

# Learning, experiences, and actions towards advancing gender equity in engineering as aspiring men's allyship group

Nicole L. Wilson (she, her)<sup>1</sup> | Torrey Dance (he, him)<sup>1</sup> |  
 Winston Pei (he, him, they, them)<sup>1</sup> | R. Sean Sanders (he, him)<sup>2</sup> |  
 Ania C. Ulrich (she, her)<sup>3,4</sup>

<sup>1</sup>Office of the Dean, Faculty of Engineering, University of Alberta, Edmonton, Alberta, Canada

<sup>2</sup>Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada

<sup>3</sup>Department of Civil and Environmental Engineering, University of Alberta, Edmonton, Alberta, Canada

<sup>4</sup>Office of the Associate Vice President (Research), University of Alberta, Edmonton, Alberta, Canada

## Correspondence

Nicole L. Wilson, Office of the Dean, Faculty of Engineering, University of Alberta, Edmonton, AB Canada.  
 Email: nicole.wilson@ualberta.ca

## Abstract

The representation of women in the engineering profession (17.90%) far lags that of the Canadian workforce (47.50%), with several authors citing the need for professional and organizational culture change for engineering to be more equitable for and inclusive of women. Recent evidence reported that men actively working on gender equity practices is one mechanism through which this culture change will occur. The practice of allyship by men involves learning and reflecting, building trusting relationships with women colleagues, continuous action even through discomfort, and influencing change at multiple levels. We share our own experiences with starting a men's allyship group in an engineering workplace, initial successes, opportunities to improve, and our vision for the future.

## KEYWORDS

allyship, engineering, gender equity, inclusivity

## 1 | INTRODUCTION

While women represented 47.50% of the Canadian labour force in 2019,<sup>[1]</sup> engineering remained a profession occupied largely by men, with over 80% of professional engineers being men in 2019, down slightly from 85% in 1990.<sup>[2]</sup> Yet, other professions traditionally occupied by men have greatly increased women's representation. Since 1990, the proportion of women in medicine has

increased by over 20%, with women comprising 43% of physicians in 2019.<sup>[3]</sup> There are calls for culture change in engineering to foster diversity and inclusivity in the workforce.<sup>[4–6]</sup> Researchers report that women's lower interest and retention in engineering compared to men stems from several systemic factors, including cultural, political, and economic systems. These systems produce and reproduce deleterious outcomes for girls and women, including women's underrepresentation in influential roles within these systems,<sup>[7,8]</sup> stereotypes about girl's/women's gender roles and math ability,<sup>[9–11]</sup> being the target of sexism,<sup>[4,5,12]</sup> being rewarded less than men for

Torrey Dance, Winston Pei, R. Sean Sanders are Co-Chairs of the Men's Allyship Group that is the manuscript's case study.

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equal performance,<sup>[13]</sup> and being less likely than men to be sponsored by leaders and promoted.<sup>[13–15]</sup>

In line with calls for change, academics, activists, and practitioners point to men's role in efforts to reach gender equality<sup>[16–23]</sup>—defined as a state where access to rights or opportunities are unaffected by gender.<sup>[24]</sup> Given that engineering is occupied primarily by men,<sup>[2]</sup> particularly at the leadership level,<sup>[7]</sup> it is logical that effective change will require the learning and action of men alongside women. Emerging research has found that in organizations where men were more knowledgeable about and directly involved in gender equity work—defined as the practices and actions taken to achieve gender equality<sup>[24]</sup>—employees reported more progress towards women's representation.<sup>[23]</sup> In our experience, men's involvement in gender equity initiatives increased their knowledge of women's representation in our organization, spread equity, diversity, and inclusivity work across a greater number of people (thereby lessening the disproportionate workload carried by women for these initiatives<sup>[25]</sup>), and increased the number of full-time faculty jobs offered to women. Men's involvement also increased knowledge of how multiple aspects of identity are relevant to equity, including the intersectional effects of race, sexuality, and other social identities. Further, our men's allyship group has begun to learn, build relationships, and consider actions to ally to transgender men and women, gender fluid, non-binary, and gender-nonconforming persons whose underrepresentation and experiences in engineering require equal attention to achieve gender equality.<sup>[26–28]</sup> This paper explores allyship, what it means for men to practice allyship, and provides a case study of our experiences with a men's allyship group in an engineering faculty of a large public university.

## 1.1 | Allyship

Allyship is described as the active support of underrepresented and marginalized identity groups and has been used in the academic literature for at least 40 years. For example, a key term search of 'white' and 'allyship' returned over 3500 research papers. Allies to LGBTQ\* communities returned over 1500 research papers when we searched 'LGBTQ\*' and 'allyship'. Further, research on allyship to persons with disabilities and who are neurodivergent is another area of allyship action and research. 'Men' and 'ally' returns comparably fewer studies with just a few hundred. Yet, this is a burgeoning area of interest, with several recent conference presentations, commentaries, and studies.<sup>[16–23]</sup>

People aspiring to be allies are characterized by a desire to learn of (i) the stories and experiences of people

who are members of underrepresented and marginalized groups, (ii) the systems-level reasons why those groups experience inequalities and injustices, and (iii) ways to support and promote their individual and collective efforts to correct these inequalities.<sup>[29]</sup> To do this work, aspiring allies must build meaningful relationships and trust with those they seek to ally to and seek feedback on their actions for accountability to those groups.<sup>[29]</sup> Allyship goes beyond an individual suppressing prejudice or violence towards members of underrepresented or marginalized groups.<sup>[29]</sup> Allyship means actions to create change in organizational and societal cultures, systems, and policies, and supporting members of underrepresented and marginalized groups.

