and professional organizations need to consciously grow diversity in leadership and recognize and outwardly manage the perception of academic excellence around slow research and education that attracts increased diversity. Supporting allyship, reducing competitiveness among community members and reinforcing collaboration will not only attract, but retain, a higher proportion of diversity in the hydrology community, academia and STEM professions in general. It is time for the water resources (and other STEM) communities to demand broader accountability and recognition of the barriers to women, implement and reward more diverse definitions of research excellence, and offer allyship training to the community of practice at large.

KEYWORDS
academic rank, gender equity, hydrology, inequality, leaky pipeline, STEM, water resources, women

1 | INTRODUCTION

Gender equality, particularly in the science, technology, engineering and mathematics (STEM) fields underpinning education, training and practice for the water resources community, is critical for us to fully leverage the requisite human brain trust needed to rapidly advance sustainable innovation in a time of unprecedented anthropogenic change. The importance of addressing the inequality divide has been underscored by some recent high-profile articles (e.g., Bendels et al., 2018; Bentley & Garrett, 2023; Ross et al., 2022; van Veelen & Derks, 2022a, 2022b). Though my particular experience is from the water (hydrology) community, this is an issue that spans *all* disciplines from health to environment to engineering to policy in academia and beyond (Llorens et al., 2021), and a problem that unnecessarily impedes the successful implementation of transdisciplinary approaches (Barr et al., 2023), those which are especially relevant for the water community. Gender has been linked fundamentally to critical aspects of power dynamics, relationship, culture, identity and the definition of roles and norms, all of which are critical structural variables underpinning transdisciplinary research methods (Brown et al., 2010). Despite targeted increases in the hiring of women into academic positions over the past decades, there is an associated increase in gender differences for both productivity and impact (Huang et al., 2020). Engineers Canada and other similar professional organizations have invested significant effort and resources into studying the leaky pipeline, the term used to describe the gradual loss, or leakage, of women from the field of engineering over time. While approximately 20% of first year engineering students are women, on average across all degrees, only 12% of women comprise licensed and practising engineers (Engineers Canada, 2020). A report recently commissioned by Engineers Canada explored some of the early warning signs and differences in workplace satisfaction related to gender, which demonstrated significant disaparities among male and female perceptions of support and fairness (Engineers Canada, 2020). Undergraduate programmes in STEM are now at or approaching parity, however, the statistics worsen as time and rank increases. Within academia is no exception with women comprising less than 12% of full tenured professorial positions in Canada (Canada Research Coordinating Committee, 2021), which is less than half the international average of 27% (Carbone & Butler-Henderson, 2022), and one-third of the proportion of female full professors in the United States (Newman, 2022). Losing any late-career academic is not only a significant loss to the academy and bad for science, but also diminishes the investment of public funds (Boivin et al., 2023).

As a woman academic in hydrology who has spent most of her career in an engineering faculty (now cross appointed in a Faculty of Arts), I feel qualified and obliged to address this issue through the lens of my own experience and perception, but also through a critical review of the academic literature. Though boasting a diverse array of academic training ranging from arts to engineering, and geography to hydrogeology, the water resources community still remains for many of us women (particularly senior academics) an impenetrable and proverbial 'old boys club'. If this statement seems strong to you, I implore you to keep reading with an open mind. The need for this contribution is critical and urgent based on the numerous conversations I have recently had with senior rank women in hydrology who are in the process of leaving the academy, or actively considering it. Anecdotal conversations with trusted male colleagues underscore that although they are supportive, they are often blind to the issues so entirely transparent to us women, but importantly, that they really would like to understand. My positionality in this conversation comes from an acknowledged point of privilege despite my gender. I am a full, tenured professor in Engineering who is white and of upper-to-middle socio-economic status in Canada (born and lived). I have been afforded, by timing of my birth and the #MeToo movement, every opportunity to succeed—at least at the junior ranks of my profession. Many others who identify as diverse have not been afforded these same privileges. Yet even in the process of publishing this manuscript, I encountered significant barriers, specifically rejection from several top tier journals who were not willing to take this on as it 'didn't fit with their scope or purpose'. Though infuriating, this was also a glaring reminder that these conversations largely remain closed door, behind the scenes topics that are difficult - near impossible to host in a public forum. I have come to recognize that it is exactly because of my privilege that I must push to exercise my voice without fear of consequence to pay it forward for other women and equity-deserving, under-represented groups in hydrology, the academy and STEM careers.

