Toronto Metropolitan University | Faculty of Engineering and Architectural Science

Dimensions
Pilot Program

FEAS Dimensions Faculty Chair's Year End Report (2021-2022)

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This report outlines my activities undertaken as DFC for FEAS for the period of June, 2021 to June, 2022 inclusive. It contains the following sections as outlined in the Table of Contents Below:

Table of Contents:

List and Description of Activities

Meetings, Participation, and Providing Support

In addition to participating in all DFC meetings, I led semi-weekly meetings with the FEAS Dimensions team. In these meetings we would brainstorm and plan events, discuss various documents that we were working on, rehearse Town Halls, and in general support the Dimensions mission and initiatives. At times we would increase our meeting frequency

to weekly occurrences, for example, in April-May, 2022, when we were planning our Town Halls.

<u>Revisions to the FEAS Dean's Research Fund (DRF) Programs Based on Updated EDI Criteria</u>

In collaboration with and under the leadership of the new Associate Dean – Research and External Partnerships for FEAS, Dr. Stephen Waldman, we proposed revisions and updates to the DRF suite of grants which are offered every year within the faculty. The main revisions associated with these updates are as follows:

1. Creation of the new DRF – Booster – Indigenous Research; Reproduced from the DRF website:

   This fund is to support new research initiatives that have the potential to benefit one or more Indigenous groups or communities. Examples may include, but are not limited to:

   high-performance buildings for northern communities

   sustainable power generation for remote communities

   solutions for food scarcity or insecurity

   water quality engineering

   addressing the digital infrastructure gap

   Depending on availability of funding, up to 12 DRF-Booster awards are available per year, each valued at $10,000 per award. A minimum of 6 of these awards (50%) will be reserved for early career researchers. An early career researcher is defined as a faculty member who is less than six (6) years from the date of their first academic appointment, minus eligible delays in research (maternity, parental, medical, bereavement, etc.).

2. New application components and evaluation criteria were added to the DRF program. Applicants are now instructed to include "a description of how Equity, Diversity, and Inclusion (EDI) will be taken into account in the project" and the review procedures now explicitly state that EDI considerations will be included in the adjudication of awards.

3. A new "Dependent Care Supplement" was added to the existing DRF – Travel, which was originally a $1000 grant that faculty can apply for to attend a conference or workshop; Reproduced from the DRF website:

   If your dependent care responsibilities require you to bring dependents or a caregiver with you to the conference location, or alternatively, to arrange additional

*temporary childcare at home, you may request an additional $500 supplement to
help cover those costs.*

Creating and distributing the Document, "Suggested Language for Inclusion in Hiring Ads for Faculty Positions" to all FEAS Department and DHC Chairs

To advance equitable and inclusive hiring processes, I generated a document with
suggested additions to hiring ads for faculty positions. The language is intended to reflect
that need for applicants to demonstrate EDI competencies (over and above EDI
understanding). An excerpt from the document is below, with the suggested language for
inclusion in blue font:

In a section on qualifications:
*-demonstrated commitment to Equity, Diversity, and Inclusion (EDI) as it pertains to
service, teaching, and research, including an understanding (either demonstrated or
planned) to create an inclusive and accessible learning environment for a diverse student
population.*

*In the section on application contents, it is recommended that candidates be required to
submit:*
*-a statement outlining evidence of commitment to EDI that demonstrates an
understanding of EDI principles and application of those principles, or clearly defined
plans of how EDI principles will be applied in research and teaching.*

Participating in New FEAS Faculty Orientation

On August 24, 2021, I participated in the FEAS New Faculty Orientation. At that event I
gave a presentation to the new hires on "Dimensions; Supporting EDI in SRC" which was
approximately 15 minutes, and included a description of the Dimensions program, its
initiatives, and the ways in which the FEAS DFC could provide support to faculty.

Advertising, Interviewing, and Onboarding the FEAS Dimensions Team

In September, 2021, I engaged in the process of filling an open position on the FEAS
Dimensions team for a graduate student researcher. I drafted an ad to be distributed
among the eligible cohorts, took applications, conducted interviews, and selected a new
team member. Throughout the F2021 term, the team comprised Anika Shafi, Bachelor's
student, Aerospace Engineering (returning from 2020-2021), Madeline McQueen, MASc.
student, Aerospace Engineering, and Dr. Sylvie Antoun, Postdoctoral Fellow, Mechanical
Engineering (returning from 2020-2021). In January, 2022, Dr. Sylvie Antoun left the
FEAS Dimensions team to join the Dimensions Director's self-assessment team. To find
a replacement, I again drafted an ad for distribution, took applications, conducted
interviews and selected a new team member, Samson Abioye, PhD student, Chemical
Engineering who served on the FEAS dimensions team from Jan-May, 2022.

EDI in Grant Writing

I participated in a number of initiatives to support grant writing within the faculty, with a focus on EDI components. They are summarized as follows:

1. On October, 7, 2021, FEAS and FoS held a joint NSERC Discovery Grant information session for Fall, 2021 applicants. In collaboration with Dr. Imogen Coe, DFC for the FoS, we gave a presentation (~30 mins) on writing the EDI components of the DG application.
2. On June 13, 2022, again in collaboration with Dr. Imogen Coe, DFC for the FoS, we gave a presentation (~30 mins) on writing the EDI components of the DG application to the Fall 2022 NSERC Discovery applicants.
3. On September 14th, I gave a presentation as part of a workshop hosted by FEAS Graduate Studies on EDI components in NSERC Scholarship Applications. I also developed and distributed a Guide to Writing about Diversity Considerations in NSERC Scholarship Applications, targeted toward NSERC PGS-D and PDF Applicants. The guide document has been appended to this report.
4. In September, 2021, I generated "A Practical Guide to Writing about Equity Diversity and Inclusion (EDI) in Grant Proposals" targeted to NSERC Discovery Grant applicants, but with added utility for other programs as well. The document was distributed to FEAS NSERC DG applicants. The guide document has been appended to this report.
5. Throughout the academic year I reviewed numerous grant applications for their EDI content. These proposals included numerous NSERC Discovery Grant applications, Canada Foundation for Innovation Applications, New Frontiers in Research Fund Applications, and others.

Town Halls

Key objectives of the Dimensions Pilot program are to engage the SRC community and learn about EDI barriers and obstacles that exist in the research ecosystem. To that end, a series of towns halls were organized and held, including two postgraduate (graduate student and postdoctoral fellow) town halls, and an undergraduate researcher town hall. In each of these town halls, the Dimensions Pilot program was introduced and explained, participants were placed in breakout rooms which were moderated by Dimensions team members, there was a discussion of the concept of bias, and participants were given an opportunity to ask questions and discuss barriers to participation in SRC. Excerpts from the slides used in these town halls are appended to this report.

Participation in these town halls was as follows:

● 13 Postgraduate researchers attended the town hall on March 22, 2022
● 11 Postgraduate researchers attended the town hall on March 24, 2022
● 38 Undergraduate Researchers attended the Town Hall on May 30, 2022

Engagement and dialogue were very strong during these town halls, and informal, anonymous polling at the beginning and end of each town hall indicated that information about EDI barriers in SRC was being effectively conveyed. For example, the table below shows four poll questions that were asked at the start and the end of the town hall on May 30th, and the response rates. A couple of the largest changes in the responses are highlighted. Notwithstanding the small sample size, it can be seen that by the end of the town hall, 100% of respondents knew the purpose of Dimensions, knew what EDI is, and recognized the importance of EDI in SRC. Notably, the percentage of participants who responded that they had experienced or witnessed EDI related barriers to Scholarly, Research and Creative activity, increased from 29% to 72%, indicating that the town hall experience made them aware of these barriers.

Question	Poll responses at the **start** of the town hall	Poll responses at the **end** of the town hall
I (now) understand the purposes of the Dimensions Pilot at Ryerson	Yes: 47% No: 24% I'm not sure: 29%	Yes: 100% No: 0% I'm not sure: 0%
I (now) know what EDI is	Yes: 66% No: 26% I'm not sure: 8%	Yes: 100% No: 0% I'm not sure: 0%
I (now) recognize the importance of EDI in Scholarly, Research and Creative activity (SRC)	Yes: 63% No: 18.5% I'm not sure: 18.5%	Yes: 100% No: 0% I'm not sure: 0%
I have experienced or witnessed EDI related barriers to Scholarly, Research and Creative activity	Yes: 29% No: 47% Maybe: 24%	Yes: 72% No: 26% I'm not sure: 2%

The town halls also featured a Jamboard discussion where participants were asked to anonymously write about bias and barriers to SRC that they had witnessed. A screen capture of a sample Jamboard is shown below. It can be seen from the image that a broad range of bias and barriers are reported. It should also be noted that common themes in the Jamboard comments are sexism and gender-based discrimination (most predominant), in addition to language and skin colour.

