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"A Space of their Own?" Professional Women's Groups in the Alberta STEM Resource Sector

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ABSTRACT

Throughout the life cycle of a geoscience career gender inequalities still exist, even in the face of legislative and societal change. One response in Alberta Canada is the formation of professional women's groups. Drawing on feminist geography, the objective of this research was to explore the social relations and power structures involved within the work environment that categorized where women's groups are created, why they are created, and the strategies used in addressing gender disparities and inequality. This mixed-methods study included an inventory of current groups that exist in Alberta, an online survey to reach professional STEM women within the geoscience community who have been members of one or more professional women's groups, and in-depth semi-structured interviews with three key actors from an Alberta based group. The intended outcomes were to create evidence-based solutions, which in turn will help contribute to concrete solutions to better support professional female geoscientists in Alberta.

KEYWORDS

Gender; Gender Inequality; Gendered Space; STEM; Geoscientists; Feminist Geography

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INTRODUCTION

Recruiting and retaining girls and women in Science, Technology, Engineering, and Math (STEM) has been of growing concern, as the gender gap can be found in the STEM professions worldwide (McKinnon, O'Connell, 2020; Blackburn, 2017; Engineers Canada, 2015; Leaper, 2014; Marasco, 2013; Long, 2011). The metaphor of a 'leaky pipeline' (Weisgram, Deikman, 2015; Blickenstaff, 2006) has illustrated that despite closing gender gaps in educational attainment and workplace entry, girls and women are leaving at critical points along the way. Evidence continues to show that STEM women lag behind men in terms of pay and authority (Nash, 2002; Williams et.al., 2012), and after more than 30 years of efforts, it is evident that the act of recruiting more women into scientific disciplines alone will not change the masculine nature of the STEM working environment (Henwood, 2010). Instead, it is the underlying systemic structures that must be understood and addressed (Ginorio, 2001; Salmun, 2001). Ignoring these structural barriers has severe consequences for professional STEM women, restricts the innovative capabilities and the profitability of STEM corporations, and limits the progression of scientific ideas to the detriment of society as a whole.

A key contribution to this research is the need to account for the spatial and contextual factors that contribute to existing power imbalances. The gendering of STEM workplaces - across the domains of labour practices, cultural norms, and knowledge - contribute to environments in which women continue to feel 'out of place'. Addressing these dynamics through interpersonal support systems and policy changes are essential for creating equitable work environments for women, particularly in traditionally male-dominated resource sectors (e.g., mining, oil and gas, geothermal). One solution has been the formation of professional women's groups. These groups have a long history, but recently, they have been spurred on by Sheryl Sandberg's *Lean In* movement. The research presented will focus on the experiences of female geoscientists in Calgary, Alberta Canada, as they participate in professional women's groups within the geoscience-based resource sectors.

RESEARCH QUESTIONS AND OBJECTIVES

Drawing on feminist geography, particularly the work of Doreen Massey (1996, 1994), this research explores how women respond to gender inequality through their involvement with professional women's groups. The following broad questions structure this research:

- What factors motivate the formation of professional women's groups?
- What are the key challenges faced by organizers and participants?
- What lessons can groups provide to the greater discussion of gender inequality?

Geographically, Alberta can provide an important test case. The study focused on professional geoscientists, such as those educated in - geology, geophysics, hydrogeology, geochemistry, and other earth-based sciences. Alberta has long been dominated by a resource economy, with the city of Calgary acting as the home of many corporate headquarters. Unlike many other STEM professionals who are scattered across Alberta and Canada, a large percentage of the geoscientists are stationed in Calgary. This explains why many of the national headquarters of the relevant professional organizations are also located in Calgary, such as the Canadian Society of Petroleum Geologists (CSPG), the Canadian Society of Exploration Geophysicists (CSEG), and the Canadian Well Logging Society (CWLS); with the effect being that these professional groups are highly concentrated and organized, with several professional women's groups starting up in the city of Calgary over the past decade.

RESEARCH CONTEXT

Ignoring gender inequalities within the STEM professions can have severe consequences to both companies and the progression of scientific ideas to the detriment of society as a whole. A critical need exists for greater participation of women in STEM professions to ensure a diverse future workforce with varied perspectives, questions, approaches, practices, and interpretations (Steinke, 2013). Greater workplace diversity is linked to innovative capabilities (Østergaard et.al., 2011) and diverse workplaces are more profitable (Noland et.al., 2016; Williams et.al., 2014). Diversity and gender are also topics of equity and justice; when environments are inhospitable for women, this, in turn, can affect the long term social and financial security of women and their families. Employers in jurisdictions such as Alberta are subject to human rights legislation in which discrimination and harassment are unlawful. This was enhanced in 2018 when the Alberta Government strengthened its provincial Occupational Health and Safety Act (Government of Alberta, 2018). Unfortunately, the Alberta resource sector has a long history of ignoring these topics.