2 | WHY WOMEN MAY FEEL UNWELCOMED

Bad puns aside, the leaky pipeline has—or very nearly has—swept all women away from the water community more than a few times throughout their careers, and most still do not rule out the possibility (dream?) of one day leaving. Having 'one foot out the door' is a common sentiment among women hydrologists in my experience, nearly all of us have or still consider 'alterative career choices', even post-tenure and promotion in the academy. Experience has taught us that the proverbial glass ceiling, originally defined by Marilyn Loden in 1978 used to describe '*an invisible barrier that prevents an oppressed demographic from rising beyond a certain level in a hierarchy*' (Wikipedia, 2023), steadily lowers (or thickens) with increasing rank. This is supported by van Veelen & Derks who introduced a perceived glass ceiling index to track differences in gender through mid career and beyond (van Veelen & Derks, 2022a, 2022b). Women are accepted—even welcomed—as equals, but only up until the point they attain any real or perceived power. Once their influence is more notable, the glass ceiling is thickened. Because of the statistically low number of women academics that remain in the pipeline, particularly within STEM fields, few studies have explored the causal nature of this phenomenon. The objective of this commentary is to present observations and reasoning, based on both experience and perception and peer-reviewed literature, as to why the leaky pipeline disproportionately impacts the most senior ranks of women in academia.

Though the experience and perception component of this article relates to the water resources community, this is a phenomenon (supported by the literature) that is ubiquitous throughout the academy. I argue that the loss of support with progression through the ranks (PTR) exists because of the prevalent lack of diversity in top leadership, ignorance of barriers, lack of advocacy for systemic change, an increasing tendency towards 'high stakes' *fast* research, and the pigeon-holing of diverse academics into administrative and teaching roles.

The leaky pipeline means fewer women are making it to the 'end of the academic pipeline' (Civitella, 2018; Goulden et al., 2011; Richter et al., 2020), defined here based on career longevity within the academy, and those who do, are afforded fewer opportunities for career success (Casad et al., 2021). Statistics Canada reports a decreasing percentage of women faculty with age (rank), down to 31% of professors who are women, tenured and full professors as of 2019 (Uppal & Hango, 2022). This statistic is downright troubling for 'engineering, architecture and related technologies', with less than 13% of faculty at the full professor level being women (Engineers Canada, 2021). In Europe, studies show similar statistics (Herschberg & Berger, 2015), despite near parity at undergraduate levels. Therefore, it should come as no surprise that the pool of candidates for top tier academic positions (Deans, Directors, Research Chairs, etc.) is extremely limited. Even at the established career stage, women are twice as likely to leave their careers as men (Boivin et al., 2023). Couple this with a lower geographic mobility factor (Anders, 2004; Kulis & Sicotte, 2002) owing to family or personal reasons, and/or the need to accommodate a spouse's career and the result is far less diversity at the top tiers (Yousaf & Schmiede, 2017). This manifests as a lack of mentorship for reaching the top for academics identifying as women or otherwise diverse, which translates to a fundamental lack of support for identification of the barriers faced by these groups in general. It is difficult to appreciate what you cannot see, are not aware of, or have not personally experienced - the challenges are simply not visible. In the same way that women engineering students struggled in the 1970's with a lack of access to support basic human functions (i.e., gender appropriate or neutral washrooms) (Ingram, 2006), or women academics who have struggled to be recognized equally for lab space and research requirements (i.e., the award winning '*Picture a Scientist*' documentary), women are now struggling to be considered for the high-level positions. Though there are women who have achieved top tier positions, the messaging around both the availability of and ability to keep those positions remains that there is only room for a few leading to the 'Queen bee' syndrome (Xiong et al., 2022). We must be mindful that every woman leaving the profession results in fewer barriers removed and less accessibility for those who come after her, and one less champion in the pipeline (Lee & Won, 2014).

Women who have made it to the rank of full professor and who have persisted despite the odds are good at what they do, hence why losing them is such a staggering loss for science and the academy (Boivin et al., 2023). But their knowledge and reputation has come at a significant personal cost. Research shows that women experience chilly academic environments fraught with pervasive bias, (un)intentional exclusion, tension, competitiveness and discomfort that are isolating and exert a strong physiological toll (Casad et al., 2021). Women often carry increased burdens of invisible work due to their lower numbers and need to overachieve to be equally recognized. The 'invisible work' disparity equates to an average of four times more research time committed by non-marginalized groups as marginalized groups, with a gap that only increasing by rank (Social Sciences Feminist Network Research Interest Group, 2017). Moreover, diverse groups do an exceptional job of masking invisible work to avoid the perception that they are somehow 'slower' or not as effective, *having* the unintended consequence of conveying to (often male) colleagues that these groups are 'doing just fine'. Women have learned from experience that speaking up comes at a cost, 'targeted with severe hostility, defamation and even institutional retaliation when they speak out', and at best, being ghosted by colleagues (Boivin et al., 2023). Women are often too busy to take the time to complain—bound to rigorously defined working hours in order to carve out time for home lives, and often missing out on the benefit of after-hours beers and social engagement with colleagues. Women are apt not to complain or point out the differences in career trajectory or workload until hitting the breaking point. *Please don't equate our silence with the perception of our success.*

