Nourishing the Tree of Hope: An art piece about peace

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Abstract:

This paper explores the intersection of engineering, violence, and peace through an arts-based project. Drawing from our lived experiences, we would like to build a narrative that highlights how engineering is deeply entwined with societal structures, including systems of oppression and colonialism. We have conceptualized our work as a tree. This tree is the representation of hope and peace as well as the engineering ecosystem.

The roots of the tree represent the foundations of our humanity. Our need for shelter, clean water, food, security, community and love. Meeting these basic needs are the reasons engineers do what they do. The body of the tree represents the engineering education. This body is generally considered as solid and solitary, disregarding the relationship between the tree and the rest of the world. Finally, the leaves of the tree are the stories of how humanity interacts with engineering and how engineering can help us achieve peace.

All parts of the tree are made with papers that have our experiences, stories, thoughts, discussions and research written on them. These experiences go back to our experiences growing up; one person during a war and the other growing up during peace but in a military family. These experiences form the foundations of our understanding of the roles that the engineers and the engineering profession play in the world.

As this is an interactive piece, we ask the conference participants to write and leave their stories in the tree. However, each person will also be asked to drop a marble into the base of the tree. These marbles are to represent the bombs and rockets that are made by engineers and will be used for destruction. The sizes of the balls vary based on the amount of military budget in the country that the participant is from. Once the weight of the marbles has reached a critical value, the tree will shake, making the leaves fall. The hope is by increasing the number of stories we leave; we will increase the hope that the tree of Hope survives.

Using a collaborative collage shaped like a tree, this work invites collective reflection on the role of engineers in perpetuating or challenging violence. Each leaf symbolizes a story or commitment to peace, while the tree's periodic "shaking" represents systemic disruptions. By fostering community engagement, the project reimagines engineering as a force for justice, advocating for responsive pedagogy and transformative practices in engineering education.

This paper explores how engineering educators can foster a culture of peace by deconstructing oppressive norms and advocating for socially just practices. Drawing on the lived experiences of two faculty members, one from Canada and the other from Iran, we reflect on the intersections of engineering, violence, and peace through an arts-based research methodology.

Building the Roots

Engineering has often been regarded as an apolitical profession focused solely on technical solutions, innovation, and efficiency. However, this perception masks the deeply entwined relationship between engineering and societal structures, which bell hooks coined as "imperialist, white supremacists, capitalist, patriarchy" [1].

However, engineering and engineers are not apolitical [2], [3]. The decisions engineers make—what to design, how to design it, and for whom—are deeply intertwined with societal values, power dynamics, and systems of oppression. The infrastructure, technologies, and products created by engineers shape how people live, work, and interact, often reinforcing existing inequities or creating new ones. From the development of weapons used in war to technologies that perpetuate surveillance and control, engineering has a direct impact on societal structures and human rights [4]. Even choices that seem purely technical, such as material selection or energy sources, carry ethical implications, as they affect environmental sustainability and global resource distribution. By failing to question the broader implications of their work, engineers risk perpetuating harm and systemic violence, highlighting the necessity of viewing engineering as a socially embedded and ethically charged profession. Engineering was founded on the military-industrial complex, a discipline that was designed to serve the state and not the people, and continues to primarily lead to employment in "government, industrial, and commercial settings" [5, p. 40].

We, as two faculty members at our institution have begun having conversations around peace and what it means to ask for engineers to advocate for peace in their work, pushing against structures.

AA comes from Canada, blind to the colonial violence and oppression for the first 30 years of her life. She was a white, middle-class, military daughter, who didn't understand that her privilege came at the expense of violence to others. BB was born in Iran and most of her childhood was overshadowed by a brutal war. She had to study for her high school algebra and physics by the light of a candle while bombs were raining down all around her. These experiences led her to become an engineer so that she could help rebuilt what was destroyed.

Together we share values of deconstructing the oppressive norms of engineering, of creating classroom spaces that foster community and possibility, of pushing against apolitical discourse and excuses, and of bringing to light normalized violence at the hands of engineers.

