Strategic Research Plan 2025–2030
Executive Summary

IMAGINE: Our Foundations, Vision, Community, and Commitment

Queen's University, with a legacy of over 180 years, stands as a globally recognized leader in research and innovation. The university has consistently demonstrated excellence across diverse fields including physics, health sciences, engineering, social sciences, and the humanities. This tradition of excellence is exemplified by achievements such as the Nobel Prize in Physics and numerous national and international accolades. Queen's continues to play a pivotal role in advancing knowledge while fostering economic and social prosperity both locally and globally.

The 2025–2030 Strategic Research Plan outlines a forward-thinking vision focused on creating the conditions necessary for transformational research. To address the world's most pressing and complex problems, Queen's emphasizes an interdisciplinary approach, breaking down traditional academic silos and fostering collaboration among researchers, communities, governments, and industry partners. This vision also reflects the university's commitment to welcoming global talent, expanding research partnerships, and sharing discoveries broadly and ethically.

A core strength of Queen's is its people: a vibrant research community comprising faculty, clinician scientists, students, and staff, all united by a shared passion for inquiry. Central to the university's strategy is its integration of diverse perspectives, particularly through its principles of Indigenization, Equity, Diversity, Inclusion, Anti-Racism, and Accessibility (I-EDIAA). These values are not only embedded in research practice but also shape the questions asked and the impact of the knowledge generated.

ENGAGE: Strategic Research Themes

Queen's identifies six interrelated research themes that leverage existing and emerging strengths to address global challenges. Each theme is interdisciplinary and aligned with the United Nations' Sustainable Development Goals, ensuring Queen's research contributes to a more equitable and sustainable future. The themes are as follows:

1. **Understanding the Earth and Universe**

   Human beings are curious and driven to explore, experiment, and discover. This curiosity-motivated work can help us to understand our place in the world and can lead, sometimes in unforeseen ways, to solutions to current and future global problems. Researchers at Queen's discover and explore by developing mathematical models that describe physical phenomena, elucidating the nature of molecular and surface reactions, and investigating interactions between biological and social systems and the environment – particularly in light of climate and other human-driven changes. We study the composition, structure, and physical aspects of the Earth, including landscape and freshwater systems. We undertake foundational research in astroparticle physics, astronomy, and quantum photonics, and also advance scholarship on Indigenous and other diverse ways of knowing. These efforts collectively

improve our understanding of the world around us and the laws and structure of the universe.

2. Promoting Health and Wellbeing

Queen's complement of discovery-based researchers, clinician scientists, nursing, and rehabilitation faculty are driving bench-to-bedside and community-based innovations that are improving patient care and outcomes. We are advancing understanding of cancer drivers and the design and conduct of clinical trials in cancer therapy and supportive care. These developments are improving cancer outcomes nationally and internationally. Our researchers are also making inroads in other health-related fields – from epidemiological and public health research to transforming the understanding and treatment of blood and cardiovascular disorders and developing innovative medical technologies and devices. We are informing novel approaches to treating inflammation and pain and improving patient outcomes for chronic and infectious diseases. Using model systems, we are furthering our knowledge of brain function and disease and providing technology-driven, patient-centred solutions. We are committed to tackling the broad and systemic health challenges of our time from an interdisciplinary perspective that encompasses prevention and the broader determinants of health. As health leaders regionally, nationally, and globally, we are working with and within communities to devise innovative and culturally sensitive approaches in support of lifelong physical, mental, and social wellbeing and healthy aging for all.