The statistics do not support reality, namely the extent of harassment women in academia endure is likely significantly underreported due to a failure because of fear of reprisal or backlash, pervasive 'power over' dynamics, and because of embarrassment (Aguilar & Baek, 2020; Hurren, 2018; Johnson et al., 2016). Once a woman has committed to staying the course, it is safe to assume that she/they have become guarded and protective, dare I say the word 'sensitive' (i.e., highly responsive) to even the notion or suggestion of harassment. All too often women who stand up for themselves are referred to as 'aggressive' or 'highly emotional' by superiors when harassment is reported, or in pointing out inequities that need to be addressed within the institution. The notion that colleagues need not be subjected to such 'aggressive feminism' need to be called out for what they are—victim blaming. Since when do the oppressors need protection from the victims? The absurdity of such comments and their sentiments has no place in any workplace—especially not higher education institutions—yet it is far more common than anyone cares to admit. If a woman is to raise such issues with colleagues, the conversation quickly becomes awkward, and the behaviour swiftly dismissed or explained away as 'harmless' or 'misreading the room' or the 'intent' of the offending comments. Such dismissals, and teh subsequent ghosting that ensues can be even more harmful than the original harassment as they communicate an unwillingness to confront the problem, and more importantly, that women's perceptions are simply wrong and their safety inconsequential. This likely, at least in part, leads to the 'men prefer men' collaboration effect (Kwiek & Roszka, 2021), which leaves women with far fewer colleagues to collaborate with. Women academics 'pay to play' and accept inflationary penalties that compound with their increasing seniority.

The more powerful and assertive a woman becomes, the more she/they are punished by the system and colleagues. The cost of not speaking up for her/them, however, is to accept the status quo and to not push for change. This is a sentiment I have often grappled with personally. *My* reason for staying in the pipeline rests not on building my own success and reputation as much as it does to affect meaningful, lasting change from within the academy. This means accepting a very high personal cost—from the uncredited time given to mentorship of junior women colleagues struggling within the system, to the students needing an empathetic ear, or to the professional cost paid for speaking up and out that manifests as a loss of allyship, personal isolation, and slower PTR. The choice to stay in the pipeline is the right one, not the easy one. For some this personal cost is simply too high (Heijstra et al., 2015). The gendered differences in late-stage career should not be confused with choice (or commitment), however - those who stay tend to do so because of more altruistic reasons, and not the more agenic reasons associated with hyperfocus on performance and career advancement (Van Veelen & Derks, 2022a; 2022b). Here is the root of the perception divide that many (with recognition that not all) men are more focused and superior researchers to women (Cameron et al., 2016). Academia for far too long has advocated a fast-paced 'publish or perish' attitude for promotion and advancement that notably results in significantly less disruptive and innovative research (Park et al., 2023), which tends instead to arise from a slower, more deliberate investment in collaboration, people, and outcomes (Adams et al., 2014; Krueger et al., 2016). Trans- or interdisciplinary practice in academia disproportionately attracts diversity, with more women holding cross-appointments and collaborating with communities and others outside their areas of training than men, both of which require significantly more time investment up front in research (and higher administrative burdens), preserving less time for more traditional academic outputs on the back end (i.e., publications) (Pinheiro et al., 2022; Rhoten & Pfirman, 2007). Academia's persistent reliance on quick output and easy metrics to evaluate success ignores the disproportionate investment of invisible work women invest that is in fact crucial to disruptive research and structural change within our institutions. The system rewards those who focus inward and *produce fast outputs*, as opposed to those who collaborate and *generate slow but disruptive* research outcomes, which increases gender disparity because of the disproportionate number of women preferring and practicing trans(inter)disciplinary research.