What examples of bias and barriers to SRC have you experienced or witnessed?

Stereotyping people of colour	Researchers doubting the research capacity of people with disability	Not being considered intelligent as a women/worthy of contributing my ideas to a project	Insensitive jokes and racist comments	Having a man in a higher position of power take ownership of my ideas in a professional setting. Not getting recognition for my work	Women students in engineering having to deal with unwanted sexual advances all the time.
TA's ignoring academic remarks made specifically by female students	As a woman, someone has assumed that I wanted to study engineering "to get closer to boys"	Women graduate students getting last pick of research project	stereotyping one's language fluency due to skin colour	stereotypes that women can't work as well in a male-dominated field	Referring to a class of students as "Guys".
Professor speaking a language other than English in the lab, to students, and not everyone can understand.	Research group with mostly male students, where the male students start a WhatsApp chat and exclude the female students	Stereotyping certain behaviours exhibited by women and attributing to their professional abilities.	Professor scolding a student for coming late when it was for religious/cultural reasons	being talked over in a discussion	sexism
sterotyping women's capabilties in engineering	A professor openly favoring male students in class and for TA positions	Feeling like my ideas are unwanted because I do not have a big male presence to present them	Having a greater sense of imposter syndrome as a female researcher	Feeling like research tends to be more of a "boys club"	Men telling me I need to just write reports instead of doing real research

Newsletter

The FEAS Dimensions team put together a newsletter that was distributed to all FEAS researchers on January 17, 2022. The newsletter gave a description of Dimensions, profiled the FEAS Dimensions team members, and provided links to various resources. The newsletter had a theme of a focus on accessibility, with content generated by the FEAS Dimensions team. For reference, the newsletter has been appended to this report.

Social Media Presence

The FEAS Dimensions team maintained a Facebook and Twitter account in the 2021-2022 academic year. These accounts are used to publicize events, share articles, blog posts, or announcements of other opportunities or events that are in support of EDI in SRC.

Faculty Interviews

As part of a larger university-wide Dimensions initiative, I conducted interviews of FEAS faculty members about their experiences related to EDI. Invitations to participate in the

interviews were sent to all FEAS faculty through the dean's office. Many faculty were individually emailed requesting interviews as well. Four faculty members agreed to be interviewed (two Assistant Professors, one Associate Professor, and one Full Professor). All four are women-identifying. I conducted the interviews with Madeline McQueen, FEAS Dimensions graduate student, taking notes. An anonymized summary of aggregated themes is included below:

On Handling EDI Related Issues:

- Most interviewees agree that they do not feel competent handling EDI related issues
- Most stated that when faced with issues that are related to EDI (such as harassment of a trainee who may identify as equity-seeking, by another trainee), they typically delegate to other sources (HR, dean, etc.)
- Multiple interviewees stated that they don't think that faculty should be the point of contact to deal with these issues, and should instead be delegated to more trained individuals

On Fostering EDI in Research Groups:

- Most interviewees are very mindful of their graduate student selection process and try to recruit trainees of a wide range of representation
- One interviewee stated that as much as they would like to have an even split between male and female students, there will not be enough female applicants for this to be possible in the near future.
- Multiple interviewees expressed concerns that although the faculty encourages them to hire students with disabilities, if they require a modified timeline or other special circumstances, it reflects badly on the supervisor for tenure and promotion evaluation, or applicant evaluations for grants
- Interviewees expressed concerns regarding difficulties finding and retaining excellent graduate students, associated with the perceptions and biases of the undergraduate class. They expressed concern that this difficulty would result in a perceived diminished SRC capacity.

Concerns Regarding Maternity Leave:

- Multiple interviewees expressed difficulty and disappointment with the current maternity leave culture. They are concerned that if faculty members take a full maternity leave, they will be perceived as not fully devoted to SRC and their academic work. They found little support if they choose to take the leave, such as administrative assistance, internal funding, or postdoctoral fellow support, which would help them maintain and/or re-establish their SRC upon return. They fear that it will impact their future tenure and promotion evaluations

- One interviewee was even denied funding because she had not published enough in the previous year due to her leave
- There was consensus that the maternity leave culture is impacting women faculty's decisions of how many children to have and at what age to have them (!)

On Faculty Hiring Practices

- Several interviewees feel that the answer to addressing EDI related issues is not to simply hire more faculty who belong to equity seeking groups. That is, it can become tokenistic very quickly because it can undermine the perceived qualifications of faculty members who are visible minorities. Faculty hiring should prioritize qualifications, but continue to be open to considering barriers which have affected applicant's journeys

Concerns Regarding Treatment from other Faculty Members/Upper Management

- Several participants described incidences where they were shown a lack of respect by senior male colleagues
- Multiple women interviewees were called "liars" by male members of senior management, as an open display of disrespect. They did not believe that would have happened to male colleagues in an otherwise comparable situation. It was also reported that colleagues more often address women by their first names, when they would use formal titles with men (i.e. "Doctor") in various situations such as in front of students
    - It was noted that these public microaggressions, although perhaps unnoticed, subconsciously impact the next generation of scholars, teaching them that women aren't as respected as men in the engineering field
- Interviewees stated that they were hesitant to speak up about these interactions in fear that it would affect their tenure and promotion
- One participant stated that there is a lack of mutual support between female faculty members in FEAS and they should all do their part to change that
- Several participants discussed their displeasure with the lack of recognition from upper management of their research achievements
- Another brought up the fact that there has only been one female CRC recipient in FEAS in the history of Ryerson, while the other faculties have a much better gender balance

Acknowledgements

I would like to acknowledge Prof. Art Blake, Dimensions Director, for continuous guidance and support. I would also like to acknowledge the Dimensions Faculty Chairs, and the Dimensions Staff, for their coordination, dedication, and for continuously sharing their perspectives on EDI with me.

I would like to express my gratitude to the FEAS Dimensions team, Dr. Sylvie Antoun, Madeline McQueen, Samson Abioye, and Anika Shafi, for their excellent teamwork, leadership, and passion that they bring to Dimensions and EDI work.

I would like to thank members of the FEAS leadership for their support of Diminsions. Thank you to Dr. Tom Duever, Dr. Stephen Waldman, Dr. Miljana Horvat, and Nika Zolfaghari for their support, consultation and advice throughout this process.

**Appendix A – A Guide to Writing about Diversity Considerations in NSERC
Scholarship Applications**

A Guide to Writing about Diversity Considerations in NSERC Scholarship Applications;

Re: NSERC PGS-D and PDF Application Requirements for Addressing Diversity Considerations in Research Design

Background Information and Introduction

Equity, Diversity, and Inclusion (EDI) is a framework for creating an environment that is fair to all participants, welcoming to all individuals, merit-based, and able to thrive by permitting access to the largest possible talent pool. It recognizes obstacles and barriers that are experienced by members of equity deprived (also referred to as 'equity seeking') groups, and seeks to better identify talent and potential, and accommodate those with differing personal needs. Supporting EDI helps to reduce and eliminate its opposites, namely *inequality*, *homogeneity* (and thus less diverse lens, experience, point of view, and creativity), and *exclusionary* practices (both overt and inadvertent). Therefore, EDI follows from a moral and ethical imperative.

As per the Tri-Agency Statement on EDI, the stated commitment to "*Increasing equitable and inclusive participation in the research system,*" and specific initiatives to achieve that, are a primary focus of Ryerson University. Researchers do not always receive EDI training, and yet there is a growing expectation, especially from NSERC, CIHR, and SSHRC, to show EDI competencies and the application of EDI principles in SRC, and on scholarship, fellowship, and grant applications. The purpose of this guide is to provide information relevant to writing about EDI in NSERC Scholarship applications.

NSERC Scholarship Application Requirements

Beginning in 2021, for the NSERC Postgraduate Scholarship – Doctoral or Postdoctoral Fellowship applications, applicants will be required to include a section on **Diversity Considerations in Research.**

Reproduced from the [NSERC Application Instructions Website](#):

> *Incorporating diversity considerations, including but not limited to sex (biological), gender (socio-cultural), race, ethnicity, age, disability, sexual orientation, geographic location, among other factors in your research design can make it more ethically sound, rigorous and useful. You are asked to reflect on how these factors could be incorporated into your research design, methods, analysis and interpretation, and/or dissemination of findings. Where relevant, their inclusion can strengthen your proposal and will be taken into consideration by the selection committee members during review.*

> *NSERC acknowledges that diversity considerations may not be applicable in the context of some research projects, but nonetheless encourages you to fully consider their relevance, as they apply to more areas than one might think. Generally, research that involves or impacts human subjects, organisms capable of differentiation, or their tissues or cells can benefit from such considerations. It is important to thoroughly reflect on the type of data collected and who might be impacted by the research findings before*

concluding that diversity considerations are not relevant. For more information consult the document: Equity, diversity and inclusion considerations at each stage of the research process.