While women face barriers across all STEM careers, mining and resource development have a long-standing narrative as 'men's work' (Perry-Sizemore, Maclaughlin, 2016; Smith Rolston, 2014). Within these masculinized gendered spaces, it is then only women who are seen to have gender and gender is only ever discussed as a problem for women - including in Alberta (Laplonge, 2014, 2013). Miller (2004) linked the Alberta resource industry with the provinces' traditional relationship to the rugged individualism of the cowboy. Success in this harsh frontier environment required toughness and tenacity, and these qualities, which were originally required of ranchers and hired hands, are still admired and have left cultural imprints and expectations that are gendered male and not female (Miller, 1998). O'Donnel (2000) presented an examination of the experiences of Alberta female geoscientists from 1914 – 1999. Barriers still included the predominance of lasting workplace cultures such as 'old boys' clubs or 'buddy systems', lack of advancement for women, as well as a lack of equal pay and benefits. The study identified that success was highly dependent on women's individual circumstances, and solutions (such as access to childcare or elder care) were being made on a situation-by-situation basis, in response to factors that they themselves could

control. The women also found solutions to personal and professional barriers through volunteer opportunities within their communities and professional organizations. These individual solutions in the Alberta resource sector in the late 1990s were in part a result of a lack of collective solutions towards gender discrimination. O'Donnel's (2000) research provides preliminary indications that volunteerism could be used as a strategy to improve women's gendered experiences. We will now discuss the theoretical framework that guided this present-day exploration of persistent gender inequalities for women geoscientists in Alberta.

THEORETICAL FRAMEWORK

Numerous literature reviews paint an accurate picture of the current and historical challenges faced by women throughout the STEM career journey (Blackburn, 2017; Nunn, 2016; Castillo et. al., 2014; Nentwich, 2010; Schiebinger, 1999), including the resource sectors (Williams et.al., 2014, 2012; Clancy et. al, 2003; Phillips, Hausbeck, 2001). Dominant solutions since the 1980s have concentrated on Women in Science and Engineering (WISE) style recruitment campaigns, with a narrow focus on women's 'choices', understood to be constrained by a lack of information about scientific and technological work and by a masculine image of 'who should be a scientists' (Henwood, 2010). This is combined with an overriding assumption that both science (Pollitzer, 2019; Harding, 2001; Haraway, 1991) and STEM working environments are 'gender-neutral' (Acker, 2012, 1990; Williams et.al., 2012; Domosh, Seager, 2001). Yet the overall numbers of women working in STEM, both in Canada and worldwide, have changed little in 30 years.

The underlying structures shaping the environments STEM women must navigate within their day to day lives, are limited from view, in particular how power operates within the intersections of space (Staeheli, Martin, 2000; Massey, 1996, 1994; Rose, 1993). Key to this discussion is gender – complex, relative, cultural, and *not* binary; but gender does not exist on its own. Women are positioned based on a multitude of identity factors, neither mutually exclusive nor separate from each other (McDowell, 1997). Intersectionality, a concept originally coined in the 1980s by Black feminist and critical race theorist Kimberlé Crenshaw, is a central aspect in the examination of the role of place and intersectional relations, and intersectionality itself is a spatial concept (Mollett, Faria, 2018). Place not only shows the variability of intersectional relations but also contributes to configuring them (Rodó-de-Zárate, Baylina, 2018). Through examination, these intersectional relations can rationalise why, as individuals and/or collectively, we may view ourselves differently or behave contrarily within the spaces and places we inhabit (Forsberg, Stenbacka, 2017), as well as who is welcome and who is excluded within a space or place.

Through a feminist geography lens, this paper will identify and explore three spatial and contextual factors: the gendered division of labour, cultural social identities/norms, and gendered knowledge. Part of this process includes understanding the gendering of paid versus unpaid labour.