Based on our literature review, and in Carlson et al.'s<sup>[20]</sup> thorough review, the following allyship themes emerged:

- **Self-education:** A critical initial and ongoing action is to learn about inequity and the systems that reinforce it; this should be done through numerous resources and texts from multiple authors and perspectives. When hearing an unfamiliar term or something that does not sit right, it is the aspiring ally who reads, researches, and seeks to understand. Self-education also means seeking out learning opportunities rather than asking members of underrepresented and marginalized groups to educate, as inequality is complex and often difficult to fully explain, especially in a brief conversation.
- **Self-reflection:** Another critical step in practicing allyship is self-reflection on one's own power and privilege in society.<sup>[20]</sup> This process can result in guilt when one comes to understand the extent to which they do not face the challenges that others do because of their gender (and additional identity factors). Discomfort is necessary and it is important to process associated emotions before taking further actions.
- **Persistent action and advocacy:** Education and reflection ultimately need to translate into action, including the continuous work of unlearning stereotypes and sexism that are prevalent in our society,<sup>[30]</sup> educating others who are misinformed or critical of gender equity through conversation and discussion,<sup>[20]</sup> and calling for better organizational policies and resources.<sup>[31,32]</sup>
- **Calling oneself an ally:** The designation of ally must be earned, and thus aspiring allies should focus on listening, humility, and action towards equity rather than seeking recognition or title.<sup>[23,33]</sup> Alternative terms, such as those that use action phrases like operating in solidarity with (rather than nouns or identity words like ally)<sup>[34]</sup> or descriptions such as accomplice and co-

conspirator, demonstrate that this work is done alongside underrepresented and marginalized groups to ensure accountability<sup>[33,35]</sup> and often requires trust-building, risk-taking, and rule-breaking.

Practicing allyship requires one to overcome their own defensiveness, to have difficult conversations, and to take risks, and thus not every man will want to practice allyship. For those that do, there is a continuous development process involving learning, reflection, and advocacy required to change. The proof of effective allyship is in that change.

## 1.2 | Gender inequity and intersectionality

The goal of men's allyship is progress towards gender equality through gender equity (as defined above). Equity does not mean quotas or preferential treatment. Rather, equity means understanding the underlying differences in how genders are treated and using that evidence to inform behaviour, policy, and practice. Policy or practice may need to be applied differently for individuals of different genders to overcome inequities; however, the intention is to raise women up to where men already are. Men are not being left behind, as they are already there.

When it comes to gender, it is important to acknowledge that people do not experience the world solely based on their gender; it is only one aspect of one's identity. The theory of intersectionality, established by Crenshaw<sup>[36]</sup> 30 years ago, means that it is problematic to treat one's social and political identities (e.g., gender, sex, race, class, sexuality, religion, ability, appearance) as separate categories of experience and study. In other words, we cannot separate our experience and how we are seen, heard, and treated into one identity category (e.g., just as a man and not in terms of skin colour, religion, political view, and so on); rather, all are experienced and seen together. This approach is important, as when an individual is part of more than one marginalized group, they often experience greater as well as unique barriers and inequities.

There is a growing body of literature that seeks to explain the intersectional and identity-related experiences of engineers. For example, in a study of engineering students who are Black women, participants discussed hearing stereotypes and wanting to correct them but being worried about others taking offence if they did. They felt valued at their university during certain instances (e.g., events for minority students, recruitment programming) and not in others (e.g., daily experiences in classrooms and labs).<sup>[37]</sup> Engineers who

are LGBTQ2S+ are underrepresented in the profession<sup>[27]</sup> and commonly face heteronormative assumptions.<sup>[26]</sup> A survey of STEM professionals who were lesbian, gay, bisexual, transgender, queer, and asexual found that 40% of respondents actively hid their queer identities from co-workers.<sup>[28]</sup> These types of experiences are collectively referred to as covering, the expectation that one must downplay their differences and hide aspects of themselves or their life in the workplace or public.<sup>[38,39]</sup> Examples include women adopting more masculine communication styles primarily at work; for some members of the LGBTQ2S+ community, fearing abuse while publicly displaying affection for their spouse; immigrants to Canada and the United States adopting new Western names; and members of marginalized religions and cultures avoiding such practices at work.

If gender equality is reached one day, it will mean organizations have focused on equity practices not only for cisgender women, but also transgender men and women, gender fluid, non-binary persons, and gender-nonconforming persons.<sup>i</sup> These communities experience significant levels of marginalization, harassment, violence, and systemic oppression,<sup>[41]</sup> including in engineering schools and workplaces.<sup>[26-28]</sup> Much of this paper is focused on cisgender women and men,<sup>ii</sup> and it is important for any discussions of gender equity to also be inclusive across the spectrum of gender identity and expression. In our own men's allyship group, we seek to foster a culture that is welcoming to, and inclusive of, colleagues and students across the spectrum of gender identity and expression and have begun learning and building trust with these communities.

## 1.3 | Gender inequity from a systems perspective

Researchers find that to understand individuals' perceptions and behaviour, we must understand the interconnected structures and systems in which they live or grew up, including cultural, legal, religious, political, and economic systems. Because we are raised and function in these systems, it can also be difficult to recognize the structures that sustain inequality as they can seem natural or even invisible. To fully affect change, inequality experienced by individuals must be addressed at the systemic level, where individuals in leadership roles and positions of power (predominately roles occupied by men<sup>[7,42]</sup>) have more ability to create systemic change. Thus, men acting alongside women as allies can move the needle on changing systems. Still, we must acknowledge that these systems are incredibly complex and resistant to change, and progress towards equality is slow and needs to occur across isolated parts of the larger system.