Yet, our different backgrounds and upbringings mean the way we approach our work in engineering sometimes diverges. The harmful rhetoric of Iran rings powerfully and educates BB in nuanced understandings to ongoing genocides and conflicts around the worlds. The guilt of 30-years of a blindfold for AA, pushes her to act, do, talk, even when sometimes she is not fully informed. Each in their own ways, they act as role models, shattering the boundaries of what is "allowed" in engineering conversations. *[AA and BB are redacted names]*

The Trunk

This reflective arts-based submission uses an interactive piece to share the importance of sharing and listening to stories, by expressing our histories, experiences, feelings, and hopes about the future of engineering. The piece will be in the shape of a tree. Each leaf of a tree is a contribution towards peace in terms of a story, or a message. The initial leaves are the stories that RP and LB have contributed. During the exhibition, the audience will be asked to add leaves to the tree. However, in certain intervals, the leaves fall due to shakes the tree endures. These shakes symbolise the ongoing violence and war embedded throughout our society. The only way to not let the tree die is through building community and continuing to share our stories. Together we can contribute to the piece and to peace to add enough leaves and help the tree thrive. Stories after all are perhaps the "primary, or even the only form of understanding open to us as human beings" [6, p. 11].

In this piece, we emphasize a different narrative of engineering. Rather than being viewed as a neutral, technical profession [7], which is solely focused on solving practical problems and improving infrastructure, technology, and public health, we show how and why engineering is not, and has never been, apolitical [8], [9], [10]. The piece discusses how the decisions made by engineers—what we design, how we design it, and for whom—are deeply entwined with social justice, human rights, and, in many cases, conflict.

The piece will confront the reality that engineers play a role in the development of weapons and technologies that perpetuate violence and war [11]. The tools of destruction—bombs, guns, and missiles—are engineered with the same precision and dedication as the tools that save lives. As engineering educators, we, the authors of this paper, passionately share with our students why it is not enough to focus on efficiency and innovation in isolation; and how the focus on efficiency and innovation has normalized the violence that happens through war and colonialism. The piece strives to show that the engineers have the power to either contribute to systems of violence or to lead efforts that promote peace, reconciliation, and sustainability.

The tree art piece serves as both a metaphor and a medium for collective reflection and action. Each leaf on the tree represents a story or message contributing to peace. Initially, the tree is adorned with (often violent and traumatic) stories from our own lives and experiences, illustrating the interplay of violence and resilience in our engineering journeys.

Perching on a Branch

Each branch in the tree represents a type of violence that is perpetuated against others (humans or nature) and discusses the roles of engineers in the upholding the systems that maintain oppression. We have dedicated each main branch of our tree to resisting "imperialist, white supremacists, capitalist, patriarchy" (inspired by bell hooks [1]). In this paper, we discuss two of the branches.

The Branch to Decolonize Engineering and Resist Imperialism

Engineering has historically been deeply intertwined with imperialism and war, serving as a tool for expansion, control, and violence. Colonial expansion relied heavily on engineering to establish control over territories [12], [13]. Engineers designed railways, roads, and ports to extract resources and support the colonizers' economies, often displacing local populations and degrading the environment [14]. For example, in Southern Alberta, where we live, and Montana, the railroad was responsible for bringing settlers, disease and destruction of buffalo breading grounds. The advocacy by Louis W. Hill, the president of the Great Northern Railway, was instrumental in establishment of Glacier National Park, restricting Blackfoot access to their own land [15]. In her book on infrastructure, Deb Chachra reflects, "civil engineering around me serves as an inescapable physical reminder of the bodies and labor of people around the world, including colonized and enslaved peoples. Infrastructural systems are designed to efficiently concentrate energy and resources to particular people in particular places" [14, p. 127].

During colonial conquests, engineering was central to warfare. Military engineers-built infrastructure to move troops and suppress resistance, while advanced weaponry provided colonial powers with technological superiority. Firearms, cannons, and later tanks enabled small European forces to dominate vast territories, reinforcing cycles of conquest and oppression. These projects often relied on forced labor, further entrenching exploitation and suffering [16]. In Canada specifically, much of the colonial engineering focused on violent resource extraction (starting with the fur trade, and currently focused on mining, oil, and natural gas extraction)—violence acted both on the Indigenous communities of the areas and a violent raping of the lands themselves [17].