Gendered Division of Labour

Sex-based occupational segregation includes navigating the construction of social, geographic, economic, and symbolic boundaries (Hanson, Pratt, 1995). Current corporate structures are based on a historical gendered expectation of unpaid labour to support paid work, with an assumption that an employee has a 'helper mate' at home (Spain, 1992). In essence, corporations are structured on a 'two for one'; paying for one employee gets two workers. Mothers are expected to be the stay-at-home helper mate and penalize those who are not, while in contrast men are expected to be productive workers but not fully involved parents (Sallee, 2012). This system creates a barrier for women to work within the workforce, instead expecting women to contribute to 'unpaid labour' in order for a worker to work long hours. Yet if men are engaged in the domestic sphere, they are praised, even rewarded (Cahusac, Kanji, 2014; Sallee, 2012). If a female worker decides to combine motherhood and working, this is generally presented as a split of loyalties (Cahusac, Kanji, 2014). Norms surrounding the 'ideal worker' privilege those who will 'go the extra mile' to help improve the organization's performance (Banihani et.al., 2013). It is assumed that working mothers cannot do this. Individuals who do not comply with the ideal worker image may have to put in extra efforts to demonstrate engagement in the workplace. Banihani et.al. (2013) show that these highly engaged women with young children experience high levels of burnout. For many women, this 'double duty' comes mid-career and is magnified as they are 'sandwiched' between caring for children and elderly family members. This can be a challenge for women geoscientists since many women in the STEM professions are more likely than their male counterparts to be a partner in a dual STEM careered family, resulting in negative career consequences for dual-career STEM couples (Juraqulova et.al., 2015). The gendered expectations within the intersections of the work and domestic spheres are often driven by the cultural expectations of gendered norms and identities.

Culture, Norms, and Identity

Culture and atmosphere in a workplace can substantially contribute to a workplace's appeal. Studies have shown that by deliberately managing corporate culture, organizations can attract and retain highly skilled employees (Trubswetter et.al., 2015). But the same cultural norms and social expectations that lead to a gendered distribution of responsibilities within the home, continue to reinforce existing gender biases in the workplace (Trubswetter et.al., 2015). Expectations around behaviour in place are important components in the construction, maintenance, and evolution of ideological values, dictating an expectation within place and creating power that has the ability to make rules for others (Creswell, 1996). Feminist geographers tie the gendering of space to the greater conversation of how space and places are structures within a 'normative' landscape – where there are ideas about what is right, just, and appropriate here - but not there (Creswell, 1996). For women, there are still spatial constraints within space – including workspaces, where women do not have the same freedom as men to move in space, or organize it, and have limited power to change the various structures on their lives (Peet, 1998). Heavy demands on women at work and at home create multiple tensions and identities within women's lives and in the labour market in general, tensions that are often resolved by the women and their families

on an individual basis versus collectively as a greater society. This suggests that the tensions are not always socially visible, reinforcing social assumptions that masculine career trajectories are the norm (Gonzalez Ramos & Verges Bosch, 2013).

Gender inequalities are lived and considered as habit and are enacted as embodied everyday practices (Valentine et. al., 2014). Valentine et. al. (2014) explains how through this repetition, the ordering of difference becomes the norm, and can create consequences where power structures – such as patriarchy – operate in and through particular spaces to systematically (re)produce what are considered traditional 'gendered norms'. It is through this repetition of behaviour that workspaces produce and stabilize as continuous masculinist space. The gradual entry of women into non-traditional occupations has led to a focus on embodiment and specifically the gendered nature of 'natural' capabilities (Valentine et.al., 2014), where this entry is not part of the dominant 'gendered norm'. Feminist geographers explain that in spaces where 'maleness' has been granted the status of 'normal', the social relations that ensue (e.g. patriarchy/sexism) may also be regarded as natural and therefore enduring (Dixon, Jones III, 2015). By deconstructing the current 'norms', we can see a richer woven fabric of current expectations of 'space and place' as society produces space and space reproduces society; where the feeling of being 'in place' is structured within an awareness of being 'out of place' (Creswell, 1996). A group may have to experience some geographical transgression before realizing that boundaries exist. The act of transgression is important because it breaks from 'normality' and puts in question what was previously considered 'natural,' 'assumed' and 'taken for granted' (Creswell, 1996). Creswell (1996) explains that when we become aware of one's position, one can then become aware of others in different positions. Change often cannot happen until agents can *put a name* to the action. For example, a male worker may not realize that their actions are sexist until they have a daughter, and the same acts happen to her. They then see the act of sexism through their daughter's eyes.

While harassment and discrimination legislation has been targeted towards preventing blatant forms of gender prejudice, day to day sexism still persists and can manifested in more subtle ways, including within geoscience (Sexton et.al., 2020). The topic of sexism is often dismissed as 'a problem from the past' or 'that may happen in other cultures, but not here'. When subordinate agents are unable to identify subtle sexism, they often deny experiencing gender prejudice, instead blaming negative experiences on their own personal shortcoming, e.g., as a lack of confidence or insecurities (Valentine et. al., 2014). Traditional, so-called 'common sense' arguments about 'natural' embodied gender differences remain a socially grounded way of seeing. By denying sexism in this way, it can serve as a strategy for women to protect themselves, enabling them to maintain a sense of personal control and a feeling of 'being' in an otherwise unwelcoming environment (Valentine et.al., 2014). Ahmed (2015) explains how attitudes and actions are institutionalized, a pattern that is established through use, so much so that it can be reproduced almost independently of individual will. Often individuals are encouraged and rewarded for participating in sexist culture, including women who can be complicit in its (re)production (Valentine et.al., 2014). Ahmed (2015)

explains that to address the act of sexism as inappropriate, it acquires a social and physical density, then making it a *tangible thing – it needs to be named*. Even in institutions where diversity and inclusion are top of mind, prominent uninviting cultures can still be present. Ahmed herself, a feminist scholar, stepped away from her academic position due to exhaustion from constant negative responses to the knowledge that she has produced. This leads us to the third spatial contextual factor, gendered knowledge.