Gender inequality is often subtle and difficult to see, but extensive evidence demonstrates that it exists in workplace culture today. Persistent stereotypes also influence perceptions of women in the workplace. For example, research suggests that men and women do not differ on job performance levels, yet the stereotype that women are less ambitious than men persists and has an impact within organizations.<sup>[13]</sup> This stereotype translates into real outcomes: across several industries and levels of jobs, the difference between the rewards received by men and women (salary, promotions, bonuses) was 14 times larger than the difference in performance, supporting the idea that women receive disproportionately fewer rewards for comparable work performance.<sup>[13]</sup>

In addition, national surveys from the United States demonstrate that there are societally-held ideas about what people of particular genders are like, called gender roles.<sup>[43]</sup> The gender role of men is characterized as being a winner (ambitious, assertive, competitive), being physically and emotionally tough, and avoiding all things considered feminine,<sup>[44]</sup> while the gender role of women is marked by compassion, caregiving, and warmth.<sup>[43]</sup> People rarely fit, nor desire to fit, into all aspects of gender roles, yet we can still feel the pressure of subtle or explicit expectations to fit in the roles that society tells us we should take in all aspects of life, including at work. The effect of gender roles can be seen in the concentration of men and women in various industries; while women and men participate in the United States and Canadian workforces at nearly the same rates, women's participation is concentrated primarily in the social skills and service sectors where they provide service and care to others, such as in education, healthcare, and restaurant and retail services.<sup>[45]</sup> For girls and women who do choose to enter careers typically occupied by men, gender roles are implicitly and explicitly communicated and reinforced; for example, women are given motherly or social duties, or are shielded from work that is too difficult, too heavy, or too dirty even though they can and want to do it, which is referred to as benevolent sexism.<sup>[46]</sup> These experiences are stressful and can lead to burnout and chronic stress,<sup>[47]</sup> and evidence suggests that these experiences are compounded for Black women.<sup>[48]</sup> Research has found, however, that opportunities to share one's own experiences, to be understood, and to be approached with empathy mitigated the long-term effects and contributed to workplace culture change.<sup>[49]</sup>

Differences between women and men were even greater in occupations where there were proportionately more men, such as engineering.<sup>[13]</sup> Mentorship is one commonly advocated practice to support career development and advancement, and women are more likely than men to have mentors.<sup>[14]</sup> Even with mentors, women

were still less likely to advance in their careers as influential senior leaders were less likely to sponsor or advocate for their career goals, development, and advancement.<sup>[14]</sup> Thus, these research findings support that gender inequality needs to be addressed at the systems level and the systems that perpetuate gender inequality need to be dismantled.

### 1.3.1 | Gender inequality in mathematics, science, and engineering

Gender inequality also can present differently within different professions and disciplines. For example, societal misconceptions that girls and women are innately predisposed to be poorer at math and science than men and boys persist, despite being disproven.<sup>[9–11,50]</sup> Laboratory experiments have shown that girls' knowledge of these stereotypes led to their underperformance,<sup>[10,50]</sup> and in turn, girls tended to be less interested and have lower self-efficacy for their mathematics ability than boys.<sup>[9]</sup> Even with equivalent past mathematical achievement, girls self-assessed their mathematical ability to be lower than boys did, suggesting that, counterintuitively, achievement does not boost girls' mathematical confidence.<sup>[51]</sup> In addition, there is a societal gender stereotype of science being a man's job,<sup>[52,53]</sup> and related meta-analysis findings showed that boys have more positive attitudes towards science, particularly physics and chemistry, than girls,<sup>[54]</sup> and that this continues into adulthood.<sup>[55]</sup> Another commonly held assumption is that women in engineering who plan to or have children do not want to work long hours or are less committed to their work, while when asked, women have reported difficulties in arranging childcare on longer work days or for work-related travel and feeling like they are not dedicating as much time to both parenting and work as they feel they should.<sup>[56]</sup> However, women enter medicine<sup>[3]</sup> and law,<sup>[57]</sup> which also require long hours at more representative rates than engineering, supporting the need to further explore the profession's contributions to women's concerns about conflicts between their engineering career and parenting.

The engineering profession has a prevailing culture that was created when the field and the labour force were both far less diverse. Engineering continues to maintain a professional culture in which newcomers must assimilate to be successful. Traits typically considered masculine, such as assertiveness, decisiveness, and toughness, are commonly held characteristics of effective leaders<sup>[58]</sup> and engineers.<sup>[59]</sup> However, women who display these traits are often liked less than men who display them,<sup>[58,60,61]</sup> and are reported as hostile, selfish, and/or devious, with





monikers like ‘battle-axe’, ‘loose cannon’, ‘diversity hire’, and ‘ice queen’.<sup>[62]</sup> Engineers who are women also report shared experiences of feeling obligated to talk about topics that do not interest them, awkwardly smiling at offensive jokes, and adopting more direct and dominating communication styles in an attempt to fit in,<sup>[5]</sup> with several studies citing similar experiences.<sup>[4,12,63]</sup> In addition, when there are few women in engineering workplaces, they simultaneously stick out yet are invisible, as they are not able to fully integrate into social networks even if they try to be one of the guys.<sup>[12]</sup>

In addition, engineers who are women also navigate the lines of friendliness (as women are expected to) and professionalism: ‘If you’re too friendly they might see that as flirting. If you’re not friendly, then you’re a bitch. It’s a very fine line, very difficult, because when I thought I was just being friendly you hear you’re being accused of being a flirt’.<sup>[12]</sup> Taken together, in engineering workplaces women must choose, consciously or unconsciously, between being liked but not respected, or being respected but not liked.<sup>[64]</sup> This dissonance is especially the case in leadership positions,<sup>[65]</sup> where women are underrepresented to an even higher degree.<sup>[7,8]</sup> Taken together, progress is needed towards women’s representation, gender equity, and the shift away from primarily rewarding stereotypically masculine behaviour. To affect change, women’s continued activism and men’s allyship actions are needed at multiple levels, including individual, organizational, and societal.

### 1.3.2 | A call to action for engineers who are men

Readers might be thinking,

I haven’t seen gender inequity in my career/  
company/unit/team.

It’s not men’s place to get involved.

This is a women’s issue.