3 | CONSEQUENCES OF GENDER IMBALANCE

Fewer women at the top tiers of the academy results in reduced advocacy for structural change of institutional policies and norms. Funding is being increasingly siloed into fewer but larger multi-institutional grants that are accessible to fewer (top tier) researchers across North America, Asia, and Europe (Canada Research Coordinating Committee, 2021; Ohniwa et al., 2023; Schiermeier, 2020). This pressures universities to 'put their best foot forward' in order to increase success rates. Disproportionately, large multi-institutional granting opportunities are led by senior male academics who are encouraged (invited) by their institutions to lead, while women are added tokenistically to satisfy grant equity requirements. The rate of women transitioning into the role of principle investigator can be up to 20% lower relative to that of men (Lerchenmueller & Sorenson, 2018). Women are also much less likely to be named on high-impact articles resulting from "big research" opportunities relative to their male peers, regardless of their level of involvement in the research (Bendels et al., 2018; Ross et al., 2022). The unspoken hierarchy within academic institutions, ranging from those with the biggest research funding (or h-indices) down to sessional instructors (Smith, 2015) puts the emphasis on grantsmanship and publication over all other factors and outputs, thereby influencing researcher behaviour and establishing a hyper-competitive environment.

Universities in an increasingly risk adverse research landscape are inclined to self-select top performing researchers (defined by conventional metrics), but also those perceived (by reputation) to be the most influential. Such selection mechanisms are biased against women who, by many alternative metrics such as those laid out by the Declaration on Research Assessment (DORA; https://sfdora.org/), are equally as strong, if not stronger candidates - but perceived by their institutions as 'riskier' bets (i.e., not meeting 'the bar' by conventional metrics) and less effective leaders (Cook & Glass, 2014) when it comes to the awarding of large, multi-institution international grants. This effect is circular in that fewer women are credited in scientific grants than their male counterparts (Ross et al., 2022). It is incumbent on institutions to recognize systemic barriers disproportionately impacting the success rate of women grantees, and to actively push back against decisions from granting institutions that can be inherently biased and overly reliant on conventional metrics rather than those pertaining to longer-term outcomes of research (Cameron et al., 2016). All too often institutions fail to defend the position of women faculty for fear of upsetting the national or international funding body (i.e., in Canada, the tri-councils). Granting institutions and funders, instead, should welcome these challenges as a chance to learn and grow through experience and missteps, and as an opportunity to enhance their EDIA policies and training.

In some cases, backlash against institutional EDIA policies in place manifests as resentment towards female academics and further minimization of their successes. It is important to recognize that the contributions of women that are visible are likely but a fraction of their actual contribution (i.e., the 'invisible work'), many of which are not rewarded under the conventional evaluation system. Women's efforts tend to be far more significant than realized on paper, despite their opportunities being far less than the average academic. This becomes even more detrimental at a time where the academy, globally, is asking too much already, shifting the burden of decreasing administrative support and funding onto their professoriate (O'Hara, 2024). Mental health and wellbeing are talked about by the administration as being important, but in reality, there is a disempowerment of the academy from the top-down that is eroding creativity, equitable strategies, and well-being in general (Jayman et al., 2022).

Recognizing and owning one's privilege within the system is key to supporting and growing diversity within academic institutions. Backlash is not always intentional or deliberate, but it is none-the-less harmful and a real phenomenon that reduces the effectiveness of EDIA policies by fostering resentment and insecurity among advantaged groups (Iyer, 2022). The backlash effect is palpable, exhibited through ego, exclusive grant or award writing circles, and the subsequent exclusion of women from opportunities and acknowledgement. The problem, of course, is that the game is not fair, with far fewer opportunities still for women and other equity-deserving groups (e.g., top tier awards, jobs, leadership opportunities, etc.) and the prevailing perception that women remain somehow less qualified. Within my own inner collaborative sphere, where despite having as much as twice as many years experience in academia as some, I remain perceived as the junior 'partner' (and based on h-index alone, this would be true).

Bias and blind spots are acknowledged in the conventional metrics (e.g., the h-index) and yet these metrics continue to dominate as a measure of academic superiority, exasperating the perception of male-dominated research excellence. Miller and Chamberlin address the notion that '*Women are Teachers, Men are Professors*' as pervasive in the academy (Miller & Chamberlin, 2000), with this bias existing even at the lowest levels of education, starting in primary school. When asked to 'draw a scientist', children overwhelmingly drew senior male characters in the 1960's and 70's, reaching only about 50% of children in more recent years (Langin, 2018). Undergraduate students consistently rank women instructors more harshly than male colleagues, citing comments relating to their appearance, attitude, and professionalism more frequently than for male professors (Peterson et al., 2019; Sigurdardottir et al., 2023). Bias in the perception of women academics was first reported in the late 1980s by Basow and Silberg, and yet it remains a problem today despite causal correlation to teaching skills being refuted and dispelled repeatedly (Basow & Silberg, 1987; Centra & Gaubatz, 2000; Khokhlova & Lamba, 2023). While senior male colleagues are perceived as stronger researchers, women (who tend to exhibit more 'soft skills' and empathetic characteristics) are perpetuated as stronger in teaching and administrative roles (Brommesson et al., 2022). With increasing rank, women are disproportionately pushed into positions of authority relating to administration and teaching, which only reinforces the sentiment that '*women teach, men think*' (Brommesson et al., 2022). This unhelpfully echoes the double standard that men are the strongest researchers. Moreover, the visibility of women in teaching and administrative roles supports the perception that these are the roles women tend to *desire*, which may not always be the case (Winslow & Davis, 2016). If given the certain opportunity to affect change among higher ranks, versus a highly uncertain (unprobable) chance of leading a major institutional research initiative, many women will opt for certainty. In other words, it is best to take what you can get rather than to aim too high and miss all-together. I have felt pressure to take such administrative and teaching roles throughout my career, and not because I wanted to, but because I often fear that some aspect of visibility is better to no chance to lead or advocate for change from within.