3. Envisioning Just Futures and Innovating in Cultural Expression

Queen's research reflects on the questions of what it means to be human. Driven by historical inquiry into beliefs and experiences, languages, arts, and Indigenous rights, our researchers collaborate broadly to envision just futures. Our scholarship addresses racial, gender, and sexual politics, inequality, colonialism, Indigenous languages and cultures, political philosophy, the role and impact of media and technology, and how artistic creation and cultural diversity elevate human experience. In our rapidly changing world, the interplay of religion, conflict, social polarization, and democratic integrity demands sustained and focused research to deepen our understanding and guide effective responses. We explore the relationship between ideals of democracy, justice, and the rule of law, and have an active collective of socially engaged researchers who are addressing important questions around fairness, human dignity, and social justice. We are committed to advancing our understanding of how human experience and cultural expression can deepen the impact of scientific and technological advances, contributing to the full spectrum of the UN SDGs and leading to human-centred, ethical, and inclusive solutions to a range of the world's challenges.

4. Delivering Materials for the Future

Advanced materials are essential in our everyday lives and our needs will only increase. Queen's researchers are exploring the potential of natural materials and the recyclability of synthetic ones and developing innovative materials and coatings for diverse applications. These include infrastructure, energy production and storage, electric and computer technologies, automobiles, and replacement of human tissues. Each application has unique design parameters that define the properties of the required materials, including corrosion resistance, environmental impact, stimuli responsivity, biocompatibility, strength, durability, processability, electric storage capacity, and many others. Materials research integrates concepts from multiple disciplines – from engineering, chemistry, mathematics, and physics to

medicine and biology. This work has broad impact and will generate new medical treatments, more durable and sustainable infrastructure, cleaner energy sources, and more efficient energy transport.

5. Advancing Next-Generation Computing and Analytics

Supercomputers are critical infrastructure supporting advances taking place across all research fields in Canada and around the world. They allow researchers to ask and address bigger, more complex questions. While Canada currently lacks the sovereign, secure supercomputing power to support its bold research and innovation goals, Queen's research is positioned to lead capacity building and infrastructure development that will increase Canada's competitiveness in supercomputing. Our experts are also poised to advance research and knowledge mobilization in the fields of artificial intelligence (AI), machine learning, human-machine interactions, and robotics, as well as their applications across disciplines, including business innovation, health, and the digital humanities, with a necessary critical lens on matters of surveillance, equitable access to technological design and uses, and anti-racist citizenship. Queen's researchers are exploring econometric methods for causal machine learning and developing new algorithms to understand human behaviour and wellbeing based on data such as video, audio, and text. AI, when used responsibly, holds the promise to revolutionize research in the upcoming decades, but only if we can transform raw data into actionable insights. We are committed to laying the foundation for research groups across Queen's to meaningfully engage with AI as they explore new applications, methodologies, and paradigms, while also thinking about its social, legal, privacy, and security implications.

6. Building Productive, Inclusive, and Sustainable Societies

The challenges of a changing climate and how humans get along with one another and share in prosperity are perhaps the interconnected trials of our time. Queen's researchers are at the forefront of these challenges, forecasting the environmental, health, and societal effects of climate change and developing technologies like low-emission energy solutions and strategies for mitigation and adaptation. We build evidence, institutions, and methods to support research-based policy and decision-making, creating a better future for people and the planet. Queen's researchers are developing options for more environmentally responsible extraction of critical minerals and for carbon dioxide capture and transformation. We are geoengineering innovative approaches to climate-resilient infrastructure and protecting our water sources. Unique campus facilities enable research on issues from coastal flooding and natural hazards to contaminants of emerging concern. Our scholarship addresses the distinctive impacts of climate change in remote northern and Arctic locations, including permafrost thaw and associated effects on carbon emissions, housing, and food and water supply. Queen's research offers economic, business, and legal solutions to support shared prosperity, while protecting the planet. We have expertise in governance, multi-cultural citizenship, peace building, and military affairs. Our researchers work collaboratively with the communities we ultimately serve, creating meaningful knowledge and applications. This includes developing adaptive technologies to support social inclusion of persons with disabilities, understanding the drivers of human migration, and engaging citizens in more sustainable modes of travel. Our education research is furthering our ability to create inclusive learning environments for Canadian children and youth.