Gender equity movements need men and research has indicated the need for men’s involvement. Men have reported that they feel it is not their place to do gender equity work as they do not feel like they have the experience nor legitimacy to act.<sup>[66]</sup> Evidence has shown that men’s involvement in gender equity was effective and was even more effective than women’s efforts.<sup>[31,67]</sup> When men pointed out other men’s sexist views or remarks, those men felt more guilt and perceived the negative reaction as being more legitimate compared to

when these behaviours were pointed out by women.<sup>[31]</sup> Organizational surveys found that the involvement of men in gender equity work led to an increase in perceived progress towards gender diversity among employees.<sup>[23]</sup> In contrast, research on women’s involvement in gender equity has demonstrated that there are consequences. For example, researchers found that when racialized women tried to create change, they were later penalized with poorer performance reviews in comparison to racialized women who did not.<sup>[67]</sup>

Women’s stories of exclusion, inequity, and sexism can be surprising.<sup>[68]</sup> In the authors’ own experience, men can hear about the experiences of their co-workers who are women in their own backyard or under their watch and respond with disbelief of women’s lived experience as they have not seen it for themselves. Becoming familiar with the experiences of women and members of other underrepresented and marginalized groups will help to make inequities easier to identify while they are happening. Practically speaking, a good starting point is to read published work on men’s allyship to women and on women engineers’ experiences (cited throughout). Shelton<sup>[69]</sup> offers practical insights and strategies for listening and building trusting and empathic relationships with women that puts much of the academic work on allyship into practice.<sup>[20]</sup> In addition, more intentionally observing the workplace interactions around you, including what is said, not said, gestures, facial expressions, and the underlying tone of the room, can be helpful in learning about more subtle cues of inclusion and exclusion. Human brains are very efficient at disregarding or tuning information out, so our allyship group challenges members to be perceptive of conversations, elevator chat, and words spoken, as inequity and exclusion are often covert and easy to miss. In our experience, when men’s allyship group members pointed out inappropriate gendered statements to peers, women colleagues who witnessed such interactions expressed gratitude for the intervention and relief that they were not the only ones recognizing the concern. Core to the development of an effective allyship practice is the recognition of inequity in one’s own workplace and the realization that men are needed in gender equity movements.

## 2 | OUR EXPERIENCE WITH MEN’S ALLYSHIP IN ENGINEERING

In Section 1, we discussed men’s allyship to women, what it is, and why it is needed. In this section, we shift to more experiential and contextual aspects of practicing allyship by discussing our experience with starting a men’s allyship group in a university engineering faculty.

The idea of a men's allyship group was prompted by research that indicated that women (i) tend to participate on committees (including equity, diversity, and inclusion initiatives) above and beyond their primary job duties at a higher rate than men,<sup>[25]</sup> and (ii) receive more student requests for academic and emotional support<sup>[70,71]</sup> as indicated by, for example, greater time spent in office hours with students.<sup>[70]</sup> The additional committee work and student requests add up to significant time and emotional labour.<sup>[71]</sup> Further, this additional work is shared across a small number of faculty members as there is an alarming underrepresentation of women among engineering faculty members—10.4% of engineering full-time faculty members in Canada in 2018.<sup>[72]</sup>

These research findings led the fifth author, also the sponsor and an executive leader, to build a working group bringing lived experience in industry and academia as a woman, professional engineer, leader, and tenured professor. As our sponsor, the fifth author influences the overall direction and goals for the group, identifies opportunities, ensures actions are taken and that progress is made towards goals, and acts as an escalation point for issues that are beyond the authority of the group. Initially, the Sponsor selected a group of faculty members who were men and women to work on equitable and non-biased hiring practices for faculty jobs in 2017. This group introduced leaders and peers to gender inequity, bias, and evidence-based hiring practices through workshops and participation in faculty hiring committees.

Faculty members and leaders who collaborated with the Sponsor on gender equity work identified potential men's allyship group members with careful attention to those who were likely to be open to this learning and work and to creating change. The Sponsor invited potential members to a presentation on current workplace demographics, work underway, and future directions. After the presentation, the Sponsor asked attendees to respond if they were interested in joining. The Sponsor observed that several attendees were aware of gender inequity and wanted to do something about it. The presentation and discussion opened the gates to explore their role in gender inequity and how they might create change. In addition, some men were not sure if their peers shared an interest in this work and the formation of this group brought them together with like-minded peers. The group grew to 16 members and included faculty members, non-academic employees, and managers of student programming at all stages in their career; there are engineers, educators, women's and gender studies experts, and social scientists. Three group chairs lead the regular activities of the group, including training, reflection, discussion, and other group initiatives. The group regularly meets with and is accountable to the Sponsor.

Learning and self-reflection is a key component of those practicing allyship. Initial meetings included a workshop led by a group member and co-developed with the first author. Group members completed an online course prior to the training on gender and gender inequality.<sup>[73]</sup> The face-to-face session reviewed the online course, gendered approaches to engineering research and design,<sup>[74]</sup> and gender inequity and implicit bias. There were excellent conversations and insights at the workshop, perhaps because of a peer facilitator meeting the group where they are at. Group members also attended a full-day course on implicit bias in the workplace and were invited to a learning series on truth and reconciliation facilitated by an executive leader and industrial professor who shares her experiences as a professional engineer and Indigenous woman. The group also holds monthly meetings to continue developing relationships, share research findings, quotes, or short lessons to start discussions on topics related to allyship, and to plan for the future. In addition, prior to their involvement in the group and on a continuing basis, the Sponsor and members are regular guest speakers on equity, diversity, and inclusion topics in courses that all new and graduating engineering students must take.

## 2.1 | Some initial challenges

Our allyship group has encountered several challenges; some were expected, some appeared unexpectedly as the group evolved, and others are ongoing at the time of this writing. First, the group needed to determine '... who we are, what we are trying to accomplish, and how we can get there...', a group formation process often explained using a classic model of small group development (i.e., forming, storming, norming, and performing).<sup>[75]</sup> This effort was impeded somewhat as the group's first meetings coincided with the first wave of the COVID-19 pandemic. All members shifted to working remotely, and until the time of this writing all meetings have been online. While progress on group formation was made by maintaining a regular online meeting schedule, reading clubs, and facilitated visioning sessions, the group is still developing as a collective. The group is comprised of 75% faculty members who must balance their commitments to teaching and research with service on University and external committees, leaving limited bandwidth for reading or individual learning, attending group meetings, or participating in group-related activities. This challenge should not be interpreted as a lack of interest or commitment by the members, but the reality is that the collective desire for progress outpaces its real-world counterpart. If not identified and discussed, these competing commitments would cause frustration among members.