After the oil crisis of the 1970s, neoliberalism came into full swing, meaning technology development was funded by investors who primarily were concerned about market and profit [18]; followed a few decades later by the ever increasing push towards 'globalization' which was simply a new way of "dress[ing] up the effects of American imperialism" to validate colonial power and economic control [19, p. 4]. The worldwide growth of technology has pushed the domination of Western culture, often violently forcing communities to abandon local solutions in favour of technological 'innovations' from the Global North [18]. The suffering continues today under the new guise of 'internationalization,' where international engineers and students leave their home countries, and instead use their valuable knowledge and skills towards their enduring colonization in the Global North [20], [21].

In their Seminal paper on "10 Calls to Action to Natural Scientists Working in Canada" [22], Carmen Wong and her co-authors, discuss calls to actions towards reconciliation with the

indigenous population of Canada. The first call to action, “Understand the socio-political landscape around your research sites”, emphasizes the political nature of natural sciences in general. It is essential that we understand that technologies created by engineers continue to “channel epistemic oppression through socio-technical acts of white supremacy” [23, p. 7].

In this branch, we will discuss our collective stories with imperialism and how our engineering education reinforced these learning.

The Branch for Social Liberation from Patriarchy

One of the branches in the tree is the symbolism our actions to oppose patriarchy and its thirst for war. Patriarchal systems often shape societal values, norms, and power structures that influence the dynamics of conflict and the possibilities for peace. Patriarchy, with its emphasis on dominance, hierarchy, and control, fosters a worldview that prioritizes power over collaboration and often perpetuates cycles of violence [24].

Patriarchy valorizes aggression, competition, and control—qualities traditionally associated with masculinity in patriarchal societies [25], [26]. These cultural norms often glorify war as a demonstration of strength and dominance, reinforcing the idea that violence is a legitimate means of resolving disputes or asserting power. Patriarchal systems also promote rigid gender roles, where men are expected to be warriors and protectors, while women are relegated to roles of caregiving and support [27], [28]. This dynamic not only fuels militarism but also marginalizes women’s voices in decisions about war and conflict.

Moreover, patriarchal systems maintain power structures that benefit from war and conflict, such as political and economic elites who profit from the arms industry and resource exploitation. These structures prioritize militarization and conflict over diplomacy and reconciliation, perpetuating cycles of violence [25]. The normalization of violence in patriarchal societies often extends beyond physical warfare, manifesting as structural violence, such as economic inequality and systemic oppression, which disproportionately harm marginalized groups. Engineers play a pivotal role in these systems. Their contributions can be seen across various domains from weapon design to logistical support. In the modern warfare, engineers are at the forefront of digital warfare including cyberattacks, electronic warfare, manipulation of information. All these systems of dominance are designed, developed and maintained by engineers. Engineers are also taught to think about systems and be able to build systems. This gives them an advantage to be able to make these patriarchal systems. For example, both Charles and David Koch were engineers with degrees from the Massachusetts Institute of Technology (MIT). Their engineering education likely influenced their analytical and systems-based approach [29].

Conversely, peace is often associated with qualities such as empathy, collaboration, and nurturing—traits traditionally devalued in patriarchal systems because they are linked to femininity [30], [31], [32]. This devaluation marginalizes efforts to build peace and resolve conflicts through nonviolent means. Patriarchal structures also exclude women and gender non-confirming individuals from leadership roles and peace negotiations, resulting in limited perspectives and solutions that fail to address the root causes of conflict or prioritize the needs of affected communities.

When women and marginalized groups are included in peace processes, the likelihood of achieving lasting peace increases [33]. However, patriarchal norms and institutions often resist these inclusive approaches, perpetuating cycles of exclusion and conflict. Additionally, patriarchal systems that prioritize domination and hierarchy over equality and cooperation create conditions that undermine efforts to build sustainable peace.

Engineers can inadvertently or deliberately uphold patriarchal systems through various mechanisms embedded in both engineering practices and education. One way this occurs is through gendered design choices, where many products and technologies are created with men as the default user or reference man [34], [35]. This often results in the needs, preferences, and safety of women and gender non-conforming individuals being overlooked.

Workplace culture in engineering also perpetuates patriarchal norms by fostering exclusionary environments where women and marginalized genders face microaggressions, unequal pay, and limited opportunities for leadership [36]. Male-dominated spaces can discourage women from entering or remaining in the field, as they often encounter harassment, a lack of mentorship, or a sense of being undervalued [37], [38]. Furthermore, engineering organizations often maintain hierarchical structures that mirror patriarchal systems of power, where leadership roles are disproportionately held by men. This reinforces the notion that men are more suited for authority and decision-making.