A critical point often missed in the leaky pipeline literature is that the career success, failure, and trajectory for women is not theirs alone to define. Successes (failures) for equity-deserving individuals represent the (missed) opportunities of an entire community. This places an exceptional amount of pressure on women and equity-deserving academics, particularly those few who make it to the highest ranks. To leave or to not apply for positions or awards is to let down the women who came before, supported, and to disappoint those who come after; to succeed and be honoured is to represent and uplift entire generations of women past and present. The consequence is that *every single* decision carries weight, and failure comes with consequence that those with privilege do not see, experience, or feel the burden of. Women often see the leaky pipeline as a reminder of our failure to protect diversity and effect meaningful change at the highest institutional levels, which is vital to solving the world's most wicked problem (Krueger et al., 2016). When in fact, the persistence of the leaky pipeline is a failure of those who *hold* the privilege—a failure to call out and eliminate the systemic barriers in the first place. Women tend to carry this burden in everything they do, in every choice, and in every opportunity—*and it is absolutely exhausting*.

4 | RISING UP

Addressing the gendered power imbalance in academia, real and perceived, requires empathy and acceptance that women and equity-deserving academics are here to stay—at all levels. This not only enriches the environment we all live and work within, but studies have shown that it creates a more fulfilling and enriching workplace culture that in turn strengthens innovation (Mathew, 2023). In fact, promoting diversity is a direct investment in innovation, and a lack of diversity in the academy leads to the 'diversity-innovation paradox' which describes the under-reporting and citation of innovative research produced by diverse groups within the scientific community (Hofstra et al., 2020). Though attaining equality throughout all ranks of academia will take time, let's not make the mistake of assuming that time alone will be enough to correct the disparity. To assume change in the upper ranks naturally progresses from parity at the undergraduate level is to ignore all the systemic barriers discussed above. This is a grand challenge that requires everyone to be an active participant in addressing, whether man or woman, diverse or not. In the meantime, however, where do women academics at the higher ranks turn to avoid becoming another leaky pipeline statistic? There is no magic silver bullet, and this is not an easy question to unpack. I may not have the solution, but I offer some recommendations in support of more rapid advancement and retention of women and equity-deserving academics into top tier positions. These include creating:

4.1 | Institutional policies that demand the advancement of women into high-profile positions

If women perceive there is no place for them at the top, then they naturally lower their expectations of their career trajectory, resulting

in lower achievement and higher drop out rates (van Veelen & Derks, 2022a, 2022b). For some, the fight to the top is simply too exhausting. This creates a self-fulfilling prophecy where women attain lower career success than their male colleagues, particularly in the research domain. By creating space at the top, institutions pave the way for women to step up, should they so choose, simply by being afforded equal opportunities as their male counterparts. Importantly, the more women who achieve higher ranking positions with influence and power, the greater the disruption to the perception that women are somehow less capable than their male colleagues. Unfortunately by demanding and implementing EDIA policy only for and at the lower ranks, our academic institutions are failing us at the top ranks. As a recent article by Glen O'Hara recently put it '*the university must be just such a moral place, or it is nothing. As of now, it's doing a pretty good job of looking like nothing: drab, pointless, miserable. That's doing harm to all of us*'. (O'Hara, 2024).