In the Diversity considerations in research design module of your application, you will be asked if diversity considerations have been taken into account in the research design, methods, analysis and interpretation, and/or dissemination of findings related to your proposed research.

If you answer "Yes," you should ensure that diversity considerations are incorporated into your research proposal, as appropriate.

If you answer "No," you will be provided with a text box to explain why diversity considerations are not relevant to your proposed research.

Important notes:

- *If diversity considerations are not relevant to your proposed research, their lack of inclusion will not negatively impact the evaluation of your proposal.*

- *If diversity considerations are relevant to the overall research project, but are not fully included in the proposal section of your application because of space constraints, you may answer "No" in the Diversity considerations in research design module and use the text box to provide additional information.*

- *This module is intended for diversity considerations in your research design. Diversity considerations in your research team and/or research environment should not be described in the text box.*

You will be required to fill out the "Diversity in Research" section of the online application (see form component list on the left side of the image below). In order to fill out this section, you will need to select and employ one of three options:

1. If diversity considerations *will not* be taken into account in your research, you will select "**No**" from the drop down menu circled in the image below. If you select this option, you will then need to fill in the text box (maximum of 750 characters) with an explanation as to why diversity considerations are *not* relevant to your proposed research.
2. If diversity considerations *will* be taken into account in your research, you will select "**Yes**" from the drop down menu circled in the image below. In this case you will not fill in the text box (it will be greyed out), and you will need to directly address diversity considerations throughout your 2-page proposal document upload. How to address diversity considerations in the proposal are discussed below.
3. If diversity considerations *will* be taken into account in your research, but you have been unable to adequately address them in your 2-page research proposal attachment due to space limitations, you will select "**No**" from the drop down menu circled in the image below. (Note that you are only selecting "No" in this case to permit the use of the text box.) In this case, you may use the text box to provide additional information and details that were not included in your 2-page research proposal attachment. Generally, this option should be avoided.

Diversity in Research >

Form
- Application Profile
- Person Profile
- Addresses
- Academic Background
- Experience
- Awards
- Location of Tenure
- S&F Information
- Thesis
- Key Words
- **Diversity in Research**
- Outline of Proposed Research
- Bibliography
- Justif. for Eligibility of Proposed Research
- Contributions/ Statements
- Special Circumstances
- Transcripts - Direct
- Transcripts - University
- Reports on the Applicant
- University Comments

Form 201 - Diversity Considerations in Research Design

Are diversity considerations including, but not limited to, sex and gender taken into account in the research design, methods, analysis and interpretation, and/or dissemination of findings?

If you answer "**yes**" to the question above, please ensure that diversity considerations are incorporated throughout your proposal (i.e. research design, methods, analysis and interpretation, and/or dissemination of their findings).

If you answer "**no**" to the question above, please use the text box provided to explain why diversity considerations are not relevant to your research design.

To confirm that your text will fit, save your information and select Preview, then adjust accordingly.

750 (750 chars)

Starting at the Beginning – Types of EDI Considerations

Aspects of EDI in research can be divided into two main categories, i. EDI considerations **for the research team members**, and ii. EDI considerations in **research methods and application**. Further details are provided below.

i. EDI considerations for the research team members: **This category is relevant to research proposals** (typically those written by faculty, such as NSERC Discovery) and can be further subdivided into i.a. EDI considerations when recruiting prospective members, and i.b. EDI considerations for current members of the research group. **These considerations are not addressed in NSERC PGS-D and PDF applications.**

ii. EDI considerations in research methods and application: **This category is relevant to some scholarship applications and research proposals** and is the focus of this document. It can be further subdivided into ii.a. EDI considerations in research methods, and ii.b. EDI considerations in the application and realized benefit of research results.

ii.a. EDI considerations in research methods; Some topics and considerations that fall under this category include:

- In research that involves human subjects, how will the diversity of the subject pool be taken into account.

- In research that involves Indigenous communities, how will Indigenous modes of knowledge and communication be taken into account.

ii.b. EDI considerations in the application and realized benefit of research results. Some topics and considerations that fall under this category include:

- Has the application of the research topic typically benefitted the majority population of Canada (predominantly White, European ancestry, middle-class and upper-middle-class Canadians), and how might it's application extend beyond these groups. For example, in advanced building science research, can climates of northern (predominantly Indigenous) communities be taken into account, or specifically considered. As another example, in robotics, how is the design of assistive robotics for persons with specific disabilities being considered.

Instructions for Meeting the "Diversity in Research" Requirements for your NSERC PGS-D or PDF Application

NSERC summarizes the research process according to the image below, with five distinct phases. Taking diversity in research into account may be necessary in any or all of the five phases.

The following steps are recommended for meeting the "Diversity in Research" requirements for your NSERC Application:

1. Conceptualize and develop your research project, including:

   Research questions:
   a. background information
   b. significance of the proposed research
   Design of the study
   c. objectives
   d. hypothesis
   Methodology and data collection & Analysis and interpretation
   e. experimental or theoretical approach
   f. methods and procedures
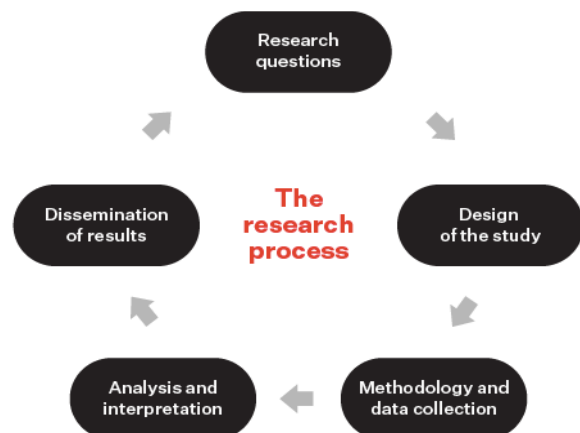   **Dissemination of results**
   g. end goals, and likely impact

Figure 1. The research process, reproduced from https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Policies-Politiques/EDI_guidance-Conseils_EDI_eng.asp

*Note, bold topics refer to the research process diagram above, and underlined items i through vi above are explicitly stated in the application instructions.

To conceptualize your project, it is suggested that you prepare a document with those headings and point form notes under each heading.

2. Consider each of the seven topics (i through vii) above. For each of them, consider whether or not diversity considerations can or should be taken into account, including, but not limited to sex and gender.

   For example, in the i. background information section, is there a way in which the needs of marginalized communities can be considered in addition to those of the majority. Such as, the increased space heating or clean power generation needs of northern Inuit communities, or in robotics, the assistance needs of persons with disabilities. See Example 3 in Appendix A.

   Similarly, when determining vi. methods and procedures, will the sex, gender, or ethnicity of the researcher possibly impact the results? How will you control for this potential impact. See Example 6 in Appendix A for more details and explanation.

3. If you determine that diversity considerations do *not* need to be taken into account in your research, you will need to justify this determination in the 'Diversity in Research' section of your application. For each topic for which you determine that diversity considerations *can or should* be taken into account, you will need to explicitly discuss those considerations in your outline of proposed research document.

   a. Diversity considerations do *not* need to be taken into account in your research – you will have a text limit of 750 characters to justify this determination. In doing so, it is recommended that you mention all five phases of research in the figure above (Research questions, Design of the study, Methodology and data collection, Analysis and interpretation, and Dissemination of the results), how they were considered, and how you determined that diversity considerations do not need to be taken into account. For example, consider research on the optimization of the curvature of aviation turbine blades for enhanced fuel efficiency. The "Research questions" for this project may be, "Do more fuel efficient curvatures of gas turbine blades exist, and can simulation methods be developed to identify those curvatures?" These research questions do not involve human subjects, nor do they disproportionately address the needs of certain communities or groups, but rather they focus on the needs of a particular industry. Therefore, in the 'Diversity in research' text box, one might write:

      The "Research questions" for this project do they disproportionately address the needs of certain communities or groups, but rather they focus on the needs of a particular industry.

Note the importance of being succinct; the above example utilizes 181 characters of the allotted 750 and only addresses one of the five research phases.

b. Diversity considerations *are* being taken into account in your research – for each of the five research phases, you must explain how diversity informs your proposed plan of study. Begin by carefully reviewing the examples in Appendix A, and the broader set of examples on the NSERC EDI Guidance page. Then, for each research phase, decide if your diversity considerations apply of not. If they do, note if they are related to human subjects, the applicability of the research, and/or a different consideration. For example, consider the HVAC systems that are optimized for climates that are predominantly experienced by Indigenous communities in the Canadian north. In the 'Dissemination of the results' phase, thought should be given to how the results can be effectively communicated to Indigenous leaders and decision makers. Peer-reviewed journal publications and conference participation, which have been historically utilized in STEM, may be incomplete. See Example 10 in Appendix A for a discussion of effective dissemination of research with benefit to Indigenous communities.