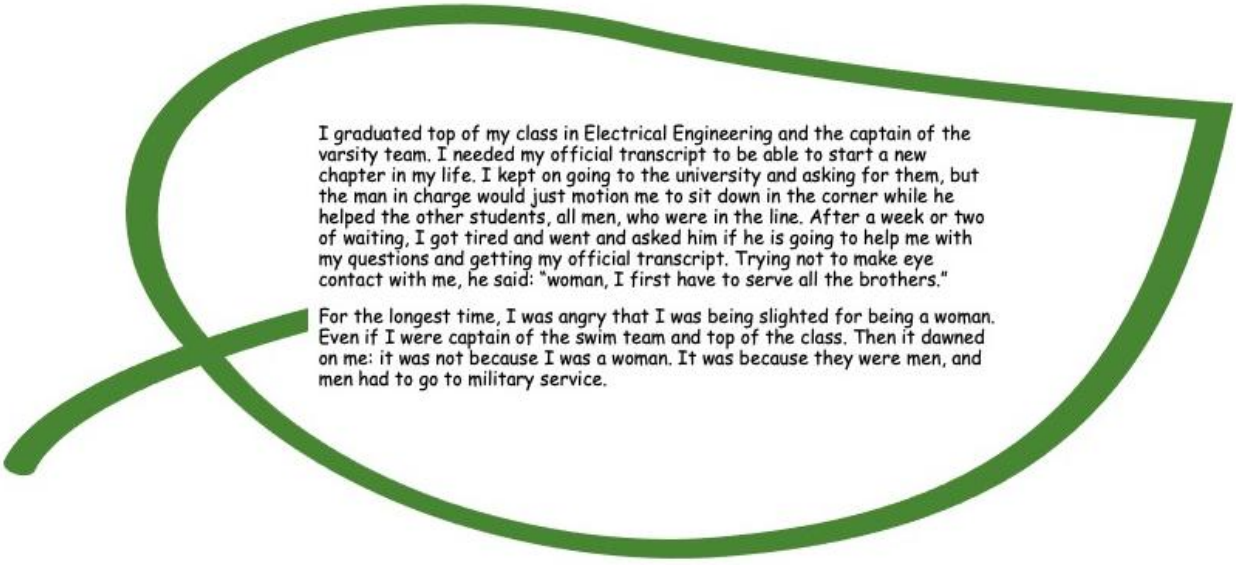
In education, engineering curricula frequently emphasize technical problem-solving while neglecting discussions on equity, ethics, and social justice [8], [10], [39]. This approach reinforces the perception of engineering as a neutral profession, ignoring the ways power dynamics and gender biases influence engineering outcomes. The underrepresentation of women and gender nonconforming role models in educational materials and leadership further perpetuates patriarchal ideals. Additionally, engineers often design and promote technologies that reinforce traditional gender roles, such as household appliances marketed primarily to women, which perpetuate the expectation that caregiving and domestic work are women responsibilities [27].