The second challenge that we faced is, in some regards, highly stereotypical for the profession in which we operate. Since engineers are ‘...hired, retained, and rewarded for solving problems’,<sup>[76]</sup> the immediate instinct from much of the group was on swift and specific actions to address gender inequity and faculty hiring. In some cases, for example, participating in recruitment and hiring (as described in Section 2.2), action was evident and welcomed. In the reading club and group discussions, however, two critical lessons were learned: (i) the primary and most crucial action of the group at this point is to learn and understand<sup>[30]</sup> and (ii) single, premeditated actions have been reported to be less effective than continual, in-the-moment actions,<sup>[77]</sup> such as providing support for a woman colleague’s ideas, often called amplifying. As the group is instinctively action-oriented, the authors who are co-chairs of the men’s allyship group refer explicitly to inward-facing actions (e.g., reading, reflection) and outward-facing actions (e.g., participating in committees, organizing workshops) to help balance the focus on both aspects of allyship.

This bias towards action led directly to the third challenge: taking meaningful outward-facing actions while acknowledging that we would inevitably make mistakes. We, as co-chairs, struggled initially, fearing that we would irreparably damage relationships with one misstep. On one extreme, we could take only inward-facing actions, which is low-risk but does not help to achieve any measurable outcomes in stopping gender inequity issues in the Faculty nor does it involve action, a key element of allyship. On the other extreme, we could rush into outward-facing actions without first doing our homework at the risk of practicing ‘performative allyship’.<sup>[78]</sup> Such an approach would be damaging to the group’s vision of supporting women and would negatively impact the success of the work that our group intends to do. Early on, the group discussed sending cards to women on International Women’s Day to honour their hard work and contributions. After numerous false starts and discarded drafts, the group abandoned the idea because many of the recipients did not know the men’s allyship group members personally—what could we possibly say to acknowledge their paths, sacrifices, and challenges fully and authentically? The group efforts are focused on finding a balance between these two extremes and developing stronger relationships with each other and with women colleagues.

## 2.2 | Initial outcomes of gender equity work of the men’s allyship group

Beyond learning and forming the group, the group’s formal initiatives as of this writing have been primarily in faculty

hiring.<sup>[79]</sup> Representatives from the men’s allyship group who sat on hiring committees made several observations over 2 years, and several practices were implemented. On hiring committees, to raise awareness about bias and evidence-based hiring practices to reduce it, representatives actively sought to engage peers in conversations about gender inequity and to establish a responsibility for creating change (practices summarized in Table 1). The group chose this approach following social science research, such as Dobbin and Kalev’s work,<sup>[92,93]</sup> rather than a compliance approach (e.g., formal policies, mandatory training, and leader diversity evaluations) as research to date has shown limited support, citing outcomes such as unchanged attitudes,<sup>[94]</sup> that bias may be activated, and unchanged or lowered representation of underrepresented and marginalized groups.<sup>[93]</sup> Hiring committee chairs engaged in these efforts to varying degrees, with some adopting each practice while others adopted only some of the practices.

One initial observation was that there were few applicants to some positions and that there were few women candidates. Literature reviews suggested we might be missing ‘passive candidates’: well-qualified applicants who are not actively searching out opportunities.<sup>[85]</sup> These candidates comprise up to 70% of the global workforce.<sup>[86]</sup> In addition, research has found that men are more likely to find jobs on traditional job boards and social media, while women were more likely to find them through recommendations from a friend or family member or favourable reviews from past or present employees of the organization past or present.<sup>[83]</sup> Additionally, researchers have found that women tend to apply for jobs when they have all of the qualifications listed, whereas men tend to apply if they have 60% of the qualifications.<sup>[84]</sup> Thus, we knew we needed to do more than post jobs on the university website. As a practical strategy, we piloted the approach of widely sharing job advertisements through faculty members who are involved in equity, diversity, and inclusion working groups, including the men’s allyship group members, as well as typical routes (e.g., hiring committee members networks, faculty member’s networks, university careers website posting). By engaging several faculty members and adopting several recruitment approaches, we aimed to see initial applicant pools with more women without overburdening women faculty to do the needed recruitment.

In addition, to create a more evidence-informed approach to recruitment, we reviewed demographic data of PhD graduates (the primary pool from which we are selecting candidates) and found that approximately 30% of PhD engineering graduates in North America were women.<sup>[89]</sup> Given this research, the allyship group’s Sponsor asked hiring committee chairs to monitor the initial applicant pool for women applicants as gender can