4.2 | Institutional-level recognition and nomination of women for top tier honours

Boosting the research profiles of women at the highest ranks must be an institutional priority. Institutions must challenge the stereotype that women are only good teachers and celebrate and recognize them publicly as both good teachers AND researchers by elevating their research profiles. As a Canada Research Chair, I find that my research has been challenged by male colleagues - but never my teaching awards, as if those are somehow expected, but less so much my status as a researcher. Institutions are increasingly in recognition of the need to bring notoriety to the institution and its researchers through external award nominations, however, these nomination still falls largely on the individual researchers themselves. Professional associations in the water resources community are lacking diversity among their top honourees and medal winners, with the majority historically and still awarded to men. We are tired of waiting for our turn - are there really no honour-worthy women in my field? Part of the issue is that women are far less likely to self nominate than male peers for several reasons: (1) they are simply too busy doing the extra committee and EDIA work, (2) it feels (and is largely) self-serving, which is awkward for many women, (3) it feels unattainable as external messaging tells us we are less deserving and need to be that much better to win, and (4) in the words of Cook & Glass '*women don't ask*!' (Cook & Glass, 2014). I can provide a compelling example here: two prestigious conferences I attended in the past year had a line up of all male medal winners. When I approached the EDIA committee for one of these conferences to voice my opinion on that, I was told that of the hundreds of applications received, not a single woman applied. Award committees would like nothing more than to honour diversity and inclusivity, but they are often bound by the applications they receive. I still battle the demons from my 'excuse list' above (reasons to not apply for awards), but I have learned a valuable lesson in the past year—applying for the highest awards and medals is NOT self-serving but an act of community service. Other women coming after you

believe they can 'be what they can see'—but seeing comes before believing.

4.3 | Funding strategies centred around diversity more than 'excellence'

Fortin and Currie (2013) demonstrated that rewarding diversity in research and team composition is more likely to result in higher impact outcomes of research grants, and more productive research. Their research into the distribution and productivity from the major tri-council granting agencies in Canada uncovered that the amount of funding was only weakly (positively) correlated to impact, and that funding could be decelerating influence on impact. Park et al. (2023) note that research advances have slowed in many fields (Park et al., 2023) despite the significant increase in investment in STEM research and development over time (Jahnke, 2015). Moving forward, institutions would be wise to proactively invest in slow, transdisciplinary research that demands teams from different disciplines to co-create new knowledge, relationships, and fosters more diverse and inclusive perspectives.

4.4 | Education and training around the implementation of DORA evaluation metrics

Several water cooler discussions I have had recently with supportive colleagues have highlighted to me that advocates often *want* to do the right thing but may not have difficulty in successfuly arguing the merits of 'soft' contributions against those of the 'hard' or quantitative ones (i.e., impact-factor) in committee settings. This is a failure of our institutions to educate committees on the implementation of transdisciplinary metrics, such as DORA, in part because there is no one-size-fits-all approach, and that academia will need to adopt a measure of subjectiveness (while minimizing bias) moving forward. This is hard - much harder than summing a few numbers - hence why there is resistance and a need for improved guidance. This is particularly crucial for the water resources sector where community-based interactions and stakeholder engagement is often a critical component of the research, and which takes considerable time and resources but is largely 'invisible work' in our current landscape.

4.5 | Disincentives for tokenistic inclusion efforts

EDIA is a buzz term, and funding agencies and institutions are demanding EDIA statements be woven into all job ads, assessments, committee composition, decisions, and hiring practices. The forced nature and wording of EDIA practise has created an atmosphere of resentment and tokenism that i inadequately supported by meaningful action (and funding). In my experience, when the full budget is not awarded to large multi-disciplinary research projects, it is often the EDIA components that are cut or reduced (e.g., Indigenous

engagement and knowledge co-creation). This practice must not be tolerated or normalized. Moreover, candidates with a poor-quality (i.e., frivalous) EDIA statements that are tokenistic and clearly ignorant of the actionable issues must become detrimental to the candidate's success. Tokenism is harmful because it actively devalues EDIA, which in comparison to omitting it, communicates that successful EDIA action exists only at face-value.

4.6 | Education and training around micro-aggressions and behaviour labelling

Extremely detrimental to the long-term retention of women in academia is the consistent, deleterious labelling of senior women raising EDIA issues as 'aggressive' or 'emotional', instead of addressing the root cause: their rising level of frustration in response to institutional inequity. We need to call out this behaviour for what it is—victim shaming and blaming. If we do not accept that dressing or acting in a specific way can justify sexual harassment, then we cannot support as a community that speaking out against bias and barriers is considered an act of aggression. The institutional support and defence of those enacting the barriers is in fact the aggression.

It is important to also recognize that perception matters *a lot*. Action is critical in implementing change but changing the perception of the change may be even more essential to the rise and retention of women in academia. In the same way that organizations plan for and implement change management procedures and policies to boost productivity and cost effectiveness, institutions within the academic community need a plan to manage expectations and outcomes of EDIA policy. The consequence of inadequate support for EDIA policy at an institutional level is a significant 'brain drain': a loss of some of the most senior and most influential researchers they have. Being mindful of unintended consequence is also important. Leaving women away from the decision-making table (even if you are 'trying to protect their time') lends the impression of exclusion, a feeling they are not welcome, or that somehow do not belong, which can incite a 'fight or flight' response that translates into either combative (instead of collegial) interaction, or a retention issue.