Checklist

Here is a 'Diversity in research' checklist for NSERC PGS-D and PDF applicants:

- ✓ Develop an overview of your project that is organized to address the five phases of research
- ✓ For each phase, consider whether or not diversity considerations can or should be taken into account
- ✓ If you determine that diversity considerations will not be taken into account, develop a (750 word max) justification, considering all five research phases
- ✓ If you determine that diversity considerations will be taken into account, consider each phase of your proposal individually, and how diversity considerations will be taken into account. Be sure to address each of the following topics as relevant (see Appendix A), human subjects, inaccurate extrapolation, influence of race and gender of the researcher on results, bias, equitable application of research benefits, the need to disaggregate data, effective modes of communication.
- ✓ Incorporate these considerations into the text of your proposal, explaining how they will be taken into account throughout the research program.

Remarks

When developing a research program, it is important to show that diversity considerations are understood, and have been taken into account every step of the way. There are many ways to effectively consider diversity, so applicants should not be too concerned with

"getting it right or wrong" but rather should show thoughtfulness, open-mindedness, adaptability, willingness to dialogue, and willingness to embrace continued learning.

Contact Information

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Examples of Diversity Considerations in Research

With reference to the five phases of research outlined by NSERC shown in Figure 1 above, the following examples of diversity considerations in research are given. Example numbers have been maintained from the NSERC EDI Guidance page.

(reproduced from NSERC EDI Guidance)

First phase: Research questions

Example 3: Important gaps in knowledge can lead to an inaccurate extrapolation of findings

Over-generalization of research findings is an issue in many disciplines. In psychology research, the ease of access to subjects where the research is conducted has led to the vast majority of psychology research being done on Western populations and often on undergraduate student populations. Indeed, a survey of some of the top psychology journals from 2003 to 2007 found that 96% of subjects used in studies were from Western countries, while representing only 12% of the world's population (Arnett, 2008). Research articles routinely assume that their results are broadly representative while no evidence supports this assumption (Henrich et al. 2010). More research on diverse and inconvenient subject pools and careful thought on how broadly specific results apply are needed to put theories of psychology on a firmer empirical footing.

Second phase: Design of the study

Example 5: Developing and mobilizing local knowledge

The Dehcho Collaborative on Permafrost (DCoP) is an initiative that combines scientific and Indigenous knowledge on permafrost to improve monitoring, adaptation, process understanding and prediction of permafrost thaw in the Dehcho region in the Northwest Territories. Members of the DCoP research team as well as community members are co-developing a number of knowledge-based resources including real-time data, interactive maps and modelling data demonstrating rates and patterns of permafrost thaw, land cover change and hydrograph response for different scenarios of warming. These resources are important for the communities to manage and respond to the disrupted hydrological cycle and ecosystems resulting from permafrost thaw and land cover change in the region.

Third phase: Methodology and data collection

Example 6: Bias introduced by the sex of researcher

Growing evidence in research where research team members interact with research subjects shows that the sex, gender, or race of the team member can impact study outcomes with both human subjects (Davis et. al. 2010; Davis and Silver 2003) and non-human animals (Sorge et al. 2014). For example, research on pain experience demonstrated the presence of male researchers blunted pain behavior of laboratory mice and rats, a response that was not observed in the presence of female researchers (Sorge et al. 2014). This difference was found to be due to stress-induced analgesia caused by the scent of male researchers. The lack of awareness of this confounding variable may have resulted in numerous studies reporting inaccurate results, highlighting the importance of accounting for the sex of the person collecting the data in this context.

Fourth phase: Analysis and interpretation

Example 7: Copepod research highlights the importance of disaggregating data by sex

In copepods, a small aquatic crustacean, disaggregating respiration rate data by sex revealed different responses to increased partial pressure of carbon dioxide (pCO2) levels between male and females. In a study to further understand how these animals respond to ocean acidification, Cripps et al. (2016) found that respiration rates of male copepods decreased when exposed to high pCO2 levels while in females they increased under the same conditions. Failure to account for this sex difference by pooling the data would have led to the false interpretation that high pCO2 levels had no effect on the respiration rate. See figure 1 in the article by Tannenbaum et al. (2019) for a visual depiction of this example and of the hazards of pooling data from both sexes.

Fifth phase: Dissemination of results

Example 10: Effective dissemination strategies in an Arctic ecology research program

The Centre for northern studies has led to the production of films, articles, and material for and with Indigenous northern communities on water and environmental resources. The program of research involves youth in Nunavik by mixing traditional and local knowledge with Western science to stimulate and nurture Inuit youth's interest in science-related careers, to promote environmental stewardship, and to build better relationships between community members and research teams. Elders, local guides and coordinators, youth and members of research teams all worked together to train Inuit youth in environmental data collection. Materials are available in English and Inuktitut.

Appendix B – A Practical Guide to Writing about Equity Diversity and Inclusion (EDI) in Grant Proposals

A Practical Guide to Writing about Equity Diversity and Inclusion (EDI) in Grant Proposals

Background Information and Introduction

Equity, Diversity, and Inclusion (EDI) is a framework for creating an environment that is fair to all participants, welcoming to all individuals, merit-based, and able to thrive by permitting access to the largest possible talent pool. It recognizes obstacles and barriers that are experienced by members of equity deprived (also referred to as 'equity seeking') groups, and seeks to better identify talent and potential, and accommodate those with differing personal needs. Supporting EDI helps to reduce and eliminate its opposites, namely *inequality*, *homogeneity* (and thus less diverse lens, experience, point of view, and creativity), and *exclusionary* practices (both overt and inadvertent). Therefore, EDI follows from a moral and ethical imperative.

As per the Tri-Agency Statement on EDI, the stated commitment to "*Increasing equitable and inclusive participation in the research system, including on research teams*" and specific initiatives to achieve that, are a primary focus of Ryerson University. Individual PIs do not always receive EDI training, and yet there is a growing expectation, especially from NSERC, CIHR, and SSHRC, to show EDI competencies and the application of EDI principles in our labs, and on our grant applications.

Writing effectively about EDI in grant applications is made easier when the PI and trainees have taken concrete steps in support of EDI in the lab or SRC environment. See *Supporting EDI in your SRC Lab or Group Environment* and *Five Easy-to-Take Action Items to Support EDI in Your Research Group* included in the 2020-2021 FEAS Dimensions Report. For example, each of the "five easy-to-take actions"[1] will provide context that an applicant can easily draw upon when crafting a proposal.

Granting Agency Requirements

Major grant proposals now require the applicant to write one or more sections on EDI. For example:

NSERC Discovery Applications require:

- In the HQP Training Plan section, a description of "the planned approach to promoting participation from a diverse group of HQP, taking into account equity and inclusion in recruitment practices, mentorship approaches and initiatives aimed at ensuring an inclusive research and training environment and trainee growth." See Appendix A for some sample HQP Training Plan text.

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[1] (i) implementing a Code of Conduct, (ii) offering flexibility of work location and time, (iii) encouraging undergraduates from equity-seeking groups to apply for URA and Masters positions, (iv) putting an EDI statement on your website, and (v) asking about religious or cultural observance requirements,

- In the <u>Past Contributions to the Training of HQP</u> section, a description of "specific actions implemented to support equity and inclusion in recruitment practices, mentorship approaches, and initiatives aimed at ensuring an inclusive research and training environment and trainee growth." See Appendix A for some sample Past Contributions to the Training of HQP text.
- In the <u>Most Significant Contributions to Research</u> section, it is noted that "Impact can be seen as … contributing to increased equity, diversity and inclusion in research."
- In the <u>Methodology</u> section, it is noted that the "inclusion of sex (biological), gender (socio-cultural) and diversity considerations in research design makes research more ethically sound, rigorous and useful." The applicant is instructed to describe "the rationale for including sex, gender and diversity considerations, and how these aspects will be addressed in the research design, if applicable."

NSERC Alliance Applications require:

- an explanation of "how equity, diversity and inclusion have been considered in the academic team" and
- "how equity, diversity and inclusion are considered in the training plan."

Early Researcher Award (ERA) applications require:

- that the "research project … meaningfully engage members of underrepresented groups within the research team" and "[t]he institution must strive to put in place the right conditions for each individual to reach their full potential".
- It also states that the "applicant must clearly demonstrate their commitment to Equity, Diversity and Inclusion (EDI) in their research teams, including undergraduates, graduate students, post-doctoral fellows, research assistants, associates, and technicians, as applicable." ERA applicants must decide how to address EDI considerations in four sections of the application on HQP training.