TABLE 1 Men's allyship group members' actions towards gender equity in hiring

Step	Action
1. Overall	<ul style="list-style-type: none"> <li>- Ensure the processes outlined below occur.</li> <li>- As group members know the culture and can meet their peers where they are at, they can create buy-in and increase hiring committee members' understanding of bias and gender equity practices. We find that peer-to-peer interactions influence, educate, and model appropriate behaviours and are more effective than those led by non-peers with a power differential (e.g., human resource professionals). Also, men influencing men is more effective, particularly in workplaces occupied primarily by men, than women influencing men.<sup>[31]</sup></li> <li>- Highlight aspects of the culture that are welcoming to women (and multiple identity groups), such as work-life balance, cultural awareness of gender inequities, and collegial and community collaboration opportunities.<sup>[80]</sup></li> </ul>
2. Job ads and description	<ul style="list-style-type: none"> <li>- Since many new hires relocate, provide information about the organization and city (e.g., parks, cultural events, schools, childcare).</li> <li>- As a higher number of masculine words in job advertisements have been shown to discourage women applicants, share infographics<sup>[81]</sup> and use online tools to achieve gender-neutral language.<sup>[82]</sup></li> <li>- Seek reviewers, especially people with different identities, disciplines, and work experience, as they may notice something the hiring committee did not.</li> <li>- Ask those with human resources and equity, diversity, and inclusion expertise to review.</li> </ul>
3. Advertising strategy	<ul style="list-style-type: none"> <li>- Faculty jobs, especially in niche research areas, can have few applicants with limited diversity and there are differences in job search approaches among men and women.<sup>[83,84]</sup></li> <li>- Share job advertisements in personal, professional, and university networks to increase visibility and reach passive candidates (highly qualified candidates not currently looking for a role, but who are open to the right opportunity).<sup>[85,86]</sup></li> <li>- Post job ads on professional group websites, such as the Canadian Coalition of Women in Engineering, Science, Trades, and Technology (CCWESTT) and the Society for Canadian Women in Science and Technology (SCWIST).</li> </ul>
4. Hiring committee	<ul style="list-style-type: none"> <li>- Those trained in bias and gender inequity (including group members) represent the Dean's office and external departments on hiring committees.</li> <li>- At the hiring committee's first meeting, facilitate a bias in hiring session to learn about it and for hiring committee members to consider how it might manifest for them.<sup>[32]</sup> These sessions were started at the request of department chairs after limited success when delivered by non-peers with power differentials, such as human resources professionals. Peer-led training made it clear to hiring committees that equity initiatives were a priority.</li> </ul>
5. Short list	<ul style="list-style-type: none"> <li>- Given limited evidence for blinded applications yielding more diverse workforces,<sup>[87,88]</sup> we took a peer-to-peer gender bias and inequity awareness-building approach.</li> <li>- Use publicly available data to determine if a well-sourced applicant pool has been produced. For example, women made up 30% of North American PhD graduates.<sup>[89]</sup> For us, applicants can disclose their gender and if the applicant pool has less than 30% of applicants who are women or another gender, we encourage a pause to reopen the posting and further advertise it.</li> <li>- When discussing applicants, shift the discussion order in each round of the process to reduce the potential for groupthink or other group biases.</li> <li>- Encourage members to ask each other open-ended questions to better understand impressions of candidates and explore potential biases.</li> </ul>
6. Interview process	<ul style="list-style-type: none"> <li>- Members on the hiring committee attend casual meetings and have one-on-one meetings with candidates to offer guidance and support as well as to communicate the organization's equity, diversity, and inclusion values.</li> <li>- Introduce candidates to the city (e.g., an appointment with a real estate agent, city tour, meals off campus) and encourage staff to share their love of the city and knowledge of community amenities (e.g., parks, schools, and childcare).</li> </ul>
7. Post-hiring	<ul style="list-style-type: none"> <li>- The Men's Allyship Group will be starting scenario role-playing to more effectively speak to those who are misinformed or critical of gender equity through conversation and discussion that leads to learning rather than reactivity or defensiveness.<sup>[90]</sup> For example, misconceptions and stereotypes, such as women hired solely to increase their representation or to fulfil non-existent quotas (colloquially labelled as a diversity hire). This incorrect assertion will damage a new hire's engagement, self-efficacy, and commitment, potentially leading to turnover (2 million professionals in the United States leave their jobs annually due to unfair treatment<sup>[91]</sup>).</li> </ul>

Note: Please note that this is not a comprehensive list of the hiring process in our faculty. Rather, it represents the processes that the Men's Allyship Group members are involved in.



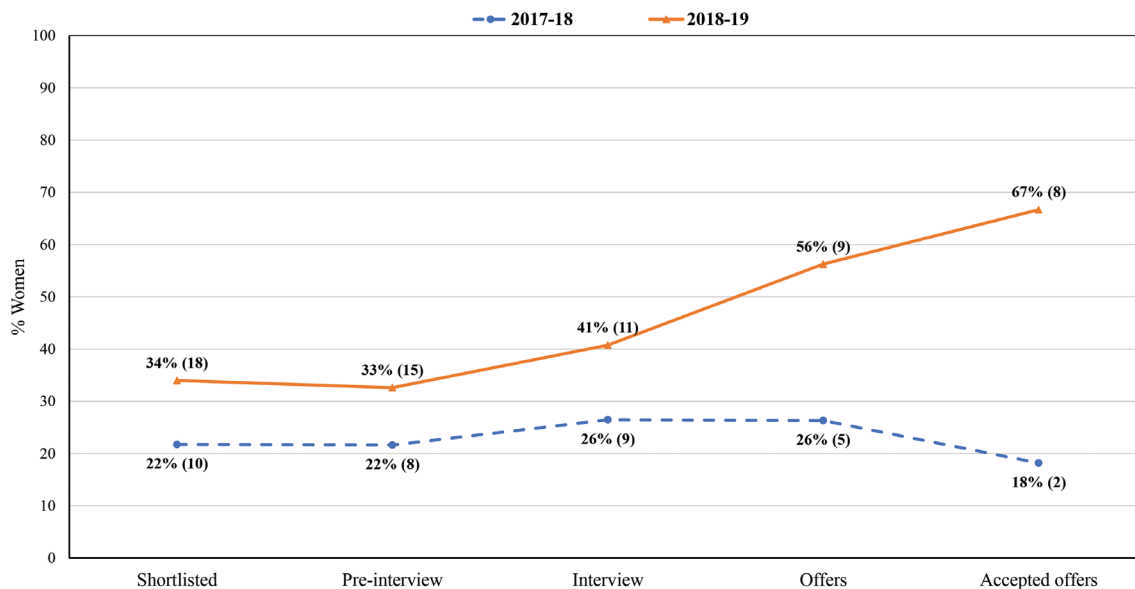


FIGURE 1 Number and percent of women in the stages of the hiring process at the University of Alberta Faculty of Engineering from 2017–2019

be optionally reported (answer options are man, woman, another gender). If the applicant pool has less than 30% women and another gender, applications are reopened, and further advertising is done. At such times, we asked faculty members to send personalized emails to their contacts to forward the job posting to women PhD candidates and post-doctoral fellows. This process is not to be confused with a quota, as our approach aims only to increase diversity in the initial applicant pool. After the initial applicant pool, our procedures outlined in Table 1 aim to reduce the influence of bias and more fully inform candidates of the university and community culture.

