

## Indigenous Inclusion and Involvement in Geoscience (I<sup>3</sup>G) Pathway; National Geoscience Research Plan

Emily Head<sup>1,2</sup>, Colin Sproat<sup>3,4</sup>, Christopher Mancusco<sup>5,6</sup>, J.S.A. McLeod<sup>7,8</sup>, Mitchell Maracle<sup>9,10</sup>, Gavin Woodburn<sup>11,12</sup>, Jade Atkins<sup>13</sup>, Des Moser<sup>14</sup>, Katherine Boggs<sup>15,16</sup>

1-Enverus, 2- Swan River First Nation, 3- University of Saskatchewan, 4- Manitoba Métis 5 – Laurentian University, 6-Sioux Valley Dakota Nation, 7 – University of Saskatchewan, 8 - Cree-Métis, Treaty 6 Territory, 9 - Nova Scotia Geological Survey, 10- Tyendinaga, Mohawk Nation, 11 - University of Calgary, 12 – Kwiakah First Nation, 13 – Joggins Fossil Centre, 14 – Western University, 15 – Mount Royal University, 16 Canadian Federation of Earth Sciences

### Introduction

The mission for the Indigenous Inclusion and Involvement in Geoscience (I<sup>3</sup>G) Pathway is to build a more inclusive Canadian geoscience community by integrating Indigenous peoples and perspectives into geoscience research. This integration involves promoting the co-production, co-ownership, and co-interpretation of geoscience data, ensuring that it remains open and accessible to Indigenous communities. With the duty to consult with Indigenous communities in the ethics code for most provincial and territorial professional bodies in Canada, the I<sup>3</sup>G pathway is an essential chapter of the National Geoscience Research Plan (NGRP), Canada's first strategic plan for the geoscience community. The NGRP is being coordinated by the last author for the Canadian Federation of Earth Scientists. Both the I<sup>3</sup>G and the NGRP are living documents with further consultations planned with Indigenous communities and the Canadian geoscience community.

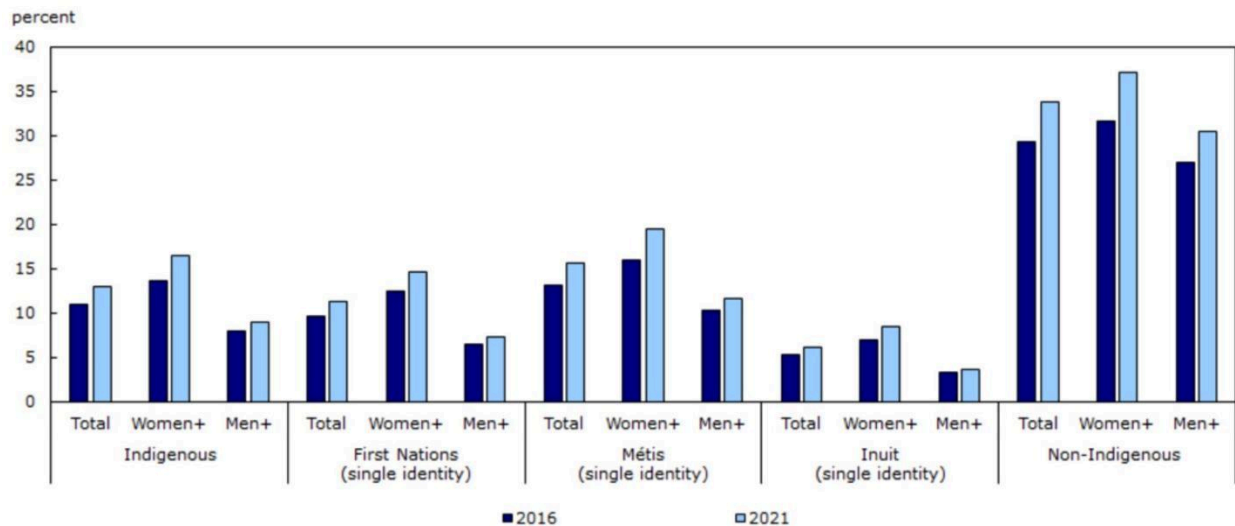


Figure 1: Percentage of adults (ages 25 to 65) with a university degree by Indigenous identity and gender for 2016 and 2021 (Statistics Canada, Population Census 2016, 2021). While overall the percentage of Indigenous people with a university degree has increased by 1 to 3% between 2016 and 2021; the number of Indigenous people with university degrees remains less than half (mostly under 15%) than Non-Indigenous Canadians (mostly over 30%).

## **Background; Need for the Indigenous Inclusion and Involvement In Geoscience (I<sup>3</sup>G) Pathway**

When discussing the NGRP at the annual meeting for the Council of Canadian Chairs of Earth Science Departments, the second last author suggested including the I<sup>3</sup>G pathway, then we realized that there were no Indigenous Geoscientists in the room of department chairs, emphasizing the need for the I<sup>3</sup>G pathway. The Canadian geoscience academic community has never had a strategic plan, leaving our community without a document that could be used to promote the importance of geosciences to humanity or to convince high school (including Indigenous) students that the geosciences represent a viable career choice. First, the I<sup>3</sup>G considers Indigenous students, who face challenges navigating through the academic system, a disparity reflected in the underrepresentation of Indigenous professors (only 3% of Canadian faculty across all disciplines). The 2021 Canadian Census (Fig. 1) shows that the percentage of Indigenous people with a university degree (mostly less than 15%) remains half of the percentage of Non-Indigenous people with a university degree (mostly over 30%). While many Canadian universities now have Indigenous Centres with smudge-friendly spaces, more could be done to support Indigenous students and staff such as creating “Indigenous Connector” liaison positions, microcredentials to support Indigenous community members, low-barrier honorium protocols for elders and knowledge holders, and targeted geoscience outreach programs to Indigenous communities.

## **Remaining Three Components of the I<sup>3</sup>G Pathway**

Secondly, the I<sup>3</sup>G addresses data sharing and data accessibility, ensuring Meaningful engagement with Indigenous stakeholders before, during and after data collection starts with plain language summaries of the proposed research. This includes mainstreaming the adoption of ethical protocols such as the First Nations Institute of Governance’s principles of Ownership, Control, Access, and Possession (OCAP). Thirdly the I<sup>3</sup>G leverages geoscience for the seven generations in ensuring geoscience contributes to the economic reconciliation with Indigenous peoples, highlighting the importance of partnerships and fair agreements. Finally, the I<sup>3</sup>G describes how geosciences can grow and learn from collaboration with Indigenous groups and traditional knowledge. For instance, through the Etuaptmumk (Mi’kmaw “two-eyed seeing”), and the Bridging, Braiding, and Weaving approaches for an appropriate inclusion of Indigenous perspectives across the geosciences. Etuaptmumk was introduced to universities by Mi’kmaq Elders Albert Marshall and Murdena Marshall, using one eye to see with the strengths of Mi’kmaw knowledge and using the other eye to see with the strengths of western science. Bridging, Braiding and Weaving (e.g. Woodburn’s Loxiwe (Clam Garden) project) starts with Bridging where one learns about different knowledge systems. Braiding explores a holistic approach to identify ways that both Indigenous science and Western Science can share space within a research project. Weaving the research outcomes at the end should reflect all information and not default to Western Science (<https://weavingknowledges.ca>).

### **References**

Statistics Canada, 2001. Population Census 2021. <https://www12.statcan.gc.ca/census-recensement/index-eng.cfm>



Weaving Ways of Knowing. <https://weavingknowledges.ca/weaving/braiding-bridging-weaving-knowledge-systems>