Starting at the Beginning – Types of EDI Considerations

Aspects of EDI in research can be divided into two main categories, i. EDI considerations **for the research team members**, and ii. EDI considerations in **research methods and application**. These two categories should be considered individually when writing a grant application. Further details are provided below.

<u>i. EDI considerations for the research team members</u>: **This category is relevant to <u>all</u> research proposals** and can be further subdivided into i.a. EDI considerations when recruiting prospective members, and i.b. EDI considerations for current members of the research group.

    i.a. EDI considerations when recruiting prospective members; Some topics and considerations that fall under this category include:

- Which equity seeking groups are, or have historically been underrepresented in your department, program, and research group (See Appendix B). For example, I note that women researchers have been historically underrepresented in Mechanical Engineering graduate studies, and continue to in the current program.
- What recruitment strategies will you use to target members of those equity seeking groups. For example, will you advertise positions in a Women-in-Engineering newsletter, or seek assistance in crafting position ads with non-gendered language.
- Recognition that members of one or more equity seeking groups may have experienced significant barriers to achievement or may have been denied research opportunities. As a result of these barriers, talent and potential may be masked, or difficult to see on their CV in traditional categories (journal publications, volunteer experience, etc.). For example, will you make efforts to interview a diverse set of applicants, including women and minorities, and will you seek to understand their academic journey and the barriers they may have encountered in your assessment of research potential.

i.b. EDI considerations when interacting in the research group; Some topics and considerations that fall under this category include:

- If your research group will implement a Code of Conduct outlining responsibilities and expectations of each member. (A sample Code of Conduct can be found in the 2020-2021 FEAS Dimensions Report).
- If your research group members will be expected or required to attend EDI training.
- Women trainees often report being denied leadership opportunities, internships, choice of research projects, and being subject to other discriminatory practices. Will the research group have policies with regard to:
  - o Equitable distribution of research projects, internships, and leadership opportunities,
  - o Authorship and co-authorship rights on collaborative works,
  - o Distribution of speaking time in meetings, interruptions
- Will accessibility and inclusion be considered when planning social events (access for persons with disabilities, accommodation for dietary restrictions, religious observances)
- Will the research group have a public statement (online, posted in a lab, etc.) on EDI policies. (A sample statement can be found in the 2020-2021 FEAS Dimensions Report).

ii. EDI considerations in research methods and application: **This category is relevant to some research proposals** and can be further subdivided into ii.a. EDI considerations in

research methods, and ii.b. EDI considerations in the application and realized benefit of research results.

ii.a. EDI considerations in research methods; Some topics and considerations that fall under this category include:

- In research that involves human subjects, how will the diversity of the subject pool be taken into account.
- In research that involves Indigenous communities, how will Indigenous modes of knowledge and communication be taken into account.

ii.b. EDI considerations in the application and realized benefit of research results. Some topics and considerations that fall under this category include:

- Has the application of the research topic typically benefitted the majority population of Canada (predominantly White, European ancestry, middle-class, upper-middle-class Canadians), and how might its application extend beyond these groups. For example, in advanced building science research, can climates of northern (predominantly Indigenous) communities be taken into account, or specifically considered. As another example, in robotics, can the design of assistive robotics for persons with specific disabilities be considered.

Dos and Don'ts of Writing about EDI in Grant Proposals

Do: Be candid about the diversity shortcomings in your department/program/research group. There is no expectation that EDI performance has been perfect, but rather it is seen as beneficial to acknowledge shortcomings, and discuss methods to address them. For example, use phrases like, "It is recognized that students who identify as Indigenous have experienced significant barriers to inclusion in our field" or "To address the historic underrepresentation of researchers who identify as women and/or BIPOC in the group…"

Don't: Don't claim that EDI issues don't exist in your department/program/research group. Similarly, don't spend too much effort touting your recruitment and team diversity achievements, unless you can draw concrete linkages from EDI initiatives that you have taken, to diversity statistics that exceed the norms in your field.

Do: Be specific about representation and diversity by citing statistics for race and gender breakdowns in your department/program/research. Quote statistics from self-identity surveys to justify the need for inclusivity initiatives. Make sure that the actions you plan to take will specifically address the shortcomings in the cited data.

Don't: Don't make generic statements about being committed to supporting EDI, or believing in the equality among researchers. Don't make statements about believing that members of equity-seeking groups are just as talented at researchers as others. Instead,

make statements about actions that you will take in support of EDI, and be sure that they have been shown to be effective.

Do: Recognize and <u>acknowledge your own privilege along your academic journey</u>, and the advantages you have had. Each individual has had a different lived experience, and has had advantages, and possibly faced barriers. Each tenure-stream faculty member has had at least some opportunities. This statement in no way diminishes the struggles that many researchers have endured, especially those who identify as in one or more equity-seeking groups. However, by clearly articulating a recognition of our own privilege, we open our minds to understanding the barriers that others face (and *vice versa*), which is an asset when it comes to breaking down barriers of others.

Don't: <u>Don't spend too much effort discussing the barriers that you encountered</u> along your academic journey, especially if it is done as a means of prefacing your ability to identify with and recognize the struggles of others. There is an enormous spectrum of identities and lived experiences in the research world, and having faced specific barriers associated with one identity does not necessarily qualify someone to truly understand the barriers and obstacles faced by others. Furthermore, having faced specific barriers does not excuse someone from self-educating on EDI issues, or mindfulness of others.

Do: <u>Understand (and discuss) the linkage between equitable and inclusive group culture, and recruitment</u> of diverse groups of applicants. When trainees feel valued, free to speak their mind, appreciated, included, and comfortable in their environment, a research lab can develop a reputation as equitable and inclusive, which can aid in recruitment. Prospective trainees often connect with current trainees (both directly, and on social networks) to discuss group culture. When it becomes known that a research group is deliberately and highly inclusive of all identities, it becomes easier to recruit trainees from a diverse applicant pool. It is important to remember, however, that reputation building alone is not enough to ensure diverse recruitment; other initiatives that are recruitment-equity-specific should be undertaken as well.

Don't: <u>Don't focus your discussion entirely on recruitment.</u> While it is valuable to discuss efforts that will be made to recruit from a diverse and larger pool of applicants for open positions, it is also important to discuss specific efforts that will be employed to support equitable treatment of group members (by the faculty and other group members), and inclusive behaviour.

Do: Understand and discuss the relationships between recruiting from a more diverse applicant pool and between increased diversity in the research group, and a stronger research environment.

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Sample Text from an NSERC Discovery Application

Adapted from the "HQP Training Plan" Section:

My approach will focus on creating an environment that is inclusive to all backgrounds, experiences, and viewpoints. I, along with all HQP, will attend an annual Equity, Diversity, and Inclusion (EDI) Workshop, organized by XXXXX[2], focusing on awareness and issues related to EDI in my field. Our group also has a Code of Conduct[3] that each new HQP is given, which outlines procedures and expectations related to harassment, expressing views and opinions, civility in discourse, critiques of colleagues work, creating an environment of physical safety (monitoring that the lab is locked, etc.), and what resources can be utilized should issues arise.

A variety of initiatives are underway to alleviate the underrepresentation of women in the group. They include building our reputation as highly inclusive; ensuring that each member gets the floor in group meetings equally, and that women members engage in project management and leadership. I actively seek women collaborators (e.g. Prof. XXXXX at XXXXX University) helping provide more diverse mentorship to HQP. I work to identify promising women students in our graduating class, and strongly encourage them to apply to our master's program.[4]

Adapted from the "Past Contributions to HQP Training" section:

I maintain a collegial and inclusive training environment. Since [*year*], I've had the pleasure of supervising X PDFs, X PhDs, X Masters, and X URAs. These HQP are a diverse group coming from all over the globe; North and South America, Europe, Africa, The Middle East, and Asia. They include HQP who are the first in their family to attend University, and HQP who identify as LGBTQ2S. Of my XX supervisees, X are women. A plan to address this underrepresentation is included in my Training Philosophy.

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[2] Discuss available workshops and training with your department chair and Associate Dean – Research and External Partnerships

[3] Consider implementing a group Code of Conduct if you have not done so already. More information and a sample code can be found in the 2020-2021 FEAS Dimensions Report.

[4] There are many faculty for whom this paragraph may not apply, however, it's form and structure may be useful for discussing any identified shortcomings and possible modes to address them.