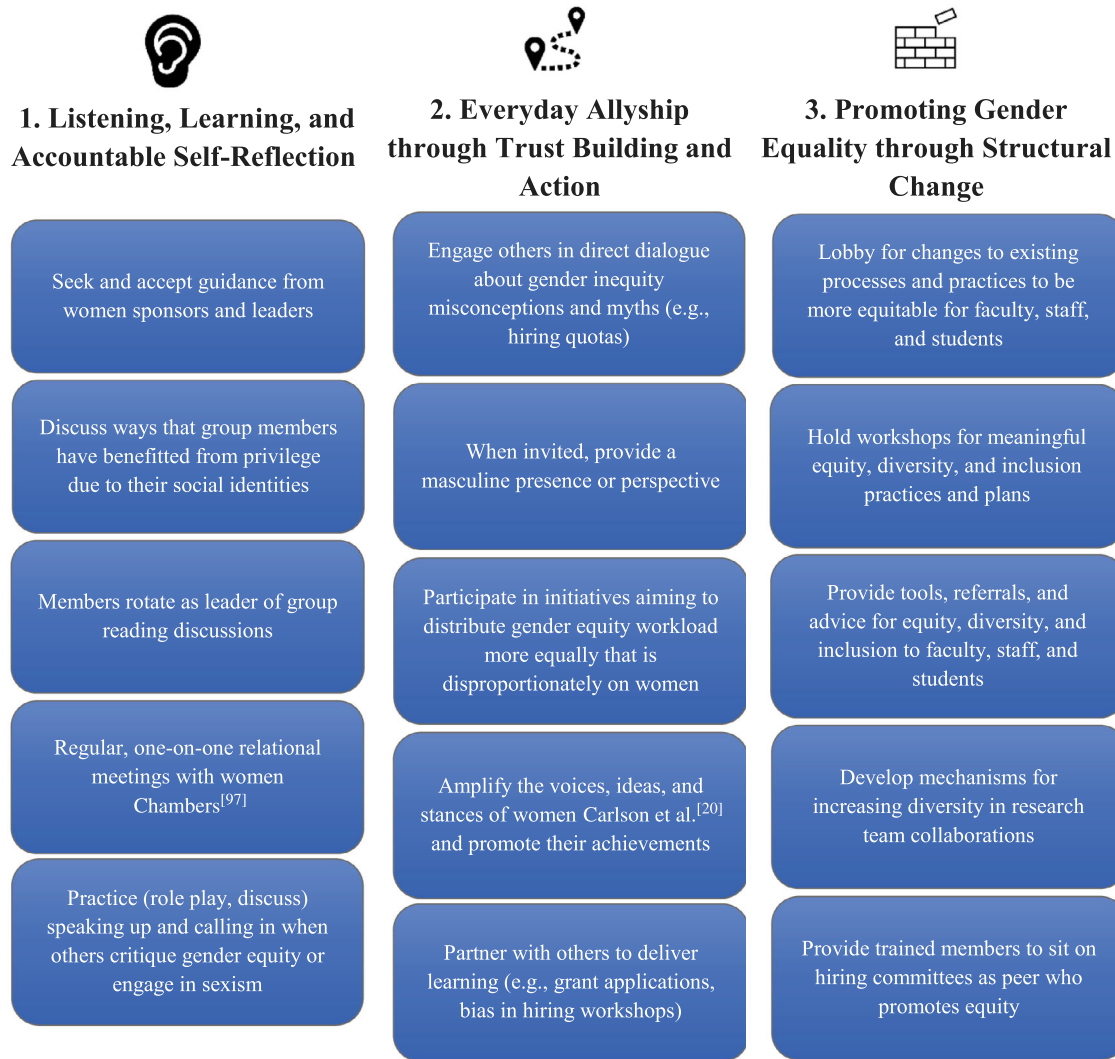
The time invested in these initiatives yielded considerably higher proportions of women at all stages of the hiring process. To track progress, we asked hiring committee chairs to keep track of candidates at each stage of the hiring process, as well as their gender when possible. Figure 1 shows that in 2017–2018, prior to the implementation of these practices, 26% of job offers were to women. In 2018–2019, during the implementation of these practices, 56% of job offers were to women—a 30% increase. While the men’s allyship group has been associated with this quick win, the reality is that the group’s Sponsor enabled this success. As Sponsor, the fifth author sought the engagement of hiring committee chairs, peers on the leadership team, and allyship group members through presenting evidence-based and practical strategies for more equitable hiring. These activities alone do not earn our group members the right to refer to themselves as allies or as an allyship group. As Carlson and colleagues note, ‘...ally is not a self-adhesive label...’ and others must appoint it.<sup>[20]</sup>

### 3 | FUTURE VISION FOR THE MEN’S ALLYSHIP GROUP

Development of short-term goals for the men’s allyship group began with members conducting an extensive review of the literature on gender inequity and allyship in social justice, holding work sessions and discussing readings, and extensive discussions with executive leaders. Figure 2 lists the short-term objectives of the allyship group that are based on the frameworks by Carlson et al.,<sup>[20]</sup> Cheng et al.,<sup>[95]</sup> and Edwards.<sup>[96]</sup> This figure also clusters the group’s activities by theme: (i) listening, learning, and accountable self-reflection; (ii) building trust and providing support: practicing allyship every day; and (iii) promoting structural change. In line with Carlson et al.,<sup>[20]</sup> we value continuous listening, learning, and accountable self-reflection, making the themes and activities under each highly interdependent and often occurring simultaneously rather than in order. For example, a subgroup both facilitates bias training for hiring committees and participates directly in hiring committees (Theme 3), continuing at the same time as Theme 1 and 2 activities.

#### 3.1 | Theme 1: Listening, learning, and accountable self-reflection

In the short term, our primary focus is on providing group members the tools they need to, hopefully, practice effective allyship through listening skills, learning, and accountable self-reflection. Many of these inward-facing activities cannot be delivered through training or telling;



### Anticipated Outcomes and Indicators of Progress toward Gender Equity

- ✓ The group and individual members seek accountability through conversations with each other and others
- ✓ Regularly check in with group sponsors who are women “are we contributing constructively?” and welcome their honest critique and areas for improvement
- ✓ Fewer misconceptions and myths about gender equity are circulated
- ✓ Greater numbers of students are seeking course and personal support from men’s allyship group members
- ✓ Greater numbers of successful national research grants due to equity, diversity, and inclusivity plans (as indicated by university-level feedback)

FIGURE 2 Objectives for developing our men’s allyship group (next 5 years)

rather, individuals must lead their own learning. For example, aspiring allies must learn and come to accept—through self-study, conversation, and group discussion—the ways that we have benefited from privilege, and to develop the ability to recognize the structures that sustain and propagate the continuation of gender inequity. In reading and learning, the allyship group takes an

intersectional lens to gender to better understand the intersection of our own and others’ identities, including (and not limited) to gender, race, religion, and culture. Without this base understanding, it is difficult to see inequity and sexism happening in one’s own workplace.

