

## Engineers Canada's Position

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- Artificial intelligence (AI), machine learning, and data science are overlapping but distinct interdisciplinary fields in which the practice of engineering plays an important role, and in which the technologies impact the practice of engineering itself.
- As governments develop new regulatory frameworks related to advancements in AI, machine learning, and data science, Canada will benefit from the expertise of engineers, who work in the interest of the public, and are overseen by the provincial and territorial engineering regulators.
- AI, machine learning, and data science hold potential to positively impact Canadian society and the economy. However, as with traditional technologies, they also have potential for harm. It is important that they be applied and managed by competent and professional people who work in the public interest, including engineers.
- Where AI, machine learning, and data science are applied as tools to practise engineering, the work must be undertaken by an engineer who is licensed by the provincial or territorial engineering regulator in the jurisdiction in which they are working. These engineers have an ethical responsibility to verify the integrity of the output of these tools.
- As AI, machine learning, and data science technologies develop, the potential emergence of Artificial General Intelligence (AGI) is significant for the engineering profession. While AGI may produce engineering output without human intervention, it cannot be relied upon, because all engineering work must be undertaken by a licensed human engineer.

## The challenge(s)

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In Canada, self-regulation of the engineering profession plays a vital role in protecting and enhancing public health and safety. Emerging disciplines and technologies are challenging established frameworks and require engineering regulators to reassess and clarify the scope of regulated practices.

Today, engineers and engineering regulators face a growing challenge with the rapid development and deployment of AI throughout the economy. AI is an advanced technology that involves the development of systems capable of simulating human cognitive functions such as reasoning, learning, and problem-solving. Machine learning, a subset of AI, focuses on algorithms that enable systems to improve performance through experience without explicit programming. Data science involves extracting insights and value from data using statistical, computational, and engineering methods.

In each of these three fields, the practice of engineering plays an important role. Each technology can impact the practice of engineering when they are used to create engineering output. Engineers involved in developing these tools, and engineers using these tools to perform engineering work, are subject to the oversight of the

### **Artificial Intelligence, Machine Learning, and Data Science**

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provincial and territorial engineering regulators. The regulators enforce the definition of engineering as outlined in provincial or territorial legislation.

As these technologies evolve, the potential that non-humans may be engaged in the practice of engineering becomes significant. This is especially challenging when considering the possibility of Artificial General Intelligence (AGI). The central challenge will be working to establish that human accountability remains foundational to all engineering work.

## How Engineers Canada has contributed

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Engineers Canada has advocated to the federal government on the safe and secure advancement of AI technology. Our [National Position Statement](#) on AI Engineering Technology in Autonomous and Connected Vehicles explores the public health and safety implications of ensuring professional engineers are involved in the development of AI technology in a specific context where the regulation of engineering is essential to protect the public from harm.

## Recommendation to the federal government

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As the federal government develops new policy frameworks for the fields of AI, machine learning, and data science, they must recognize the essential role that engineers and engineering regulation play. While the provincial and territorial engineering regulators regulate the practice of engineering, including the use of AI, machine learning, and data science tools in the practice of engineering, the federal government has a role to play in addressing larger questions of the governance of these technologies and their impact on society.

Engineers Canada therefore asks the federal government to consider the following principles in efforts to develop new frameworks governing AI, machine learning, and data science:

### **1. Professional ethics and accountability**

To strengthen public trust in the use of AI, machine learning, and data science tools, governance frameworks should incorporate requirements for human oversight and accountability.

### **2. Safety, security, and reliability**

As new tools are deployed throughout the economy and society in ways that impact public safety, governance frameworks that result in higher levels of safety, security, and reliability for these tools are essential.

### **3. Innovation and economic growth**

AI, machine learning, data science and the technological changes these fields induce are powerful drivers of economic growth. When developing new regulatory frameworks, the positive benefits of technological advancements should be balanced with the need to protect the public from potential harms.

# How Engineers Canada will contribute

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Engineers Canada will continue to monitor the federal government’s agenda, legislative initiatives, and proposed regulations related to the development and deployment of AI, machine learning, and data science, particularly where these may affect life, health, property, economic interests, public safety and welfare, or the environment. Engineers Canada will continue supporting the provincial and territorial engineering regulators as they develop guidance on the use of AI in an engineering context.