Gendered Knowledge

Feminist theory explains that mainstream knowledge is produced by men; placing masculinity as privileged over the feminine. The patriarchy is based on male control of dominant social structures, and the exclusion of women from positions of power through means such as direct discrimination, socialization, and the gender division of labour (Bowling, Martin, 1985). To describe knowledge as masculine is to refer to particular systems that serve to legitimize and privilege knowledge created by men and is broadly constructed through processes that iteratively inscribe masculine practices, rituals, and performances as normative (Nunn, 2016). This masculinization of knowledge is then privileged knowledge that is produced through hegemonic systems that privileges a particular human figure and is intricately connected to historical traditions of masculine domination in the academy (Nunn, 2016; Harding, 2001; Haraway, 1991). This can be perceived in its neglect of women's experience and its adoption of paradigms built on assumptions of competition and hierarchy (Bowling, Martin, 1985). Feminism has in many instances changed the content of human knowledge (Del Giudice, 2014; Schiebinger, 1999). Feminist Science Studies identify aspects within science that are missing the 'feminine' – from domestic spaces and reproductive labour, and on how women physically conduct science. As more women enter academic fields, knowledge will continue to reflect their experiences and concerns, expanding scientific knowledge overall. Yet the scientific career journey for many women in STEM can require individualised gendered based negotiations.

Due to the general masculine culture within the STEM disciplines, men often have a smoother career progression than women (Leslie et.al., 2015: Mott, Roberts, 2014; Crang, 2003). Scientific research is designed on an apprenticeship style system (Bowling, Martin, 1985). Men tend to be able to establish stronger and wider networks, mentorships, and sponsorships compared to women, which enables them to secure further placements within their careers (Moss-Racusin et.al., 2012; Šadl, 2009; Hanson, 2000). Some women in science may never get the chance to work with, work for, or be mentored by another women scientist. Women scientists can experience a feeling of isolation and may have to take on what seems like male values or a 'masculine rationality', both consciously and subconsciously, in order to participate in the science community (Bowling, Martin, 1985). These gendered relations can cause some female scientists to leave their identities as 'a woman' behind (Mackenzie Davey, 2008; Manorama, Walters, 2001) for fear of being 'pushed out' if they do not 'fit' the current social norms. To 'fit in' to the scientific culture that exists, women may have to play a 'role' or assimilate.

Assimilate vs Separate

Current societal pressures are directed at women to find ways to 'fix their behaviour' to 'fit' or *assimilate* into current work cultures and attitudes. This approach was popularized by a TED talk given by Sheryl Sandburg, which was later published in her bestselling 2013 book Lean In*.* Drawing on her career at Facebook, Sandberg's dominant narrative was to challenge professional women to figuratively '*lean in'* to their careers by transforming themselves in order to fit into and succeed in a male-dominated environment. The decision to 'play a role' and/or assimilate ties into the topic of professional women's groups, as one strategy presented by Sandberg was for women to create what she coined *Lean In Circles*.

> "Lean In Circles are small groups who meet regularly to learn and grow together, and they're changing lives. Women are asking for more, stepping outside their comfort zones, and leaning in." (Lean In, 2018).

Sandberg and the *'lean in'* movement she created have come under numerous criticisms. In general, her *'lean in'* approach emboldened women towards aspirational personal qualities often deemed 'masculine'. Women are encouraged to be and to think more like men; women are, in a sense, deficiently men (Jackson, 2017). Society assigns a lower cultural value to anything considered 'feminine' (Whippman, 2019). As such, women are culturally socialized to avoid traditionally categorized 'feminized' behaviors. Whippman (2019) states: *"We (in turn) barely question whether the male standard really is the more socially desirable or morally sound set of behaviors or consider whether women might actually have had it right all along."* When addressing many of our current social and political problems, Whippman (2019) questions if these very issues were created - less on a lack of 'assertiveness' style traits in women, but more by the over-assertiveness and overconfidence among men. Instead of policing women to meet 'male standards', we should strive to train men and boys to aspire to women's cultural norms and selling those norms to be both default and desirable (Whippman, 2019).

