



CFI 2027 Innovation Fund

UManitoba Expanded Expression of Interest (E-EOI)

CONFIDENTIAL Project Synopses

April 21, 2026

Prepared by the Office of Research Services
Vice-President (Research & International)



**University
of Manitoba**

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EOI Project Synopses

Clayton H. Ridell Faculty of Environment, Earth, and Resources

Ricardo Silva (Co-Lead: Pierre Francus)

Department(s): Department of Earth Sciences; Eau Terre Environnement Research Centre, INRS

Project Title: *Canadian Science, Technology, and Research Infrastructure for Drilling in the Earth System (CAN-STRIDES)*

Proposal Overview

The Stream 3 “CAN-STRIDES” proposal aims to establish a coordinated, nationally accessible scientific drilling and core-analysis platform integrating ice, terrestrial, and marine systems through a unified core-to-data infrastructure. Anchored by the Canadian Core Repository Facility (CCRF), the platform combines distributed core storage, high-throughput and high-resolution scanning laboratories at the University of Manitoba and Institut National de la Recherche Scientifique, and a Canadian-developed laboratory information management system (LIMS) to enable interoperable workflows, standardized data practices, and long-term stewardship. The initiative addresses fragmented national drilling capacity by linking field equipment networks, legacy core collections, and analytical infrastructure within a coordinated operational model, supporting research across climate science, Arctic systems, critical minerals, carbon capture and storage, and geohazards, while strengthening data sovereignty, accessibility, and international competitiveness.

Faculty of Arts

Kent Fowler (Co-Lead: Mirjana Rokсандic)

Department(s): Anthropology; Anthropology, University of Winnipeg

Project Title: *The Long-Term History of Human-Environment Relationships*

Proposal Overview

This Stream 2 initiative proposes to establish the Earth Materials and Archaeometry Centre (EMAC), a distributed research platform integrating palaeoproteomics, high-resolution geochronology, and advanced provenience analysis to study long-term human–environment relationships. The platform combines minimally destructive ancient proteomics, novel magnetic and thermal clay sourcing approaches, and complementary luminescence, uranium-series, and rehydroxylation dating methods within coordinated facilities at the University of Manitoba and the University of Winnipeg. EMAC aims to address a critical national gap in integrated archaeological science infrastructure by linking biological, material, and environmental data within robust chronological frameworks, enabling interdisciplinary research on adaptation, subsistence, mobility, and human–ecosystem interactions across deep time while strengthening national capacity and international competitiveness.

Faculty of Agricultural and Food Sciences

Nandika Bandara (Co-Lead: Rotimi Aluko)

Department(s): Food and Human Nutritional Sciences

Project Title: *Integrated Research Platform for Sustainable, Inclusive and Circular Food Systems (IRP-SICFS)*

Proposal Overview

This Stream 1 proposal advances an integrated food systems platform spanning sustainable production and processing, biomass valorization, circular manufacturing, and data-driven supply chain optimization. Organized around technological innovation, AI-enabled systems analytics, and the integration of Indigenous and traditional knowledge, the initiative aims to transform food systems from linear to circular models while improving sustainability, resilience, and equity. The infrastructure supports advanced production and processing technologies, multi-scale analytical platforms, digital modeling and life cycle assessment tools, and portable health and nutrition monitoring systems to enable community-engaged research, including applications in northern and Indigenous contexts, and to strengthen Canada's leadership in sustainable, nutrition-sensitive food systems.

Faculty of Science

Francis Lin (Co-Lead: Claudio Rigatto)

Department(s): Physics & Astronomy; Internal Medicine, Seven Oaks Hospital

Project Title: *Lab-on-Chip Innovation Centre*

Proposal Overview

This Stream 1 proposal advances the Lab-on-Chip (LOC) Innovation Centre as an integrated translational microfluidics platform spanning manufacturable device fabrication, biological integration, analytical verification, and regulatory-aware benchmarking. The Centre combines pilot-scale thermoplastic fabrication, automated assembly and reagent deposition systems, controlled processing environments, and validation infrastructure within a single coordinated pipeline. Designed to address the gap between academic prototyping and real-world deployment, the platform supports applications across point-of-care diagnostics, agricultural sensing, environmental monitoring, and functional microphysiology systems, while strengthening regional capacity in translational microfluidics research and commercialization.

Jörg Stetefeld (Co-Lead: Ned Budisa)

Department(s): Chemistry

Project Title: *Structural Biology meets the Cell: Integrated Platform for hybrid method approach in Structural Cell Biology*

Proposal Overview

This Stream 1 proposal advances an integrated structural cell biology platform linking high-resolution macromolecular structure determination with quantitative live-cell imaging to enable a closed-loop, cross-scale analysis of structure–function relationships. The initiative combines an advanced in-house X-ray diffraction facility with a time-resolved quantitative imaging platform to connect molecular design, structural validation, and cellular response within a unified workflow. By addressing the current disconnect between structural and cellular analyses, the platform supports interdisciplinary research across structural biology, synthetic biology, and biomedical sciences, enabling predictive, architecture-driven models of cell signaling while strengthening institutional capacity and reducing reliance on external facilities.

National Centre for Truth and Reconciliation

Raymond Frogner

Department(s): UM Libraries

Project Title: *“Surviving Canada”: The Indigenous health impacts of residential school trauma*

Proposal Overview

This Stream 2 proposal advances a nationally significant research initiative examining the intergenerational health impacts of residential school trauma through the integration of archival records, health and social data, and Survivor and community testimony within a secure, Indigenous-governed data infrastructure. Building on existing capacity at the National Centre for Truth and Reconciliation, the platform combines trauma science, epidemiology, AI-enabled archival processing, and advanced data analytics within a privacy-preserving, data sovereignty-aligned framework. The initiative aims to bridge Indigenous knowledge systems and quantitative health research to generate population-level evidence that informs Indigenous-led policy, health systems planning, and reconciliation efforts in Canada and internationally.