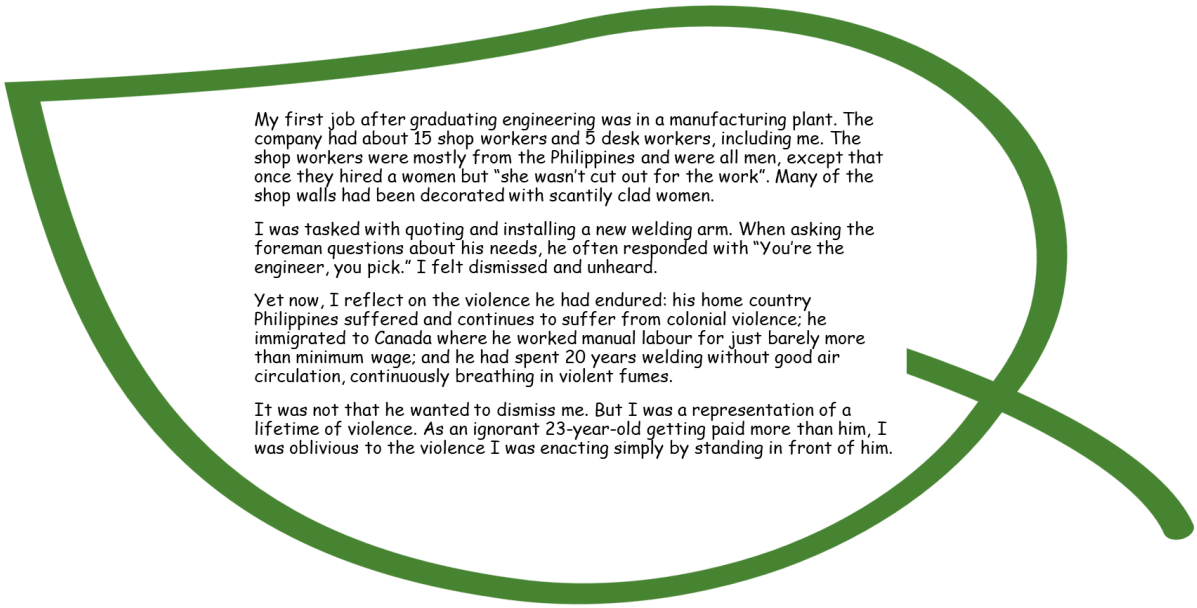
Patriarchy is also upheld through the exclusion of women and gender nonconforming individuals from decision-making processes in engineering projects. This exclusion can result in outcomes that ignore or marginalize their needs and perspectives, maintaining men as gatekeepers of technological and infrastructural development. Compounding this issue is the failure to address intersectionality within engineering. When engineers overlook how gender intersects with race, class, disability, and other identities, they create systems and technologies that marginalize diverse groups of people, further reinforcing patriarchal and other oppressive systems [4].

In this piece, we have dedicated one branch to social liberation. This branch bears our stories of living within patriarchy, being affected by its impacts, and working to change it. These are stories of war, stories of male aggression, stories of military based projects in the curriculum, and stories of our triumph to break free of the system.

The Raising Hope and Falling Leaves

During the exhibition, attendees are invited to add their own leaves, contributing their stories, hopes, and commitments to peace. Periodically, the tree "shakes," causing some leaves to fall. These shakes symbolize the ongoing violence and systemic disruptions that threaten peace. The act of replenishing the tree with new leaves emphasizes the role of community in sustaining peace and resilience. Our hope is that there are more leaves added to the tree than taken away from it because of the shaking. This will symbolize our efforts to change the world by bringing different perspectives into our engineering education, and by holding hope together as a community through sharing stories.





Final Words

Engineering is not, and has never been, neutral. Engineers have historically contributed to both the tools of destruction—bombs, guns, and missiles—and the tools of healing—medical devices, sustainable infrastructure, and clean energy solutions. The same precision and dedication are applied to both, raising critical questions about the ethical responsibilities of engineers.

This work confronts the normalized violence inherent in engineering practices and education. From the development of weapons to the perpetuation of colonial systems through infrastructure and technology, engineers play a pivotal role in shaping societal outcomes. By focusing solely on efficiency and innovation, engineering education often overlooks the broader social and ethical implications of its work.

Through this piece, we would like to challenge the apolitical narrative of engineering and highlight the importance of integrating social justice into engineering education. By fostering critical reflection, storytelling, and community engagement, we aim to:

1. Increase accountability for the societal impacts of engineering decisions.
2. Dismantle oppressive structures within engineering education and practice.
3. Promote responsive pedagogy that centers equity, diversity, and inclusion.
4. Expand the understanding of engineering as a socially embedded and ethically charged profession.

The Tree of Hope invites us to reimagine engineering as a collaborative, community-driven practice rooted in equity and justice. By sharing our stories and creating space for others to contribute, we challenge the normalized violence of engineering and envision a future where engineers are advocates for peace, reconciliation, and sustainability. Together, we can transform engineering into a force for good, cultivating a profession that not only builds but also heals.

References:

[1] bell hooks, *Feminist theory: from margin to center*, 2nd ed. in South End Press classics, no. v. 5. Cambridge, MA: South End Press, 2000.

[2] C. Mitcham, ‘Brief for Political Philosophy of Engineering and Technology’, *NanoEthics*, vol. 18, no. 3, p. 14, Dec. 2024, doi: 10.1007/s11569-024-00463-8.

[3] S. P. Nichols, ‘Professional responsibility: The role of the engineer in society’, *Sci. Eng. Ethics*, vol. 3, no. 3, pp. 327–337, Sep. 1997, doi: 10.1007/s11948-997-0039-x.