2019 Student Diversity Self-ID Data
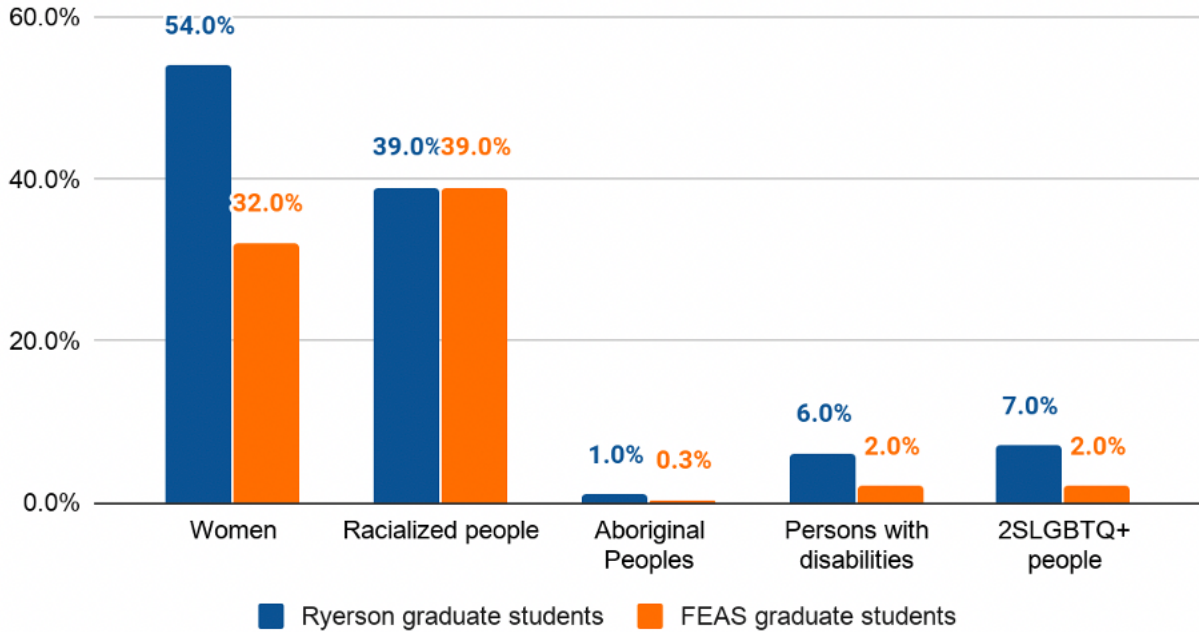
FEAS women graduate student representation by department
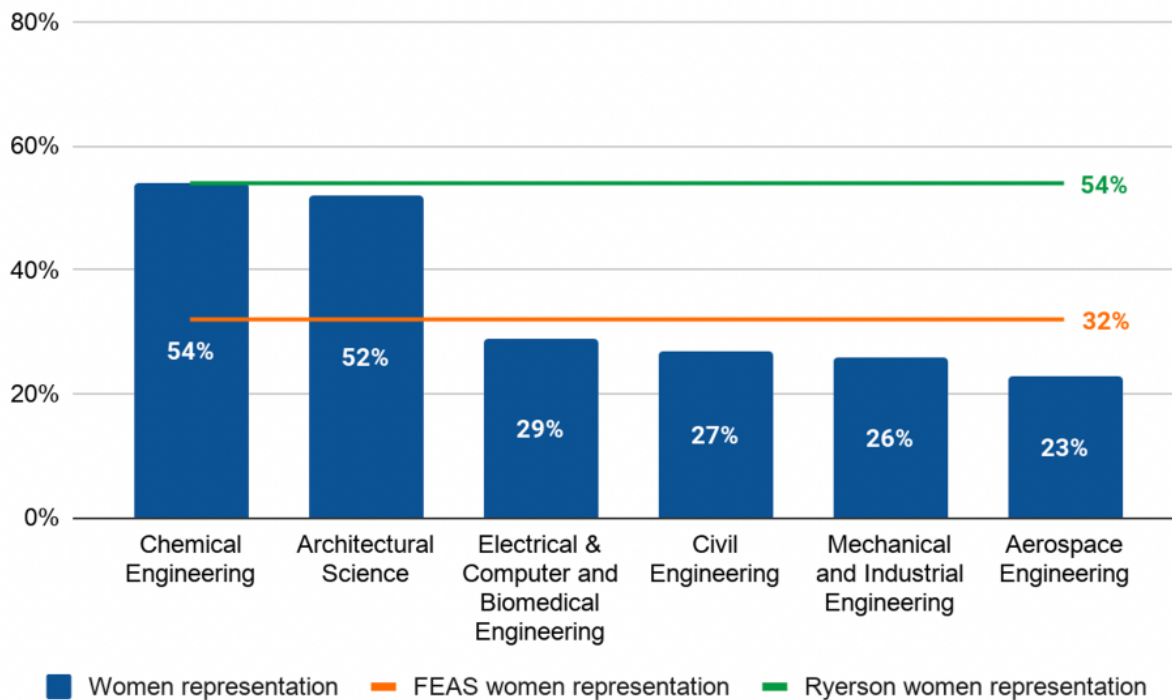
FEAS Aboriginal graduate student representation by department

Legend:
- Aboriginal Peoples representation
- FEAS Aboriginal Peoples representation
- Ryerson Aboriginal Peoples representation
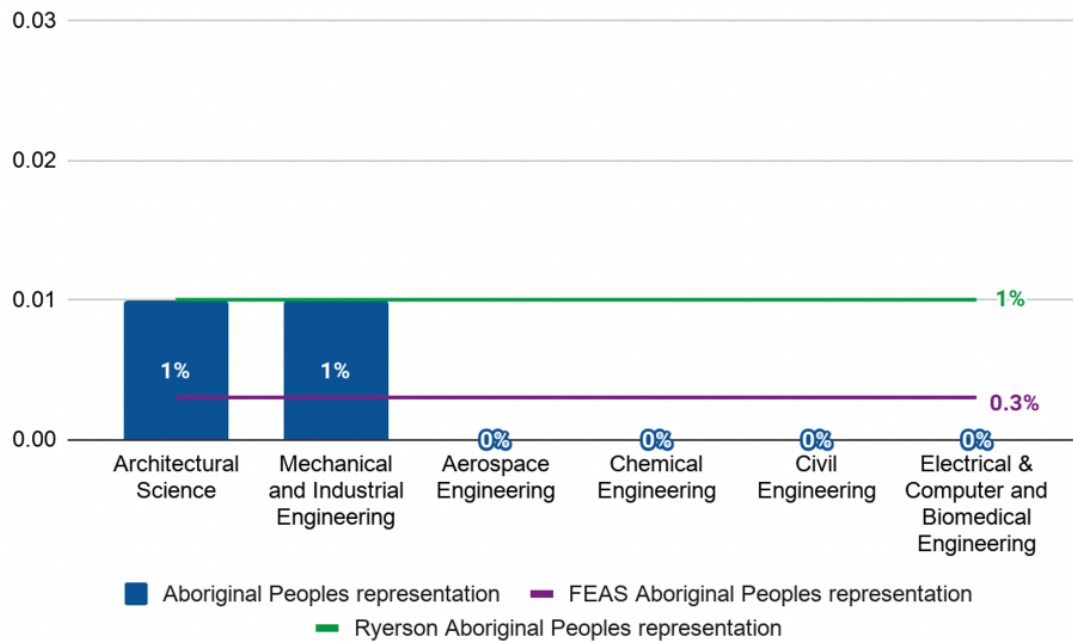
FEAS 2SLGBTQ+ graduate student representation by department

