



GenomeCanada

Genome Canada Leaders' Roundtable Series on the Future of Genomics in Canada

Pre-event briefing note for Roundtable 2

Where is the future of innovative genomics in Canada?
Strengthening our Future.

A VIRTUAL MEETING ON OCT. 5, 2021, AT 1:00-4:00 PM EDT

INTRODUCTION

For 20 years, Genome Canada has invested in building Canada's genomics capacity across sectors through applied research and innovation partnerships. As we look to the next 20 years, Genome Canada is convening a series of three virtual roundtables with Canada's genomics research community, global experts and key partners in the national genomics ecosystem. These roundtables are designed to help identify future opportunities and challenges for Canadian genomics, and to inform Genome Canada's strategic direction and a new mission-driven approach to delivering greater impact.

The second of these three roundtables will focus on identifying where Canada's strengths and areas of future focus should be—with a particular focus on where Canada can double down on its international advantage to lead in the future of genomics, and how we can leverage unique multi- and interdisciplinary genomics across areas of research and innovation. The first roundtable explored developing research and innovation strategies across the Canadian genomics ecosystem. The final roundtable will cover foundational ecosystem elements required to deliver on potential impacts for Canada and globally.

CONTEXT

We are in the early days of a **Bio Revolution** where advanced biosciences and biotechnology will fundamentally transform our lives. Driven by the confluence of genomics, big data, artificial intelligence (AI), gene editing and synthetic biology, we have an unparalleled opportunity to deliver homegrown biological solutions to complex problems, drive economic growth and position Canada for global market leadership in key areas of strength and—most fundamentally—protect and improve Canadians' lives.

To harness this transformative potential, Genome Canada is moving to a mission-driven approach to address major challenges where genomics can make a real difference and ensure that promising concepts can be taken through the research and innovation ecosystem to deliver equitable impacts that benefit communities across the country. This was recognized in Budget 2021, where Genome Canada's mission-driven programming was

highlighted in initiating the development of a new [\\$400 million Pan-Canadian Genomics Strategy](#) (PCGS). Delivering on this transformation will require a clear understanding of Canada's greatest genomics strengths and opportunities, and how to leverage them to Canada's competitive advantage.

FRAMING

This roundtable provides an opportunity for Canada's genomics research community to bring their expertise and insight to framing the question: "Where does Canada have significant global strengths and opportunities in genomics, and what are the areas in which we can lead?" In addition, it will foster discussion on where Canada can benefit from intersections across genomics and related research and innovation sectors, and when we will need to identify priorities in Canada's investments in genomics.

Engaging in the thinking on the future of genomics has predominantly been a case of assessing sector by sector. In the **health sector**, many national governments have begun to map out their strategic health genomics futures. The U.S. has made [10 'bold predictions'](#) for future human genomics that include genomic testing becoming routine in healthcare and genomic therapies curing multiple genetic diseases. In the U.K., the [health genomics strategy](#) has laid out a future built on U.K. strengths including cancer, rare diseases, pharmacogenomics and screening. In **agriculture and agrifood**, the future of genomics is being highlighted [in supporting food security, agricultural resilience and food production](#) (from [cellular](#) to [precision](#) agriculture). In the **environment and climate change** sectors, genomics has the capacity to deliver [environmental monitoring](#) including biodiversity, resource management strategies from [forests](#) to [fisheries](#), [environmental harm mitigation](#), and [climate change adaptation](#).

While each of these sectors has multiple strengths and potential futures, there is also a significant benefit for the future in addressing cross-sectoral approaches—be they in overarching subject areas such as ['One Health'](#) or in [foundational genomics elements](#) necessary across sectors and technologies.

However, for all of Canada's strengths in research and innovation, there is a limited capacity to support the full suite of potential impactful genomics—in contrast to the U.S., where genomics spending dwarfs Canada's. This means that as a country, Canada will need to make decisions about where to place or finite resources and make trade-offs between investments that can deliver impacts.

In this second roundtable, we will discuss where Canada has strengths and opportunities to build on existing and potential competitive advantages in genomics research and innovation. This will include sectoral approaches and technologies in broad areas such as health, agriculture and environment, but also where Canada can leverage its cross-sectoral strengths in multi- and interdisciplinary genomics.

To frame the discussion, the roundtable will feature a keynote from [Professor Dame Sue Hill](#), Chief Scientific Officer for England at NHS England. The U.K. is a world leader in genomics and the unique structure of the NHS is allowing them to deliver these advances at scale and pace for patient benefit. To leverage this unique opportunity, in September 2020

the U.K. unveiled its new National Genomic Healthcare Strategy, [Genome UK: the future of healthcare](#). The strategy sets out how the U.K. genomics community will come together to harness the latest advances in genetic and genomic science, research, and technology for the benefit of patients, to create the most advanced genomic healthcare system in the world. The strategy focuses on [three key areas](#): diagnosis and personalized medicine; prevention; and research. This strategy is also now aligning with the new [U.K. life sciences strategy](#) released in July 2021.

Key to delivering the strategy through NHS England, Professor Dame Sue Hill has been integral to implementing the strategy to ensure that it leverages both areas of health genomics strengths in the U.K., and where it can be integrated into NHS patient care. Her experience, and that of the U.K. strategy, can serve as an example of how to build research and innovation strengths into national capabilities, and on to future health, social and economic benefits.

QUESTIONS

The roundtable sessions seek to produce generative insights that will help shape Genome Canada's mission-based strategy and inform broader thinking including the Pan-Canadian Genomics Strategy. To deliver on this goal, roundtable participants are asked to consider the following questions:

- What are Canada's strengths and areas of competitive advantage to leverage for delivering future genomics impacts in Canada and internationally? Where are the unique opportunities to create cross-sectoral benefits from genomics research and innovation in Canada?
- How can we ensure we strengthen Canada's global standing and competitive advantage on our relative areas of strength and also support the broad future of genomics in the country? Where do we need to prioritize and make choices?
- How can Canada's focus on future genomics research and innovation address diverse needs across society, and drive to health, social and economic benefit?

KEY DOCUMENTS

For those interested in further information on the topics identified above, the following provide useful primers to the subject area.

- Cheifet, B., 2019, [Where is genomics going next?](#) *Genome Biol* 20, 17.
- CSIRO, 2021, [Environomics Future Science Platform](#).
- Green, E.D., Gunter, C., Biesecker, L.G., et al., 2020, [Strategic vision for improving human health at The Forefront of Genomics](#). *Nature*; 586 (7831):683-692.
- McGuire, A.L., Gabriel, S., Tishkoff, S.A., et al., 2020, [The road ahead in genetics and genomics](#). *Nat Rev Genet* 21, 581-596.
- Nature Genetics, 2019, [Genomics and our future food security](#). *Nat Genet* 51, 197.
- U.K. Government, 2020, [Genome UK: the future of healthcare](#).