[4] S. Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need*. Cambridge, Massachusetts: The MIT Press, 2020.

[5] D. Riley, ‘Engineering and Social Justice’, 2008.

[6] J. Kociatkiewicz and M. Kostera, ‘Writing Differently: On the Constraints and Possibilities of Presenting Research Rooted in Feminist Epistemologies’, *Gend. Work Organ.*, p. gwao.13072, Oct. 2023, doi: 10.1111/gwao.13072.

[7] C. Seron, S. Silbey, E. Cech, and B. Rubineau, ‘“I am Not a Feminist, but. . .”: Hegemony of a Meritocratic Ideology and the Limits of Critique Among Women in Engineering’, *Work Occup.*, vol. 45, no. 2, pp. 131–167, May 2018, doi: 10.1177/0730888418759774.

[8] E. A. Cech, ‘The (Mis)Framing of Social Justice: Why Ideologies of Depoliticization and Meritocracy Hinder Engineers’ Ability to Think About Social Injustices’, in *Engineering Education for Social Justice*, vol. 10, J. Lucena, Ed., in Philosophy of Engineering and Technology, vol. 10. , Dordrecht: Springer Netherlands, 2013, pp. 67–84. doi: 10.1007/978-94-007-6350-0_4.
[9] J. A. Leydens and J. C. Lucena, *Engineering justice: transforming engineering education and practice*. Hoboken, NJ, Piscataway, NJ: John Wiley & Sons, Inc. ; IEEE Press, 2018.
[10] D. Nieusma and D. Riley, ‘Designs on development: engineering, globalization, and social justice’, *Eng. Stud.*, vol. 2, no. 1, pp. 29–59, Apr. 2010, doi: 10.1080/19378621003604748.
[11] D. A. Banks and M. Lachney, ‘Engineered Violence: Confronting the Neutrality Problem and Violence in Engineering’, *Int. J. Eng. Soc. Justice Peace*, pp. 1–12, Aug. 2017, doi: 10.24908/ijesjp.v5i1.6604.
[12] R. Macleod, ‘Colonial engineers and the “cult of practicality”: Themes and dimensions in the history of Australian engineering’, *Hist. Technol.*, vol. 12, no. 2, pp. 147–162, Jan. 1995, doi: 10.1080/07341519508581881.
[13] J. Lucena, ‘What is Engineering for? A Search for Engineering beyond Militarism and Free-markets’, in *What is Global Engineering Education For?*, in Synthesis Lectures on Global Engineering. , Cham: Springer International Publishing, 2011, pp. 361–383. doi: 10.1007/978-3-031-02125-1_6.
[14] D. Chachra, *How infrastructure works: inside the systems that shape our world*. New York: Riverhead Books, 2023.
[15] Q. Smith, ‘New IACB Film: “The Blackfeet, The Great Northern Railway, and Glacier National Park” | U.S. Department of the Interior’, US Department of the Interior. Accessed: Jan. 15, 2025. [Online]. Available: https://www.doi.gov/iacb/new-iacb-film-blackfeet-great-northern-railway-and-glacier-national-park-0
[16] B. Seely, ‘Patterns in the history of engineering education reform: A brief essay.’, in *Educating the engineer of 2020: Adapting engineering education to the new century*, National Academies Press, 2005, pp. 114–130.
[17] N. Klein, ‘Canada’s founding myths hold us back from addressing climate change’, *The Globe and Mail*, 2016. Accessed: Nov. 20, 2023. [Online]. Available: https://www.theglobeandmail.com/news/national/canadas-founding-myths-hold-us-back-from-addressing-climate-change/article32022126/
[18] J. D. J. Vandersteen, ‘Humanitarian Engineering In The Engineering Curriculum’, Queen’s University, Kingston, ON, Canada, 2008.
[19] P. Bourdieu and L. Wacquant, ‘Notes on the new planetary vulgate’, *Radic. Philos.*, 2001.
[20] C. Chen, ‘(Un)Making the international student a settler of colour: a decolonising autoethnography’, *Qual. Res. Sport Exerc. Health*, vol. 13, no. 5, pp. 743–762, Sep. 2021, doi: 10.1080/2159676X.2020.1850513.
[21] P. Rodrigues Affonso Alves, ‘The awareness of her position as a colonist by a student of Brazilian doctorate in Canada’, 2023.
[22] C. Wong, K. Ballegooyen, L. Ignace, M. J. (Gùdia) Johnson, and H. Swanson, ‘Towards reconciliation: 10 Calls to Action to natural scientists working in Canada’, *FACETS*, vol. 5, no. 1, pp. 769–783, Jan. 2020, doi: 10.1139/facets-2020-0005.
[23] M. Finn *et al.*, ‘Troubled Worlds: A Course Syllabus about Information Work and the Anthropocene’, *J. Crit. Libr. Inf. Stud.*, vol. 3, no. 1, May 2020, doi: 10.24242/jclis.v3i1.137.