Legend:
- 2SLGBTQ+ people representation
- FEAS 2SLGBTQ+ people representation
- Ryerson 2SLGBTQ+ people representation
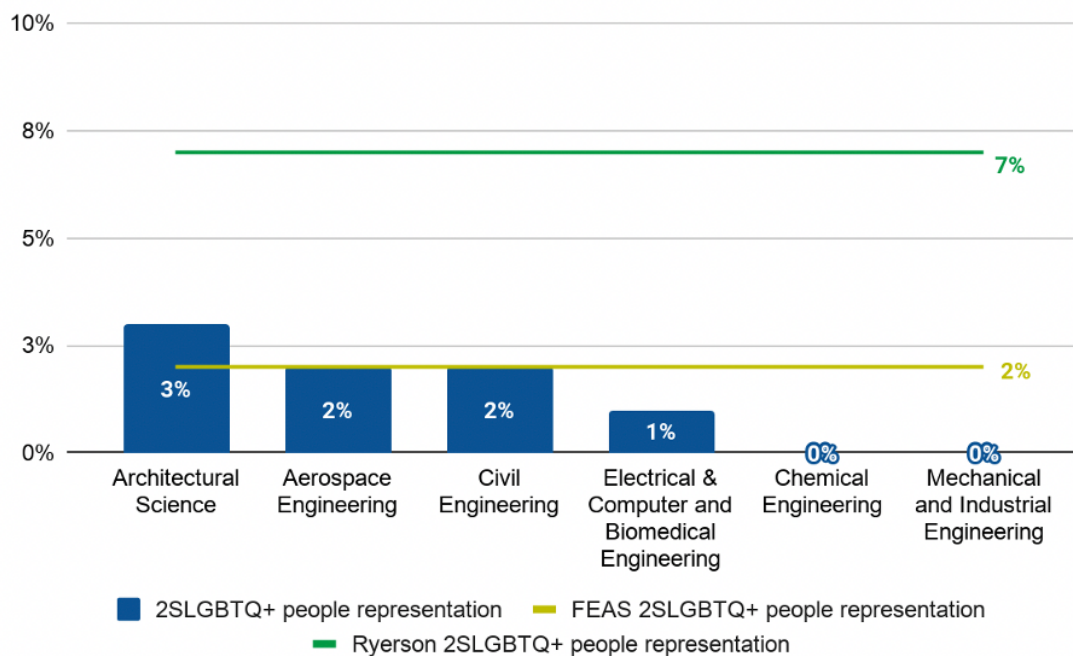
EDI Application Requirements for other Programs

A variety of other grant programs, that are commonly subscribed to in FEAS have instituted EDI application requirements. A brief (non-exhaustive) summary of some of those programs and their requirements is included below.

NSERC Alliance
- In the NSERC Alliance research proposal, the applicant must "explain how sex, gender and diversity have been considered in the research design".
- EDI must be addressed in the proposed training plan portion of the application.
- In the 'Team' section of the application the applicant must "explain how equity, diversity and inclusion have been considered in the academic team composition.

SSHRC Insight
- In the 'Knowledge Mobilization Plan' section: the applicant must "include a plan to increase knowledge uptake by target audiences, and anticipated outputs, outcomes and/or impacts of social sciences and humanities knowledge among various appropriate audiences or participants (academic and/or non-academic), including:
  - methodologies and approaches to engage appropriate target audiences or participants, including, as applicable, diverse groups of researchers, policy-makers, business leaders, community groups, educators, media, international audiences, practitioners, decision-makers and the general public"

CIHR Project Grant
- In the 'Proposal Information – Details' section: If the project involves research involving Indigenous peoples, the applicant must explain their engagement with the community in relation to the research proposal.
- If biological sex and or gender as a socio-cultural factor are to be taken into account in the project, the applicant must explain its/their role in the research design, methods, analysis and interpretation, and/or dissemination of findings.
- If biological sex and or gender as a socio-cultural factor are not to be taken into account in the project, the applicant must explain why they are not applicable.

NSERC Alliance
- In the Research Proposal, the applicant must "explain how sex, gender and diversity have been considered in the research design."
- EDI must be addressed in the 'Proposed Training Plan.
- In the 'Team' section of the proposal, the applicant must "explain how equity, diversity and inclusion have been considered in the academic team composition.

Appendix C – Excerpts from Slides used in Town Halls

What is Dimensions Canada?

The **Dimensions Pilot Program** is a
- federal initiative supported by NSERC, SSHRC and CIHR
- support post-secondary institutions seeking to increase equity, diversity and inclusion (EDI) in scholarly, research and creative (SRC) activities

Objectives
- identify and eliminate obstacles and inequities to research in academia especially for those from under-represented, historically excluded groups (women, visible minorities, people with disabilities, Indigenous peoples, & members of the LGBTQ2S+ community)
- improve equitable access to funding opportunities, increase equitable and inclusive participation, and embed EDI-related considerations into research design and practices

Jointly administered by

CIHR IRSC   NSERC CRSNG   SSHRC CRSH

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Why do we need Dimensions?

- **We know** there are barriers to access and inclusion in research activities.
- **We know** there are biases that underlie racism, sexism, homophobia, ableism and other types of exclusionary behaviours in STEM (and all disciplines in the university).
- These barriers limit the ability of diverse people to contribute, and they create unwelcoming environments. They limit both individual and group success.

Breakout Activity #1:
Conscious (explicit) and Unconscious (implicit) bias

- Biases: Shortcuts our brains take to form an opinion or characterization based on upbringing, stereotypes, culture, media, etc.

- Because of biases, we make automatic associations about people that are often incorrect.

- Biases can be **conscious**, where we observe a trait, and then think about how a characteristic would be associated with that trait, or **unconscious**, where we automatically assume a characteristic based on an observable trait that we don't even consciously consider

Dimensions
Pilot Program

How you can engage with the Dimensions Pilot at TMU?

- Feel free to connect with your Dimensions Faculty Chair (DFC) or team members to further this discussion

- If you are experiencing or witnessing EDI related barriers, feel free to inform, discuss, dialogue, or ask questions. All discussions can be kept private and confidential

- Connect with us on social media via Twitter and Facebook

- Help engage our campus and raise awareness! e.g. link to our Ryerson Dimensions website from your email or social media: https://www.ryerson.ca/dimensions/

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Appendix D – FEAS Dimensions Newsletter (Jan, 2022)

Dimensions
Pilot Program

DIMENSIONS NEWSLETTER FOR WINTER, 2022
Faculty of Engineering and Architectural Science

Dimensions supports Equity, Diversity, and Inclusion in Scholarly Research and Creative activity. This Newsletter edition shines a spotlight on Accessibility.

Meet the Team

Dr. Sylvie Antoun
Postdoctoral Fellow, Mechanical Engineering

Sylvie is a postdoctoral fellow in Mechanical Engineering and strives to curb the inequities existing in research and technology faced in our science and engineering worlds. At the core of all her work is impact within the community. Impact is what drives her to tackle the biggest challenges of marginalized communities, like the climate crisis and its injustices. Impact also drives her to nurture her leadership and teaching methods, by telling stories and sharing experiences — both of her own and others. She has a passion for taking on initiatives that impart her knowledge and ability to help underrepresented communities, while at the same time reinforcing a sense of engineering responsibility for professional practices and collaborative work.

Madeline McQueen
Masters Student, Aerospace Engineering

Madeline McQueen is a second year masters student studying aerospace engineering. Her research aims to make a more sustainable future for the aviation industry through the implementation of hybrid electric and fully electric aircraft. Madeline is passionate about creating a more diverse research environment in STEM fields through encouraging women and BIPOC to continue into graduate studies. She believes that promoting EDI is crucial in an academic environment to produce the most successful graduates and researchers.

Anika Shafi
Undergraduate Student, Aerospace Engineering

Anika is an undergraduate student in Aerospace Engineering. Her early life experiences formed the framework for her belief that when it comes to inequity in any form — inaction is complicity. Thus, through involvement in Dimensions, she is determined to play her part in creating ethical and culturally safe spaces where difficult conversations and social change pertaining to EDI can be explored.

Ryerson University

Faculty of Engineering & Architectural Science

Message from FEAS Dimensions Faculty Chair

Prof. Seth Dworkin
Professor and Canada Research Chair,
Mechanical and Industrial Engineering,
Dimensions Faculty Chair,
Faculty of Engineering and Architectural Science

The FEAS Dimensions team members are passionate about supporting Equity, Diversity, and Inclusion (EDI) in our Scholarly Research and Creative (SRC) activity ecosystem. I want to start by commending the Dimensions team, Dr. Sylvie Antoun, Madeline McQueen, and Anika Shafi, for their hard work and devotion to this program. I want to acknowledge Dr. Art Blake, Ryerson's Dimensions director, for his leadership, and the Ryerson Dimensions Faculty Chairs group for their ongoing work. Thank you also to Dr. Tom Duever, Dr. Stephen Waldman, Dr. Medhat Shehata, Dr. Miljana Horvat, and Nika Zolfaghari for their support, guidance and advice throughout this process.

The Dimensions Pilot Program is now midway through its second year, and with strong support from FEAS leadership, it has been deeply embedded in our faculty practices and programs. In the last semester, Dimensions assisted with training for applying for NSERC Discovery Grants, NSERC Fellowships, and Department Hiring Committee (DHC) Equity Advocates. The FEAS Dimensions team members have also been providing *ad hoc* support to researchers in our faculty on research design, team management, recruitment, and various other ways of supporting and considering EDI.

Dimensions work will continue on throughout the Winter 2022 semester. The COVID-19 pandemic has had an immeasurable impact on scholars and their SRC. In addition, many researchers, especially new Canadians, those who live alone, and those who do not have a strong financial cushion, report increased anxiety and strong feelings of isolation. To help support our SRC community, FEAS Dimensions is planning to hold a number of events, including introductory town halls for undergraduate and postgraduate researchers, a panel discussion on research success in the face of barriers, and networking events for emerging researchers (postdoctoral scholars and new professors). We hope that it will be safe and permissible to hold these events in person.