Secondly, the overall movement was designed for a certain kind of professional, the unequivocally heterosexual, able-bodied, middle-class white corporate women in Western cultural expressions who have support systems within the home setting (Jackson, 2017). This lack of an intersectional lens, combined with giving little recognition to women who live in poverty, those who have no access to education, and/or those with little to no support system (Broadley, 2013) leaves many women behind. Additionally, Broadley (2013) points out the lack of acknowledgment of the added barriers for women in underrepresented fields, such as STEM, where women incur additional barriers due to the masculinized nature within STEM culture. Sandberg herself addressed some of the tensions after the death of her husband within a second book written in 2017 called Option B – Facing Adversity, Building Resilience and Finding Joy. Sandberg admits that when she wrote Lean In, she did not know how hard it could be at work when you are overwhelmed at home (Sandberg & Grant, 2017).

Others criticize the book's emphasis on individual actions. Both Jackson (2017) and Rottenberg (2013) argue that the success of Sandberg's '*lean in'* approach is tied to

neoliberal feminism, where the feminist subject accepts full responsibility for her own wellbeing and self-care. This neoliberal direction of individualistic action is consequentially displacing what liberal feminism has fought for in social or collective justice. As such, the neoliberal feminist subject is thus mobilized to convert continued gender inequalities from a structural problem into an individual affair; women are the problem and the solution (Rottenberg, 2013).

Whereas (neo) liberal feminist assumptions about equality lead to strategies of assimilation, where the integration of women into private and public spheres is considered to be an inherent good, *separatist* strategies present another option. In an analysis of the conditions that supported the rise of liberal feminism, Freedman (1979) found that women-only groups and spaces can play a key role, with the importance of "female institution building" as a way of integrating feminist strategies into existing cultural patterns. Echoing Virginia Woolf's 1929 essay assertion that women need a *'room of one's own'*, Freedman (1979) identified lessons that can be learned from separation as a political strategy. She suggests that when women tried to assimilate into male-dominated institutions, without securing feminist social, economic, or political bases, the movement lost the networks which had made the suffrage movement possible: *"Women gave up many of the strengths of the female sphere without gaining equally from the man's world they entered." (*Freedman*, 1979, pg. 254)*

Ultimately, individual success for some and not others does not bring the full movement forward. This individuality can just as easily be a target, weakening the greater movement towards gender equality. Women are stronger together, and the act of institution building could be an asset.

RESEARCH METHODS

This mixed-method study was conducted in three phases: 1) An inventory of professional women's groups was complied, where geoscientists might be members, as a way to comprehend the landscape of these organizations in Alberta and to assist with participant selection. 2) A survey was developed and administered to better understand the experiences of professional geoscience women who were members of professional women's groups. 3) Three in-depth semi-structured interviews were conducted with key actors who organize a grassroots professional women's group.

The Inventory of Groups

The inventory of professional women's groups with a presence in Alberta included an investigation into the available mission statements and group histories. This investigation revealed that groups can be found in both the private and public setting, can range from being newly established to being over a century old, and have a range of membership sizes from just a few members to thousands. Some groups function and reside within a physical space, while others exist more virtually. Membership and/or participation can be fully open to the public and free, while others restrict access based on varying criteria, and some require paid membership. These factors contributed to whether or not the groups could be

located, and many had to be found through snowball sampling. In total 89 groups were identified.

Overall, the groups can be broken into two types: The first can be classified as 1) *Institutional Groups* (or top-down); which can be divided into three categories: a) *governing bodies/professional organizations*, b) *universities/colleges* or c) within *corporations* where STEM women work. This third category of institutional groups is often referred to as *Employee Resource Groups or ERG's*. The second type can be classified as 2) *Community-Based Groups* (or bottom-up), referring to those created through not-for-profits, charities, or community-based initiatives. Within this style of group, two categories were apparent: *a) international and national,* meaning the group had a presence both in Alberta and elsewhere, *b) grassroots, Alberta-based groups*. The participants acknowledged a total of *21* different groups that they had been members of with many being members of more than one group.

The Survey and Semi-Structured Interviews

For the surveys and interviews, sampling was purposive, meaning the focus was on women in Alberta who worked or were working within the geoscience work environment, and who had or were a member of a professional women's group. In Alberta, the geoscience and engineering professions are registered with the professional regulator APEGA (Association of Professional Engineers and Geoscientists of Alberta). In 2016, APEGA had 76,423 members, of which only 15.2% were women (engineering and geoscience), approximately 1100 of these members were professional women geoscientists (APEGA, 2016), but not all of these women belong to a professional women's group. The groups may also have members who are currently non-practicing professionals therefore not included in the APEGA membership numbers. Most of the groups themselves have a much smaller membership size. For comparison, in 2020 AWSN (Alberta Women's Science Network) had 158 STEM professionals subscribed to their newsletter, not all would be geoscientists or women. Meanwhile, the GeoWomen, whose members are mostly women geoscientists, had 249 subscribers on their list. As such, these women can be difficult to identify and locate. For the survey, potential participants were found through 3 strategies: 1) To approach groups through contact information gathered during the group list inventory. Three groups replied and agreed to distribute the survey to their members. 2) To attend professional STEM women's group's meetings; two groups accepted the invitation. 3) To distribute the survey through the researcher's own network. As such, 200 STEM professionals were contacted through blind copy email and the survey link was advertised through social media channels such as Facebook, Twitter, and LinkedIn. LinkedIn would have had the greatest distribution to potential professional participants. The researcher has over 500 professional connections, most are within the resource sectors in Alberta. The link was advertised on social media twice a week in the months of May and June in 2017. Three professional women's groups also used LinkedIn to help publicize the survey link.