Additionally, the group members must (re-)introduce themselves to colleagues who are women and create a



trusting relationship to hear their stories. The goal is not to ask, ‘how can we help?’, but to better understand women’s experiences in engineering and in academia. We plan to build relationships through informal coffee/tea meetings as well as more formal relational meetings, where trust can be built to share personal stories about experiences, values, and motivations.<sup>[97]</sup> Members will be trained to facilitate (and participate in) these relational meetings. We aim for members to move relatively rapidly from their initial stances into a growth mindset (‘I can do better.’)<sup>[98]</sup> and a beginner mindset (‘I don’t know everything and might make a mistake, but I’m open to feedback and learning.’),<sup>[99]</sup> and to be well-prepared to help move others out of feelings of fear, defensiveness, and discomfort. In addition, we also aim to build relationships with students and student groups, such as our diversity-focused student group, to help build our awareness of students’ experiences and learn how we can support change at this level. The overall goal of activities in this theme is to develop a committed and self-aware group of men who practice effective allyship.

### 3.2 | Theme 2: Building trust and providing support: Being an ally every day

Theme 2 activities focus on outward-facing actions where group members will use their social positions to speak up and stand up to harmful views and practices. There is strong evidence to show that men are only seen as effective allies after they have stepped into a situation by pointing out gender inequity, or calling in a person whose behaviour is potentially hurtful to a colleague who is a woman.<sup>[16,20,77]</sup> In this theme, many activities ask members to step up and do the right thing, including risking awkward and uncomfortable moments with friends, colleagues, and peers. In this case, allyship lies with the individual and their actions rather than with their affiliation to any group. The role of the allyship group is to prepare them for the moment in which they need to act.

Further, members will be involved in a nascent Trusted Teacher type program where faculty members are trained to engage students who are in crisis (like the Block Parent Program of the 1970s and 80s). While this program is not specifically for group members nor led by our group, the intention is to address (as mentioned earlier) the disproportionately higher amount of work done by women beyond their primary job requirements.<sup>[25,70,71]</sup> By having more faculty who are men trained and identified as individuals that students can seek support from, we aim to help distribute this workload more equally among faculty and ensure faculty are better prepared when students are in distress and need support.

In addition, the men’s allyship group envisions a program analogous to the Standardized Patient Program used universally in Faculties of Nursing and Medicine. These types of programs use standardized patients or actors to role-play scenarios and have improved communication skills over time.<sup>[100]</sup> One study tested experiential learning activities to learn about gender inequity, called the Workshop Activity for Gender Equity Simulation.<sup>[101]</sup> Results showed this activity was found more effective than lecture-based training because it did not provoke reactance, and it built self-efficacy for participants to act for gender equity.<sup>[101]</sup> The purpose of the as-yet-unnamed program is to provide allyship group members the opportunity to develop their ability to respond professionally but forcefully to common situations they will inevitably find themselves in. For example, responding to criticisms of equity, diversity, and inclusion initiatives, as well as when witnessing bullying and sexism.

### 3.3 | Theme 3: Promoting structural change

Theme 3 activities are primarily longer-term and have the goal of identifying policies and procedures that act as barriers to gender equality and then working to change them. We work closely with the Sponsor and fifth author who is on the senior leadership team to advocate for consultation of underrepresented and marginalized groups in policy development and updates. We also communicate with our peers in other faculties to be aware of what other units are doing to promote gender equity. To initiate structural and cultural changes, the allyship group will reach out to, and engage, all newly hired faculty as well as new graduate students and postdoctoral fellows (regardless of gender). The goal is simply to create a connection; the form or format it takes does not need to be planned or specified. It could be as simple as helping a new faculty member to find winter leisure activities, facilitating meetings with senior faculty to develop cross-generational scientific collaborations, or taking a spontaneous opportunity to listen, learn, self-reflect, and build trust.

## 4 | CONCLUSIONS

The practice of allyship by men to women is one mechanism through which change can occur. Gender equity initiatives are needed to increase women’s representation in engineering, engineering faculties, and engineering leadership roles to shift workplace culture to be more inclusive, reduce sexism, and increase equity. Our

experience with creating a men's allyship group deepened our understanding of the complexity of gender inequity, how it manifests, how it involves discomfort and requires relationship building, and how to influence change at multiple levels. As such, this learning is not attained in just one book, one co-worker or family member's experience, or one training course. Many academic theories, research, books, articles, and personal stories need to be explored to understand the complex and systemic aspects of gender inequity and the everyday experiences of women. Practices outlined here, including learning and reflection, educating others, and learning from others' experiences and pitfalls, are all important components of allyship for gender equity. Although extensive learning and action are needed for men who aspire to be allies to women, the hope is that the profession of engineering will be more welcoming to every woman who chooses to study and work in this field.

## ENDNOTES

<sup>i</sup> Trans is an umbrella term describing people whose gender identity does not correspond with their socially expected gender based on the sex they were assigned at birth.<sup>[40]</sup> Gender fluid refers to persons whose gender is on a spectrum and varies on time, for example, feeling more masculine one day and more feminine another day.<sup>[40]</sup> Gender non-binary is an umbrella term for persons whose gender is not man or woman, but somewhere in between or neither. Please note that while we use umbrella terms here, in our workplace we ask and use our colleagues' genders and pronouns.

<sup>ii</sup> Cisgender is used to describe people who identify as the same gender as they were assigned at birth.<sup>[40]</sup>

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