One of the main objectives of the Dimensions Pilot Program is for us to learn about EDI related barriers and obstacles to participation in SRC. We are very grateful to the many researchers who have reached out and connected to us directly. We have learned about barriers and about the great work that many researchers are doing to foster and support EDI. Still, we want to hear more from you, the researchers. If you have not yet connected with Dimensions, I want to again invite you to contact any member of the FEAS Dimensions team. Share your stories and perspectives with us. Let us know how we're doing. Let us know how we can further support EDI in FEAS SRC.

Thank you to everyone who has engaged with Dimensions in meetings, Town Halls, training sessions, and otherwise. Through our dialogue, engagement, and collective efforts, we will drive continued cultural change towards a more equitable, diverse, and inclusive SRC environment in FEAS.

Ryerson University | **Faculty of Engineering & Architectural Science**

Embedding Accessibility within EDI, Dimensions, and across Campus

By Madeline McQueen, Masters Student, Aerospace Engineering, Ryerson University

EDI to EDI&A – What does this mean?

From its inception, the Ryerson Dimensions Pilot Program has been seeking to increase Equity, Diversity, and Inclusion (EDI) in Scholarly, Research, and Creative (SRC) activities. Included under the "I" Inclusivity umbrella, is the often-overlooked Accessibility. Many are now using "EDI&A", with the "A" for Accessibility, giving it more prominence. The Dimensions mandate pertains to increasing EDI&A: Equity, Diversity, Inclusion, and Accessibility.

What is <u>Accessibility</u>?

Accessibility is a very simple concept by nature; the ability for someone to access something, which may pertain to education, resources, facilities, etc. Often, those who face barriers pertaining to accessibility are people with disabilities. In our university environment, it is critical to ensure that there are methods in place to make a safe and inclusive academic space for people with disabilities.

What are the 5 principles to Accessibility?

1. Attitudinal Barriers: discriminatory behaviours, perceptions, and assumptions which can lead people to ignore, to judge, or have misconceptions about certain individuals.

2. Organizational Barriers: policies, procedures or practices which can prevent individuals from participating fully in a situation.

3. Architectural Barriers: elements of buildings or outdoor spaces that create barriers to certain individuals such as the design of a building's stairs or doorways, the layout of rooms, or the width of halls and sidewalks.

4. Communications Barriers: occur when sensory disabilities, such as hearing, seeing, or learning disabilities, have not been considered.

5. Technological Barriers: occur when a device or technological platform is not accessible to its intended audience and cannot be used with an assistive device.

How is our university addressing these barriers?

- **Academic Accommodation Support (AAS):** disability services office working directly with incoming and returning students looking for help with their academic accommodations (*Addressing Organizational Barriers*).

- **Ryerson University Library and Archives (RULA):** provides access to course readings, research texts, and videos in accessible formats, as well as various adaptive software in select workstations in the library (*Addressing Communications Barriers*).

- **Mandatory Accessibility Training for Employees:** ensuring all faculty and staff receive training is critical to ensure the ongoing development of an accessible and inclusive environment (*Addressing Attitudinal Barriers*).

- **Campus Access Tours:** designed for campus community members with mobility impairments highlighting information such as: best barrier-free routes of travel around campus, TTC Wheel-Trans pick-up and drop-off points, and locations of elevators, accessible washroom facilities and information (*Addressing Physical Barriers*).

- **Web Accessibility:** university websites have been designed with the intent of creating equal access to information and websites for people with disabilities. For example: well structured headings or self-explanatory page links for ease of navigation for those using a screen reading software (*Addressing Technological Barriers*).

References

https://accessiblecampus.ca/understanding-accessibility/what-are-the-barriers/

https://www.ryerson.ca/accessibility/

Ryerson University
Faculty of Engineering
& Architectural
Science

Embedding Equity, Diversity and Inclusion into Research and Innovation

Designing Research Projects with Inclusivity in Mind

By Dr. Sylvie Antoun, Postdoctoral Fellow, Mechanical Engineering, Ryerson University

In addition to addressing the numbers of under-represented groups, various case studies [1-4] have highlighted that narrowly focused research design may result in outcomes that primarily apply to men, ignore cultural minority groups, or are less relevant to the people in underserved communities and regions. Such research may inadvertently benefit far fewer people than would be possible with better design.

Intelligent system technologies are now widely used to make decisions involving hiring, the provision of medical treatment available, and even who gets bail. While these tools show great potential, they can also discriminate against vulnerable and marginalized people [2-4]. Similarly, research, teaching, and even engineering designs, if based on biased data, can perpetuate historical inequities.

The League of European Research Universities (LERU) position paper [1] about *"Equality, diversity and inclusion at universities: the power of a systemic approach"* has highlighted multiple examples in which the systematic failure to include sex, gender, ethnicity and other characteristics in research and innovation has been to the detriment of female or non-dominant groups.

Three examples reproduced from [1] include:

Example 1

Female and pregnant crash test dummies lead to better vehicle safety standards (Gendered Innovations Project)

Although crash test dummies were developed as early as 1949, female crash test dummies only appeared in the late 1960s and pregnant test dummies did not become a research priority until the 1990s.

Conventional seatbelts do not fit pregnant women properly, and motor vehicle crashes are the leading cause of foetal death related to maternal trauma. Today, state-of-the-art virtual pregnant crash test dummies, including a 36-week foetus (developed by Volvo, for example), allow researchers to model the effects of high-speed impact on the womb, placenta, and foetus.

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Analysing sex has led to the development of pregnant crash dummies and computer simulations. Ultimately, it has given rise to more inclusive standards for crash test dummies and greater vehicle safety overall. However, safer seatbelts for pregnant women are still not legally mandated anywhere.

Importantly, it should be remembered that from the start, devices should be engineered for safety in broad populations. Taking both women and men as the norm may expand the quality and creativity of scientific and technological innovation.

To read the full case study and for research references, go to: https://genderedinnovations.stanford.edu/case-studies/crash.html#tabs-2

<u>*Example 2*</u>

Artificial intelligence and data science

A growing body of evidence demonstrates the need to pay due attention in artificial intelligence (AI) knowledge production to a range of characteristics such as sex and gender, skin colour, ethnicity and geodiversity. Schiebinger and Zou (2018) highlight for instance the problematic effects of biased AI systems, noting that "when Google Translate converts news articles written in Spanish into English, phrases referring to women often become 'he said' or 'he wrote'". Word embedding, a popular algorithm used to process and analyse large amounts of natural language data, characterises European American names as pleasant and African American ones as unpleasant. They argue AI algorithms researchers must ensure datasets are bias-free and inclusive. The growing influence and use of AI means that existing biases built into the data risk yielding ever-increasing negative and discriminatory effects.

<u>*Example 3*</u>

"Examining geographic bias in teaching and learning" *- a case study, written by Matthew Harris and Mark Skopec, Imperial College [5]*

Bias against research from low-income and middle-income countries (LMIC) can lead to limited impact of highly relevant research [5] on globally important topics. It is a pervasive issue which may further result in the research-led curriculum being less inclusive and diverse.

Students at research-intensive universities have begun to demand a change in narratives, reading lists and course content, to avoid inherently favouring certain perspectives over others. The issue is relevant in social sciences and humanities, but equally so in STEM fields, particularly in the more applied STEM sciences. There is growing evidence to suggest that building more diverse and inclusive research groups may support an inclusive approach to research and innovation and to more diversity in the research-led curriculum.

What can we learn from this?

To continue 1) to grow our knowledge of intercultural competence and research excellence related to research and innovation, 2) to actively engage in dialogue on EDI barriers and best practices for research and technology in engineering fields, 3) to actively consult with various stakeholders, and take advantage of resources, such as FEAS Dimensions to foster awareness of the related EDI issues in research and engineering design.

Insights on how to apply EDI in research?

Intentionally recognizing whether aspects such as race, sex, gender, sexual orientation, age, ability, social and cultural background may be relevant at each stage of the research process. This process may include setting research priorities, making funding decisions, establishing project objectives, developing methodologies, gathering and analyzing data, evaluating and implementing results. This approach will:

- Add value to research and engineering by ensuring excellence and quality in outcomes and enhancing applicability.

- Make the research outcomes more responsive to social needs.

- Diversify FEAS academic community by attracting a broader range of students.

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Stay tuned for FEAS Dimensions activities planned for 2022:

Graduate Student Town Hall - February, 2022

Panel Discussion on Overcoming Barriers in Academia - March/April 2022

Undergraduate Researcher Town Hall - May, 2022

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