The survey was organized into three sections and included both fixed and open-ended questions: 1) consisting of questions on gendered attitudes, 2) concentrated on the structure, execution, and location of the women's groups in Alberta, 3)

focused on the participants' work and family life and their own personal experiences within the geoscience work environment in Alberta. In total, 73 participants started the survey; 66 agreed to participate after reading the consent form. Fifteen of the participants had not been a member of a professional women's group and did not qualify to participate. Seven more chose not to continue. Though 44 participants started the survey, 14 elected to not finish. In total, 30 participants finished the survey in full. Using Statistic's Canada categories, the participants identified as predominantly white (80%), but also South Asian (10%), Southeast Asian (10%), and Aboriginal (6.67%). Note: two geoscientists contacted the researcher directly and indicated that, due to signing confidentiality clauses in advance of filing workplace grievances, they could not participate. Three in-depth semi-structured interviews were conducted with select participants who organize a grassroots professional women's group. In the interviews, two participants identified as being white and one was Southeast Asian. All participants had a post-secondary education with a background in the geosciences, with a majority (70%) being in their mid to late careers (10-20+ years). The analysis was based on the 30 fully completed surveys combined with the three in-depth interviews and the group inventory investigation.

RESULTS

Why Women Join

In the survey and interviews, the participants expressed a multitude of reasons for joining a professional women's group, with many joining more than one group. Three predominate themes emerged. The first theme focused on the women themselves, as joining any women's group was seen as a way to network and socialize (survey 97%, interviewees 100%) – including to assist in finding mentorship and/or sponsorship, to help build self-confidence, and to combat isolation. A quote from an open-ended survey answer: "(Membership to these) organizations have given me the confidence to speak up for myself in the workplace, and not simply accept current attitudes." When ERG's were formed within institutional settings, these spaces provided an atmosphere to help combat isolation, as often the women were one of only a few within their working group or in a division. Meanwhile, community-based groups were often found to support women who were currently taking a leave, were unemployed, or had recently graduated. For professional women who were 'the only' woman in a company or within their STEM working environment, creating an institutional or ERG type group was impossible. Instead, many of these women joined community-based groups. A second theme focused on work-related topics, such as finding employment (survey 63%, 1 of 3 interviewees), taking soft skilled training (survey 40%, interviewees 100%), and to gain professional development hours (survey 43%, interviewees 100%). Women could find support on all three of these work-related topics through larger institutional groups (such as governing bodies like APEGA and alumni University/College women's groups) and through community-based groups, while ERG's could only focus on the last two topics. A final major theme for joining any of the groups was to organize gender-sensitive policies (survey 20%, 2 of 3 interviewees). The groups and the women faced a variety of challenges.

Challenges Facing the Groups

Five major themes were identified from the survey participants/interviewees who indicated that they had played active roles in the formation or governance of one or more women's groups (survey 43%, interviewees 100%). Themes included: 1) The recruitment, retainment, and engagement of volunteers and members could be frustrating and time-consuming, as the act of joining or volunteering with a professional women's group was often secondary or tertiary to work and home responsibilities. 2) Internal politics – between the women themselves and within the organizations. The women expressed how at times the group's goals and the women's expectations did not always align. For example, the research found that the formation of ERG's within institutional settings can help reshape working environments. But the women warned that these benefits can only happen if the women have a space to be heard. A quote from an interviewee: *"The larger companies may have larger interest groups such as ERG clubs, where employees can network and meet and have mentorship style discussions. But I think within the corporate setting, women may not be able to speak freely."* 3) Both the securing of financial support and a physical space to meet can be time-consuming and complicated. 4) The perception that membership to a women's group could be seen by some as a negative. The geoscience women found that they often had to justify or legitimize the group's existence and that membership could be perceived as not as important versus membership in, for example, technically focused groups. A quote from an open-ended survey answer: *"Joining these groups can attach stigma, has the potential for you to be perceived as self centred and focused on political issues rather than the job."* There are women's groups in Alberta whose membership goes beyond STEM, such as the Young Women in Energy who have over 4,500 members of all backgrounds within the energy sector (EnergyNow Media, 2020). A survey participant mentioned that the non-STEM members of this group seemed to be able to advertise their engagement more than the STEM member, such as geoscientists. This may be tied to the masculinized nature of the geoscience work environment. 4) Participants in both the survey and interviews expressed that the groups needed more men to be involved, as topics on gender inequality are not being addressed within the working environment or beyond. Despite these challenges, the participants appreciated the space these groups provided to discuss a variety of gender-sensitive topics – including individual and collective solutions.