TRANSFORM: Strategic Objectives for 2025–2030

To actualize its vision, Queen's has established strategic objectives aimed at enhancing its global research impact. These include:

Being at the forefront of discovery and research impact

The diversity and scale of knowledge creation in the Queen's community enables opportunities to understand and resolve some of the world's most complex issues. From new approaches to treating diseases to unraveling the mysteries of our universe or tackling climate change, the advancement of knowledge brings us closer to the solutions we need. These challenges exceed the individual and require the collective inputs of Queen's thought leaders and emerging thinkers, support networks, funders, partners, and decision-makers. Through this collaboration, we aim for our impact to be palpable on a global scale.

We will:

- Grow the number of identified strong research foci
- Increase our readiness for, relevance to, and alignment with philanthropic opportunities, national and global research priorities and to international funding opportunities, including Horizon Europe
- Excel in stewardship of Canada Foundation for Innovation Major Science Initiative platforms, research centres and institutes, and core research facilities
- Provide leveraged support to major interdisciplinary and partnered research funding applications
- Measure success by ranking among the top 10 research universities in Canada in terms of inputs (research funding support), outputs (scholarship in all its forms) and research impact (commercialization, thought leadership and influence, a thriving and agile research and innovation ecosystem)

Building research excellence by attracting and developing talent

In an increasingly connected world, talent mobility is the greatest opportunity. Not only are higher education institutions competing nationally for the brightest minds, but they are also competing with institutions around the world. We are in an enviable position to attract top-tier research talent. To retain and develop these individuals into leading experts in their field, we will integrate research opportunities with their training at Queen's.

We will:

- Attract and retain world-class research talent, including faculty, staff, graduate students, and postdoctoral fellows
- Enhance talent development through the evaluation of the university research ecosystem to identify and address gaps and barriers, including those related to I-EDIAA
- Support the research trajectories of early-career researchers across disciplines
- Embed research as a fundamental component of the university's teaching mission by engaging students at all levels of their academic careers with research opportunities

Creating greater research intersections between Queen's and partners

Kingston is home to Queen's, the Royal Military College of Canada, St. Lawrence College, and two affiliated research hospitals, Kingston Health Sciences Centre and Providence Care. The city is well

positioned to become a key economic centre along the Toronto-Montreal corridor, and Queen's is ready to provide leadership in partnership-building across sectors.

We will:
• Create capacity to bolster regional economic development and cooperation
• Expand the scale and impact of fundamental and clinical health research through increased external funding and coordination across the university and its affiliated hospitals
• Pursue strategic partnership-building, both locally and farther away – we will demonstrate the value of locating in a smaller region anchored by strong post-secondary and research-focused health care institutions

Providing best-in-class research supports
We are committed to providing the research community with client-focused support. This means providing the research community with the tools they need to achieve their ambitions, safeguard their ideas and align their proposals and programs with the fundamental principles of I-EDIAA in research. Navigating the research system is increasingly complex, and we will ensure we have the resources, processes, and expertise in place across the university.

We will:
• Implement new platforms and tools that identify novel research funding opportunities
• Create modern systems and services to streamline administrative processes
• Provide advanced research computing and digital research services in support of all disciplines
• Promote Open Science and FAIR (Findable, Accessible, Interoperable, and Reusable) data principles within our research landscape
• Develop an I-EDIAA in research strategy in collaboration with the Vice-Principal Culture, Equity, and Inclusion portfolio and empower our researchers to implement I-EDIAA wise practices and considerations in their research programs
• Provide enhanced resources to support Indigenous and community-based research
• Work with faculties to ensure the operational sustainability of core facilities
• Prioritize safeguarding our research, ethics and compliance support, and protecting intellectual property
• Support our researchers in formalizing research agreements, mobilizing their research outcomes and impact, and in communicating their successes to different audiences, raising public awareness of the value of their research

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View the complete Strategic Research Plan.