THE TERRY FOX RESEARCH INSTITUTE
L'INSTITUT DE RECHERCHE TERRY FOX

Digital Health &
Discovery Platform
Digital · Hôpital
Découverte · Plateforme

Backgrounder

In 2019, Innovation, Science and Economic Development Canada, announced an investment of up to $49M from the Strategic Innovation Fund (SIF) as part of the Stream 4 - Health and Biosciences competition

- This award, together with $108M in-cash and $165M in-kind contributions from 97 consortium partners, supports a Digital Health and Discovery Platform (DHDP) that will combine Canadian expertise in artificial intelligence (AI) and precision medicine to improve healthcare for Canadians.
- TFRI will catalyze collaborations with industry to stimulate commercialization of home-grown research discoveries.

DHDP GOALS

The hope for conquering complex diseases such as cancer is in the intelligent use of digital information.

- Canadians will benefit from more personalized treatments and a more collaborative health care system that is better positioned to maximize medical breakthroughs.
- DHDP's project, estimated at $159 million, will also help to create and maintain highly skilled jobs and provide training opportunities across Canada.
- It will lead to the creation of innovative new start-ups and support the growth of small and medium-sized businesses.
- A focus on membership recruitment and engagement to mobilize Canada's knowledge economy: educating, linking and significantly growing the number of Canadians capable of using AI for healthcare innovation.
- The new completion date for the project is 2027.

MOH AND PATHFINDER

The DHDP will greatly empower the Marathon of Hope Cancer Centres Network, launched by the Terry Fox Research Institute in 2019.

- The Marathon of Hope Cancer Centres Network (MOHCCN) launched its **Pathfinder Project** in 2021 and its cleared the way for the acceleration of precision medicine for cancer in Canada – a collaboration with the Canadian Distributed Infrastructure for Genomics (CanDIG), a pan-Canadian initiative led by a team at the University Health Network in Toronto.
- The MOHCCN Pathfinder project helped establish the technical software that will allow clinical and genomic data to be deposited according to MOHCCN standards, setting the stage for the creation of the largest, and most complete, cancer case resource in the country: The MOHCCN Gold Cohort.

BUILDING OUR ECOSYSTEM
- The network has connected almost 100 partners across Canada, including health care institutions; small, medium-sized and large companies; universities and research foundations; and all four major artificial intelligence (AI) research labs in Canada.
- Currently, DHDP has signed agreements with **52 members** who are still committed to this project and remain involved and engaged. Going forward we will continue to recruit and engage new members.

DHDP TECHNICAL PARTNERS
DHDP now has three technical partners who bring leading-edge capabilities for secure data sharing and expertise in building and integrating federated networks for AI-based inquisition.

Bitnobi - This new, Toronto-based partner has developed secure certification software to allow safe accessibility and control over data. In 2016, Bitnobi's patented system was designed and developed by big data cloud computing and cybersecurity experts who identified the problem of sharing Big Data across varying data infrastructure with different types of users.

"We can confidently say that working on this specific project gives us the opportunity to showcase what Bitnobi has built from a data-sharing perspective and, at the end of the day, we're trying to unlock cancer data that sits in silos across the entire country…. There's a real opportunity to make an impact, not just at a cancer level, but at a grassroots level for Canadian citizens as a whole."
Hassan Jaferi, CEO, Bitnobi, Inc.

CanDIG - A partner since 2019, CanDIG is a Canadian solution to analysis of health data; A national, distributed, analysis of locally controlled, private genomic data.

"Partnership between companies and public healthcare systems is absolutely essential to make sure a project like this succeeds in Canada. CanDIG is happy to be part of something that's going to both create new jobs in Canada that are going to be essential towards growing our expertise in this important area, and making sure it gets used in a way that maximally benefits the public entities that are ultimately providing the health care."
Michael Brudno, Chief Data Scientist, UHN and CanDIG Academic Lead

Integrate.ai - This new, Toronto based partner is a leader in development of federated learning infrastructure that simplifies incorporation of analytics into distributed workflows. Integrate.ai helps developers solve the world's most important problems without risking the world's most sensitive data.

"At the core of integrate.ai's involvement in the DHDP is our commitment to leveraging our federated data science platform for the discovery, evaluation, and safe use of health data without the need to move it. Our federated data

science platform is uniquely positioned to play a pivotal role in the DHDP's mission to bring precision medicine and personalized care to Canadians by ensuring that valuable insights can be derived from distributed datasets while maintaining the highest standards of data privacy and security."
Steve Irvine, integrate.ai Founder & CEO

OPERATIONAL AND TECHNOLOGICAL APPROACH

The DHDP harnesses the talent of experts across the country to develop a state-of-the-art software Platform to help unlock data-driven discoveries for cancer and other diseases.

This Platform will be deployed at participating sites across Canada and contain specific tools that help ensure privacy, accessibility and traceability of data within a federated data governance framework, allowing users to build sophisticated machine learning models and learn collectively from data without ever sharing sensitive patient information.

- **Federated Learning Ecosystem**
  To minimize the risks to patient privacy, the DHDP uses a federated model to support pan-Canadian research. Under this model, patient data remains at the site where it is generated, and never crosses any institutional, local or provincial borders.
- **Privacy-By-Design**
  The DHDP's privacy-protecting data governance framework and data science technologies will transform collaborative health research.
- **International Standards**
  By leveraging international standards and initiatives, many of which have been informed by our own Canadian experts and thought leaders, the DHDP is ensuring high quality, consistency and interoperability.
- **FAIR Principles**
  The adoption of FAIR Principles allows data to be Findable, Accessible, Interoperable, and Reusable. The DHDP will build a trusted data source by ensuring data is effectively managed and can be appropriately shared and used across the network.

PROJECT LEADERSHIP

The project is overseen by a management committee led by TFRI and an executive council comprising key members of the DHDP ecosystem.

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Dr. Laszlo Radvanyi, president and scientific director of the Ontario Institute for Cancer Research, is the Independent Chair, representing Executive Council members.