Price Faculty of Engineering

Olanrewaju Ojo (Co-Lead: Mohamed Bassuoni)

Department(s): Mechanical Engineering; Civil Engineering

Project Title: *Centre for Additively Manufactured Protective Systems (CAMPS)*

Proposal Overview

This Stream 1 “CAMPS” proposal advances a national platform for the design, fabrication, and validation of multifunctional protective systems under coupled extreme conditions using additive manufacturing. The initiative focuses on system-level co-design of metals, composites, and cementitious materials, where performance is governed by architecture, interfaces, and hierarchical structure rather than composition alone. The platform integrates multi-material additive manufacturing with high- and hypervelocity testing, enabling validation under combined threats such as impact, blast, radiation, and extreme cold. Leveraging existing infrastructure at the University of Manitoba, CAMPS supports applications across defence, space, nuclear systems, and resilient infrastructure, while advancing sustainable construction approaches using locally sourced materials for northern and remote environments.

Puyan Mojabi (Co-Lead: Cyrus Shafai)

Department(s): Electrical and Computer Engineering

Project Title: *Centre for Antenna and Sensor Testing and Nanofabrication (CAN-FAB)*

Proposal Overview

This Stream 3 proposal advances CAN-FAB as a nationally positioned centre of excellence in antenna and sensor testing and nanofabrication by integrating and upgrading the Applied Electromagnetics Laboratory (AEL) and the Nano-Systems Fabrication Laboratory (NSFL). The initiative will modernize anechoic chambers, extend measurement capacity into the sub-terahertz range, enhance cleanroom nanofabrication and advanced assembly capabilities, and support a fully integrated design-fabrication-measurement workflow. CAN-FAB is designed to enable emerging applications across communications, Arctic and defence technologies, critical minerals exploration, advanced manufacturing, smart agriculture, health technologies, and quantum systems, while building on longstanding open-access infrastructure and collaboration with academic, industry, government, and community partners.

Shaahin Filizadeh (Co-Lead: Caniggia Viana)

Department(s): Electrical and Computer Engineering

Project Title: *The Energy Innovation Centre (EIC)*

Proposal Overview

This Stream 1 “EIC” proposal advances a multidisciplinary research platform focused on electrification, grid modernization, renewable integration, and decarbonization to support Canada’s net-zero transition. The initiative will establish a smart-grid-ready testing and experimentation facility integrating real-time simulation, power-hardware-in-the-loop validation at 200+ kW scale, battery systems, advanced loads, and alternative energy carriers such as hydrogen. By linking engineering, science, economics, and law, the platform enables system-level analysis of emerging energy challenges, including large-scale electrification, energy storage, and northern grid resilience, while strengthening collaboration with utilities, industry, and community partners.

Rady Faculty of Health Sciences

Jason Kindrachuk (Co-Lead: Keith Fowke)

Department(s): MMID

Project Title: *Centre for One Health & Emerging Pathogen Security (COHEPS)*

Proposal Overview

This Stream 1 proposal advances the Centre for One Health & Emerging Pathogen Security (COHEPS) as an integrated platform to strengthen national and global preparedness for emerging and re-emerging infectious diseases. The initiative combines high-containment in vivo imaging, high-throughput diagnostic and countermeasure evaluation systems, and advanced computational infrastructure within a coordinated, multi-pillar framework spanning foundational science, diagnostics, analytics, and program science. Leveraging expertise at the University of Manitoba and extensive international partnerships, COHEPS supports pathogen discovery, surveillance, and medical countermeasure validation, while enabling rapid, coordinated responses and advancing One Health approaches across human, animal, and environmental systems.

Sabine Mai (Co-Lead: Rene Zahedi)

Department(s): Physiology and Pathophysiology; Internal Medicine

Project Title: *Manitoba Bio Innovation Core (MBIC)*

Proposal Overview

This Stream 3 proposal advances the Manitoba Bio Innovation Core (MBIC) as an integrated, end-to-end biomedical platform linking eight established core facilities into a coordinated pipeline spanning discovery, validation, and translation. The initiative introduces a single-entry governance and intake model to enable cross-core workflow design, supported by targeted upgrades in imaging, single-cell and spatial omics, proteomics, in vivo systems, and high-performance computing. By addressing current bottlenecks and unifying previously siloed infrastructure, MBIC aims to maximize the use of limited biological samples, accelerate translational research, and strengthen partnerships with clinical, government, industry, and Indigenous collaborators while enhancing national competitiveness.

Tabrez Siddiqui (Co-Lead: Michael Jackson)

Department(s): Physiology and Pathophysiology; Pharmacology and Therapeutics

Project Title: *The Manitoba Multiscale Integrated Neuroscience Data (MIND) Platform*

Proposal Overview

This Stream 1 “MIND” platform proposes to establish integrated, next-generation neuroscience infrastructure at the University of Manitoba linking nanoscale super-resolution imaging, volumetric live and whole-tissue imaging, high-speed functional recording, magnetic resonance imaging, and AI-enabled computational analytics. By combining advanced optical modalities, electrophysiology, and high-performance data analysis within a single multiscale workflow, the initiative aims to connect molecular architecture with circuit dynamics and whole-brain signatures across models of neurological disease. Building on the existing Live Cell Imaging Facility within PrairieNeuro, the platform will create a coordinated discovery pipeline spanning single molecules to systems-level neural function, with applications across neurodegenerative, neurodevelopmental, neurovascular, regenerative, and neuro-oncology research.