5 | STAYING THE COURSE

In my opinion, the strongest allies keeping women in the game come from the community that (openly) rallies against these issues and barriers; those who continue to stand up for what is right, not what is easy. The colleagues who recognize and work to dismantle their blind spots are critical to this issue—not only in terms of their support of women, but their leadership among others. The administrators that acknowledge the inequities and frustrations and simply '*see us*' and our challenges and take the time to say 'no, it's **NOT OK** and we must do better as an institution'. And the staff behind the scenes working to nudge things in the right direction continuously, consciously, and deliberately—with intent. I am fortunate in my water resources

community to have found such allies, who have undoubtedly been the changemakers that have supported me in achieving the highest ranks of the academy. And yet, on a near daily basis I still experience barriers to my progression and success, unjust aggression, and face significant inequities that push me to consider other options for my career. I have come to realize that these are real—not simply imposter syndrome—and my choice to stay involves sacrificing some aspect of my mental health and well-being in order to persist.

Allyship education in the workplace is something more commonplace in professional settings than in academia. Though additional EDIA training could provide a much-needed educational focus on supporting diversity and inclusivity in academia, it alone will not be enough. Smith et al. (2022) describe the growing gap in the perception of allyship in their article '*Men are far worse allies than they think*' (Smith et al., 2022), supported by the concrete definitions and continuum of allyship presented by the Integrating Women Leaders (IWL) foundation (Figure 1) (Integrating Women Leaders Foundation, 2022). Women tend to notice (more than men) a lack of diversity in senior leadership, translate this into a lack of support, and feeling of a lack of transparency to measuring progress towards leadership. A reported 20%–35% gap in perceived allyship exists between the sexes, which increases with career responsibility; men feel they are twice to three times more likely to engage in allyship actions than women feel they in fact are (Smith et al., 2022). My own recent interactions support this: upon organizing external active bystander training for my research team, I reached out and encouraged some male coleagues to join. I was met with the response 'this is a little bit like preaching to the choir, is it not?' This underscores the need to define allyship and supports the call for more training: the IWL found that men who had participated in organized allyship training were twice to three times more likely to have recognized and witnessed biased behaviours (e.g., interruptions, questioning a women's expertise or failing to credit them when appropriate) than those without training. I am calling on the water resources community to adopt and develop such training opportunities at our national and international conferences, and to be open-minded enough to attend. There is a growing presence of EDIA and science communication sessions that could be further complimented by allyship education and training - and publication!.

Good allyship recognizes and calls out the biases affecting women and equity-seeking groups, so they are not the ones paying the price for speaking out, which is in line with the principles of active bystander intervention and referred to as upstanding (American Psychological Association, 2022). It means being *aware* of the barriers that exist in one's field and offering to support impacted colleagues. It also means *learning* the best way to advocate by *asking* what is appropriate or needed in a particular context, even if you think you know. Strong allyship means owning missteps when they occur—not justifying or situating them—simply owning them, learning from them, and doing better next time. Actions speak louder than words. Allyship requires learning from each other—women from men, and men from women as we each bring unique perceptions and perspectives. Working together to create a community culture of allyship and awareness of EDIA is critical, along with the recognition that we are stronger—

Source: adapted from Integrating Women Leaders Foundation (IWL) 2022 State of Allyship-in-Action Benchmark Study
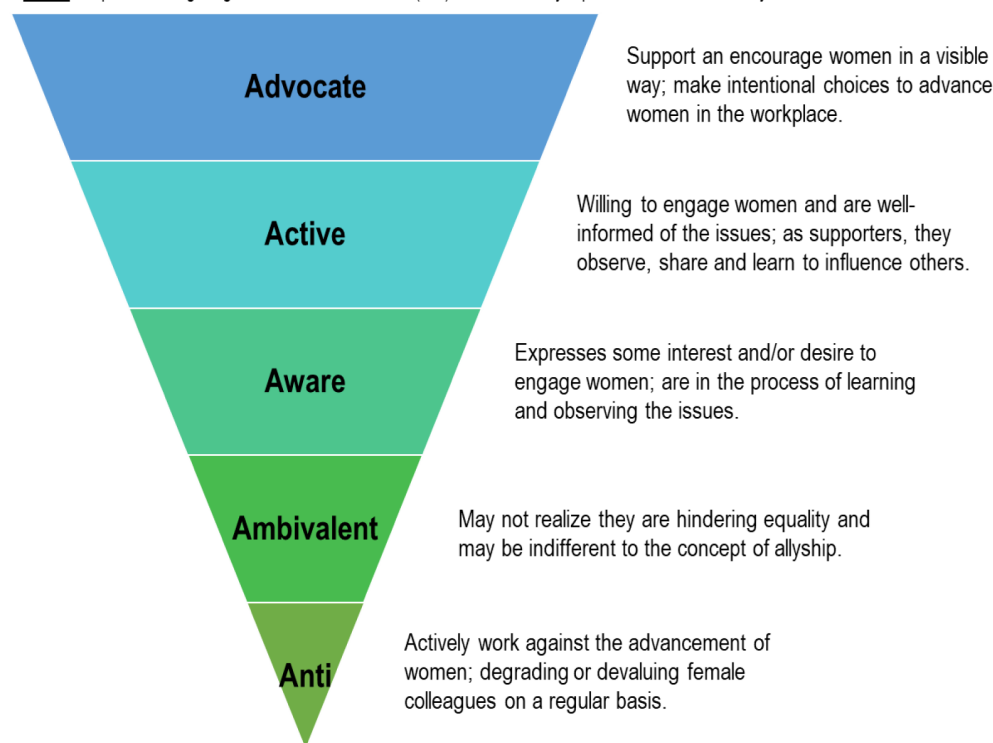