[24] R. A. Martusewicz, J. Edmundson, and J. Lupinacci, *EcoJustice education: toward diverse, democratic, and sustainable communities*, Second edition. in Sociocultural, Political, and Historical Studies in Education. New York: Routledge, 2015.
[25] J. Valle, 'Abolitionist Engineering: An Autoethnographic Approach to Understanding How Abolition Can Transform Materials Science and Engineering', 2022, doi: 10.7302/5935.
[26] L. B. Simpson, *As we have always done: indigenous freedom through radical resistance*. in Indigenous Americas. Minneapolis: University of Minnesota Press, 2017.
[27] F. Henwood, 'WISE Choices? Understanding Occupational Decision-making in a Climate of Equal Opportunities for Women in Science and Technology', *Gend. Educ.*, vol. 8, no. 2, pp. 199–214, Jun. 1996, doi: 10.1080/09540259650038860.
[28] A. Phipps, 'Re-Inscribing Gender Binaries: Deconstructing the Dominant Discourse around Women'S Equality in Science, Engineering, and Technology', *Sociol. Rev.*, vol. 55, no. 4, pp. 768–787, Nov. 2007, doi: 10.1111/j.1467-954X.2007.00744.x.
[29] J. Mayer, *Dark Money: The Hidden History of the Billionaires Behind the Rise of the Radical Right*. Westminster: Knopf Doubleday Publishing Group, 2016.
[30] D. Riley, A. L. Pawley, J. Tucker, and G. D. Catalano, 'Feminisms in Engineering Education: Transformative Possibilities', *NWSA J.*, vol. 21, no. 2, pp. 21–40, 2009.
[31] S. G. Harding, *The science question in feminism*. Ithaca: Cornell University Press, 1986.
[32] D. Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', *Fem. Stud.*, vol. 14, no. 3, p. 575, 1988, doi: 10.2307/3178066.
[33] UN Women, United Nations Entity for Gender Equality and the Empowerment of Women, Ed., *Preventing conflict, transforming justice, securing the peace: a global study on the implementation of United Nations Security Council resolution 1325*. New York: UN Women, 2015.
[34] W. Later, A. Bosy-Westphal, E. Kossel, C.-C. Glüer, M. Heller, and M. J. Müller, 'Is the 1975 Reference Man still a suitable reference?', *Eur. J. Clin. Nutr.*, vol. 64, no. 10, pp. 1035–1042, Oct. 2010, doi: 10.1038/ejcn.2010.125.
[35] C. Criado-Perez, *Invisible women: data bias in a world designed for men*. New York: Abrams Press, 2019.
[36] K. Bell, 'A philosophy of social work beyond the anthropocene', in *Post-Anthropocentric Social Work: Critical Posthuman and New Materialist Perspectives*, 1st ed., V. Bozalek and B. Pease, Eds., Abingdon, Oxon ; New York, NY : Routledge, 2021. | Series: Routledge advances in social work: Routledge, 2020. doi: 10.4324/9780429329982.
[37] W. Faulkner, 'Dualisms, Hierarchies and Gender in Engineering', *Soc. Stud. Sci.*, vol. 30, no. 5, pp. 759–792, Oct. 2000, doi: 10.1177/030631200030005005.
[38] W. Faulkner, 'Doing gender in engineering workplace cultures. I. Observations from the field', *Eng. Stud.*, vol. 1, no. 1, pp. 3–18, Mar. 2009, doi: 10.1080/19378620902721322.
[39] M. Savaria and K. Monteiro, 'A Critical Discourse Analysis of Engineering Course Syllabi and Recommendations for Increasing Engagement among Women in STEM', vol. 18, no. 1, 2017.