**Science, Technology and Innovation Priorities for the Canada Excellence Research Chairs Program and the Canada First Research Excellence Fund**

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| **CHALLENGE** | **Healthy Canadians** | **Innovative and Resilient Communities** | **Sustainable Food Systems** | **Clean and Resource-Rich Canada** | **Technologically Advanced Canada** |
| **DESCRIPTION** | Enhancing the health and wellness of Canadians across all life stages. | Building thriving communities that are inclusive, liveable, smart, and safe. | Maximizing Canada’s agri-food potential to support economic growth and secure, equitable access to food. | Fighting climate change and protecting Canada’s environment while harnessing the potential of our natural resources to support a resilient, sustainable economy, and high quality of life. | Advancing transformative and enabling technologies that will support a technologically advanced economy and society. |
| **OBJECTIVES** | * Promote physical and mental health and wellness, including addressing the social, economic, and environmental determinants of health * Prevent and treat disease whether chronic, rare, or infectious, including emerging public health threats and future pandemics * Support Canada’s readiness for health emergencies * Strengthen health care and primary care | * Reduce economic and societal inequality, including through addressing systemic barriers to economic and social inclusion * Improve and strengthen public institutions and public trust * Support diverse forms of creativity to foster innovation | * Protect food sources through clean innovations in agri- and aqua-culture that enhance biosecurity, support biodiversity, and improve water and waste management * Enhance food quality, safety, stability, and shelf life * Develop and apply innovative technologies to improve agricultural processes and products and reduce carbon emissions | * Fight climate change through the advancement of knowledge and applications in climate science (mitigation) * Enhance resiliency to the adverse effects of climate change (adaptation) * Preserve and protect the natural environment, including water, air, and soil quality, and its biodiversity * Develop sustainable approaches to resource extraction and processing that maximize economic value and minimize adverse environmental impacts * Advance energy diversification and renewable and next-generation clean energy * Develop and accelerate the adoption of clean technologies across the economy and society * Integrate different knowledge systems, including traditional, community, and Western science * Accelerate progress in difficult-to-decarbonize sectors of the Canadian economy, such as aerospace | * Develop enabling and digital technologies and leverage disruption to support innovation * Transform manufacturing processes and practices to enhance productivity * Advance knowledge on public acceptance and adoption of new technologies * Accelerate transition to a more digitally enabled society |
| **AREAS OF FOCUS** | **Aging population** (e.g., chronic conditions, dementia, healthcare systems)  **Antimicrobial resistance** (e.g., OneHealth, microbiology, genetics)  **Brain health** (e.g., Alzheimer’s, dementia)  **Indigenous health**  **Mental health and wellness**  **Precision medicine** (e.g., treatment, prevention, diagnostics, imaging and analytics)  **Primary care** (e.g., delivery models, access, and outcome improvements)  **Problematic substance abuse**  **Public and population health**  **Regenerative medicine** (e.g., stem cells, tissue engineering, cell therapy)  **Vaccinology and therapeutics** (e.g., vaccine development, CAR-T cell research) | **Data** (e.g., data privacy, security, collection, analysis, communication, ownership, use)  **Governance and public institutions** (e.g., democracy, security, public trust, law)  **Healthy communities** (e.g., social dimensions of aging; economic and social determinants of health)  **Inclusive growth** (e.g., business-sector innovation, digital economy, marginalization / inclusion, research barriers)  **Inclusive societies** (e.g., reconciliation, systemic barriers, cross-cultural understandings, social cohesion, transportation, housing)  **Inequality** (e.g., social, economic, health)  **Resilient infrastructure**  **The North**  **Technological solutions** to address community opportunities and challenges (e.g., Smart cities)  **Technology and society** (e.g., impact and ethics of AI, bioscience, or surveillance; impact of technology on relationships and human systems, transportation) | **Agri- and aqua-culture** (e.g., regenerative agriculture, genomics-enabled agriculture)  **Agri- and irrigation technology** (e.g., smart / precision agriculture, plant biotechnology, nanobiotechnology)  **Bioeconomy**  **Climate change research**  **Food sovereignty** (e.g.,Northern and Indigenous communities)  **Indigenous-led agriculture** (e.g., Indigenous plants, products, and knowledge)  **Livestock health and sustainability** (e.g., livestock vaccine research)  **Plant health**  **Proteins and alternative food sources**  **Safety and security of food supply chain** (e.g., blockchain technology) | **Alternative energy technologies** (e.g., carbon dioxide conversion; industrial-scale hydrogen production; high-performing clean battery technology; small modular reactors; wind and solar power, geothermal and waste heat)  **Circular economy** (e.g., waste treatment, management and value creation, greening manufacturing, sustainable food packing and new compostable materials to replace single use plastics)  **Clean technologies**  **Clean transportation** (e.g., electrification, green aviation, clean fuels and materials)  **Climate change research** (e.g., mitigation; adaptation and resilience; climate monitoring, modeling and prediction; sensing technologies; human impacts; climate policy)  **Conservation ecology** (e.g., biodiversity, OneHealth)  **Energy** (e.g., sustainable oil and natural gas technologies and processes)  **Forestry** (e.g., forest ecology, fire science, sustainable forest management)  **Green chemistry**  **Low carbon materials for the construction sector**  **Modern mining** (e.g., sustainable mining technologies and processes)  **Northern and Arctic** (e.g., polar science, Indigenous resilience and adaptation)  **Reducing energy consumption for the transport of data**  **Water** (e.g., oceans science and technologies, blue economy) | **Artificial intelligence** (e.g., machine and deep learning; human emotions/language applications, including Indigenous languages; surveillance, computer vision)  **Big data technologies and analytics** (e.g., Internet of Things, blockchain, predictive and cognitive analytics)  **Biomanufacturing**  **Cybersecurity** (e.g., confidential computing technology and processes)  **Genomics and applied science**  **Materials and processing technologies** (e.g., new and advanced materials; chemical manufacturing; metal, non-metal, composite material, and photonics manufacturing; nanotechnology)  **Micro-electronics and semi-conductors design and manufacturing**  **Next generation communication technology** (e.g., 5G, 6G)  **Photonics**  **Quantum technologies** (e.g., quantum computing, quantum sensing)  **Smart and digital manufacturing** (e.g., robotics, embedded sensors, 3D printing)  **Space economy** |
| **CROSS-CUTTING DISCIPLINES AND APPLICATIONS** | **Enabling technologies (e.g., AI, blockchain, genomics, quantum)** | | | | |
|  | **Social sciences and humanities, including ethics** | | | | |