FIGURE 1 Allyship continuum, adapted from the Integrating Women Leaders Foundation (IWL) (2022) benchmark study on the State of Allyship-in-Action.

and the research better—working and learning together. Within the water resources community, a culture of allyship and upstanding must become the new standard if we hope to stem the outflow of senior women and diversity from our future leadership.

Increasing the retention and advancement of women and diversity in academia means institutions must value, prioritize, and enact diverse leadership to demonstrate its importance for the academic and research community. This means providing resources, such as allyship training, to employees, but also necessitates moving beyond awareness into actionable implementation. Meaningful action begins by listening to (not dismissing or explaining away) the affected community, and then by observing and acknowledging the barriers in place. This could model a process similar to programme or unit evaluation conducted by external reviewers. Institutional priority must be mobilized to disrupt and dismantle existing policies and structural elements inhibiting women's career advancement—and not 'in due time', but in a meaningful time frame such that a woman see's an opportunity to lead in her career lifespan. Within academia, there is an urgent need to offer education and training around the broader, more inclusive definitions of research excellence (impact) and innovation (outcome) which value non-traditional, transdisciplinary methodologies that tend to be more time-intensive and 'less productive' by conventional metrics (e.g., collaborative processes, networking, research-to-action, science communication, knowledge translation, etc.). While many researchers and institutions are now aware of and are signatories of DORA (https://sfdora.org/), there remains confusion on the implementation of DORA concepts for research or researcher assessment (Bruneaux, 2023).

For the water resources community, valuing and supporting trans(inter)disciplinary research and researchers is critical for the transformative adaptation needed to face the global grand challenges around water and climate change. Water is intrinsically connected to the intersection of environmental, social and economic dimensions and therefore is inherently transdisciplinary in nature. This offers us, as a water community, an opportunity to lead with respect to diversity by attracting (and retaining) more women scholars opportunistically invested in and trained to examine the interplay between the three dimensions. Solutions to grand challenges, such as the United Nations Sustainable Development Goals, and demand the entire community of practice to expand our definition of sustainability science (Messerli et al., 2019; Smith et al., 2018). We also know that 'diversity breeds diversity', therefore as a greater proportion of women are attracted, invested in, and supported, the more diverse our community will become. Importantly, we must all recognize the deficiencies in our own individual knowledge and the collective strength and power of diverse teams and approaches, which demands new approaches to assessing research excellence and valuing the often slow, but crucial outcomes of practicing science communication and knowledge translation (Belcher et al., 2016; Lang et al., 2012). The water-centric representation of the United Nations SDGs highlight the interconnectedness of human well-being, planetary health and economic viability that water supports, and the role that gender equity plays (Sadoff et al., 2020).

Importantly, as we grow and change as a community of practice, we must work to create a culture of acceptance around missteps, recognizing these *will* happen in an environment of rapid change, but that

real value and opportunity lies in collectively learning from, and openly addressing (in a positive manner) these mistakes. It is time for the water community and academia to move away from a judgement-fuelled competitive model to one of allyship and acceptance in order to fully embrace the progressive, diverse and innovative research outcomes needed to tackle grand challenges in water resources (Kosow et al., 2022). The benefits to our field will not only be increased diversity and future talent, but also an increased awareness of and focus on realizing mental health and well-being for all of us in the academy.

DATA AVAILABILITY STATEMENT

This is a commentary and all data are retrieved from previously published sources. No new data are presented.

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