Individual Versus Collective Solutions

The women expressed an improvement within their working environments. When asked 'I see career development opportunities for myself', 67% of the survey participants replied agree or strongly agree. The women have also witnessed good gender relations. In the statement 'At the companies I have worked for, I have observed respectful working relations between men and women', 73%, answered agree, or strongly agree. Seventy-three percent also indicated that in the companies they have worked, gender issues had been well integrated into workplace training. Despite these positive indicators, many STEM women question if they should stay in their professions. Shockingly, *over half* of the survey participants indicated that they have already left or are thinking of leaving. Many gendered contextual factors, barriers and individual solutions recognized in the

present day are not much different than what Miller (2004, 1998) and O'Donnel (2000) had described 20+ years before. The women still face gendered consequences as they navigate their domestic and professional lives.

The survey results showed that 63% of the participants indicated that the geoscience work environment was sexist, while 20% answered that they did not know. Yet 90% answered agree or strongly agree with the statement: 'Gender stereotypes and discrimination occurs within the geoscience community'. Companies may believe that their work environments are gender-neutral, yet the survey findings express that women experience more barriers than their male counterparts, with 73% of the participants answering that they "did not believe men and women geoscientists, with equivalent levels of training and experience, have equal opportunities for promotion". The majority of survey participants (93%) felt that female geoscientists were less likely than their male colleagues to reach leadership positions and that the decisions on who should be promoted can be highly gendered. Meanwhile, 60% of the participants responded that they "did not believe that men and women geoscientists, with equivalent levels of training and experience, receive equal pay'. Women participants in both the survey and interviews communicated how, at times, they had to 'play a role', or suppress who they were to fit in. Others expressed how they had to act in ways that were 'unnatural' to them. A quote from an interviewee *"You can 'Lean In' if you speak the language of the company, and if it is a male-dominated company/culture, you speak a male-dominated language."* The women identified a lack of female mentors and supervisors and acknowledged challenges to creating meaningful relationships with male counterparts, restricting knowledge production and creating an unwelcoming environment. Others expressed a lack of access to experiences, such as fieldwork, with access denied due to a lack of facilities or safety gear - designed based on male bodies. This was despite the fact that these types of experiences are highly beneficial to STEM professionals within their career path. For others, the work environment could be dangerous, creating gendered relations that promote harassment, discrimination, or worse. In the survey, almost half of the participants, 47%, indicated that they had experienced sexual harassment within their working environments.

When work and the domestic were combined, the STEM women expressed how societal expectations still place a larger burden of both child and elderly care on women, adding an emotional dimension as these women navigate their personal and professional lives. Not only was this tension emotionally taxing, it was leading to both burn out and financial burdens. A quote from an interviewee:

> *I have a brother; this is his mother. On Sundays, he picks her up at say 2-3 pm and brings her back at 7 pm. This is nice, but that is it. He does not help financially. No, no, no. It is falling on the women. He says that he might get laid off…I was laid off. Whatever. He has none of the mental load.*

Without collective solutions, women can be forced into constructing self-solutions. Sixty percent of the survey participants and all three of the interviewees described working environments without adequate policies and/or supports. The research

identified two situations where the women had to write their own company policies – one on harassment and the other on maternity/parental leave.

When trying to navigate the challenges of a gendered working environment, two diverging approaches were identified in varying capacities. They sit within the themes of '*Fix the women vs Change the Culture'.* Within the first approach, there was a push directed at women to find ways to 'fix' their behaviour to 'fit' (or assimilate) into the current male-dominated environment. This ties into the *'Lean In'* theme of self-solutions. An interview participant explained a strategy she had heard:

> *So, if you Lean In, and you earn money, and that income is enough to pay for say, a cleaning person and childcare, etc., then you are paying for your own Equity. Your earning potential has bought your power within the relationship in your home.*

Other women tried to control their working environments through tactics such as precarious consulting work, finding their own childcare options, and using holiday time/self-funding for professional training. Though participants had found the assimilation style strategies beneficial, these approaches were not igniting change. A second option was to organize (or separate) in order to challenge underlying structures affecting workplace culture. The survey participants themselves expressed the need for this, two quotes:

> *I would love to see my professional organization, or our technical societies push the agenda on promoting and retaining women in our industry.*

> *Groups need to have greater influence but that means that they must be more action-oriented rather than just providing platforms for discussion.*

For many geoscience women, joining professional women's groups offered options that fall within these two approaches, assimilation or separation, while others are helping the groups to evolve over time. Participants identified that they had been members of more than one group, with many helping in group creation and governance. This spreading of volunteer time has allowed for knowledge sharing and collaboration. The group inventory investigation identified that Alberta has an advantage in that the professional STEM women's group landscape has been around for over 30 years. There are indications that some groups, in both settings – institutional and community-based, have changed over time. Two great examples are WISEST (Women in Scholarship, Engineering, Science and Technology, an institutional group at the University of Alberta) and AWSN (a provincial community-based group). Historically both groups' approaches would have been similar to the traditional WISE style recruitment campaigns, but more recently the strategies have shifted to structural inequities, collaboration and inclusion, with both acknowledging an updated understanding of gender, gendered relations, and intersectionality (AWSN, 2018; WISEST, 2018). As more women's groups in Alberta pop-up, they are forming their strategies based on the learnings from the groups that have come before them.

DISCUSSION

Women's Groups – Assimilate or Separate

Alberta geoscience women have a history of finding self-solutions to tackle gender inequality, including through volunteer opportunities within their communities (O'Donnel, 2000). It is then not surprising that these women would join or start a professional women's group as a strategy to tackle gender-sensitive topics individually and/or collectively.

The groups identified in the inventory investigation fall into one of the two camps of *Assimilation vs Separation*. Many of the institutionalized ERG type groups had a tendency to be more focused on supporting women to 'fit' into current corporate cultures, versus using the platform and the information provided by the members to help create systemic transformations. Meanwhile, many of the grassroots community-based groups were better located to be action-oriented to influence greater systemic change. The community-based groups also allowed for a space away from the working environment and could bring knowledge to the women that they may otherwise not have access to; examples included legal advice around maternity/parental leaves, wrongful dismissals, and occupational health and safety rights on harassment in the workplace.

Over time, groups are evolving, while many new groups and initiatives are starting from an intersectional lens, bringing into view identify factors and experiences both intertwined and beyond gender – from anti-black racism, indigenous knowledge, to accessibility. This intersectional approach allows outreach and advocacy to be structured on societal inclusivity and systemic change versus trying to make people 'fit' into outdated societal norms.

Regardless of which approach the women, or the groups, take (assimilation or separation), one common overarching theme was clear. Both options play into the neoliberal notions that put the onus on women to make change; women are the problem and the solution - with both paths having women in the position as their own advocates. A task that, without support, is daunting. A quote from one of the interview participants rings true:

> *When change happens, it comes from those who have to change. Going back to all the anti-racism work I have done; it is about power. Whoever has the power, they have to give up power.*

Marginalized groups can only push their agenda so far. The greater movement needs allies. But change must happen within all parts of society, including within governing bodies and corporations. The push must come from not just those with power, but those with power who will lead.

CONCLUSIONS

Without collective solutions, STEM women are forced into constructing self-solutions within both their domestic and working environments. For women geoscientists in Alberta Canada, this included the formation of professional women's groups. These groups were positioned through two settings: Institutional (or top-down) and

Community-based (bottom-up). Professional geoscience women join these groups for a variety of reasons; including to network and socialize, to find mentorships/sponsorships, build self-confidence, and to combated isolation. The women also joined as a way to job search, acquire soft-skilled training, to gain professional development hours, and to organize gender-sensitive topics. Groups faced a variety of challenges, including recruitment and retention, internal politics, securing both financial support and a physical space to meet, legitimizing the group's existence, and finally needing male allies to help ignite systemic change.

Two diverging approaches were identified in varying capacities. They sit within the themes of '*Fix the women vs Change the Culture'.* Within the first approach, there was a push directed at women to find ways to 'fix' their behaviour to 'fit' (or assimilate) into current male-dominated environments. As such, women tried to control their domestic/working environments through tactics such as precarious consulting work, finding their own childcare options, and using holiday time/self-funding for professional training. Though participants had found the assimilation style strategies beneficial, these approaches were not igniting change. A second option was to organize (or separate) in order to challenge underlying structures affecting workplace culture.

Regardless of which approach the women, or the groups took (assimilation or separation), one common overarching theme was clear. Both options play into the neoliberal notions, presented by cultural phenomenon's such as *Lean In,* that put the onus on women to make change; women are both the problem and the solution. Marginalized people can only advocate and push the agenda of equality so far, they need allies. Both governing bodies and STEM companies can learn from professional women's groups by centering their cultures on gender, gendered relations, and intersectionality. Ultimately it is up to *them* to change – not the women.

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