Fedoruk Centre
SYLVIA FEDORUK CANADIAN CENTRE FOR NUCLEAR INNOVATION

STRATEGIC PLAN 2025

ADVANCING SASKATCHEWAN'S LEADERSHIP IN NUCLEAR RESEARCH AND INNOVATION

Table of Contents

The Sylvia Fedoruk Canadian Centre for Nuclear Innovation, Inc. is a not-for-profit corporation with an independent Board of Directors and a sole member, the University of Saskatchewan. The Fedoruk Centre is funded by Innovation Saskatchewan and third-party revenues.

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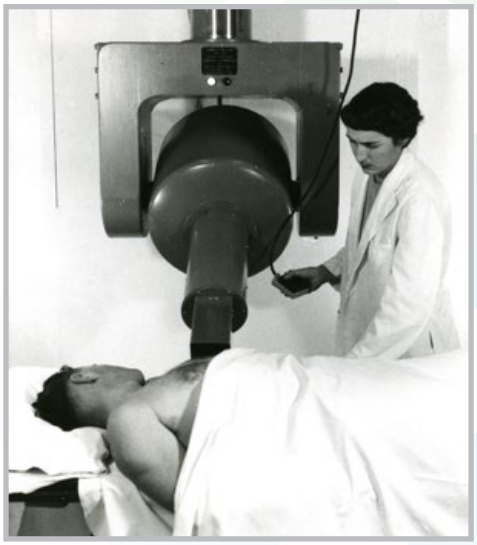
Context

SASKATCHEWAN IS COMMITTED TO CONTINUED LEADERSHIP IN NUCLEAR SCIENCE AND TECHNOLOGY.

Since the early 1950s, Saskatchewan has been a pioneer in nuclear science. Among many contributions, Saskatchewan's legacy includes developing the first cobalt-60 radiation therapy device (1953), which transformed cancer treatment and saved millions of lives; designing and constructing the Saskatchewan Accelerator Laboratory (1964), which later became part of the Canadian Light Source; and operating a SLOWPOKE II research reactor, which provided industry with analyses of the concentrations of uranium and other elements in various samples for 37 years (1981-2018).

Given the wide range of applications of nuclear science and technologies within medical, materials, agricultural and environmental sciences, nuclear innovation offers important opportunities to enhance Saskatchewan's health and economic prosperity. The Government of Saskatchewan's Growth Plan 2030 recognizes this potential and the important role the Fedoruk Centre will play in sustaining leadership in nuclear science, innovation and know-how.



As a graduate student at the University of Saskatchewan, Sylvia Fedoruk helped to determine the right dose of gamma radiation that would be safe for the patient but kill cancer tumours, pioneering cobalt cancer therapy that has saved millions of lives around the world.

THE FEDORUK CENTRE IS AN IMPORTANT ENABLER OF SASKATCHEWAN'S AMBITION.

With financial support from Innovation Saskatchewan, the Sylvia Fedoruk Canadian Centre for Nuclear Innovation Inc. (Fedoruk Centre) was established in 2011 to build on the province's historic foundation and help place Saskatchewan among today's global leaders in nuclear research, development and training. Innovation Saskatchewan, Western Economic Diversification Canada and the Fedoruk Centre partnered to establish the Saskatchewan Centre for Cyclotron Sciences (SCCS), which commenced operation in 2015 to support nuclear innovation and achieve health, social and economic impacts.

Today, the Fedoruk Centre operates and maintains the SCCS in a state of readiness for access by users from diverse fields and organizations; funds projects led by Saskatchewan researchers; invests in program partnerships with Saskatchewan institutions to support the application of nuclear methodologies; and provides consultative services on nuclear topics for the public and policymakers.

> **The Fedoruk Centre is advancing value-added areas of nuclear innovation in medicine, materials research, power generation and environmental stewardship.**
>
> – Saskatchewan Growth Plan 2030

Context

Through these efforts, the Fedoruk Centre has:

- Established state-of-the-art infrastructure for radiochemistry and the production of radiopharmaceuticals in compliance with current Good Manufacturing Practices (cGMP);
- Renovated the SCCS Innovation Wing for radiochemical and life-science research and the development of nuclear imaging probes;
- Invested in specialized infrastructure at the SCCS, such as the prototype BioPETx for real-time detection of metabolic processes in plants, and made these tools available for access by users from academia and industry;
- Partnered with the Johnson Shoyama Graduate School for Public Policy's Centre for Science and Innovation Policy to support research on public perceptions of nuclear technologies and best practices for engaging diverse communities on nuclear topics; and
- Enabled internal leaders and Fedoruk Centre-funded researchers to share their expert opinions on nuclear energy technologies and breakthroughs in nuclear medicine.

Top left: University of Regina undergraduate students build and test a nuclear particle detection system in an outreach project supported by the Fedoruk Centre. **Top right:** The Fedoruk Centre holds a public discussion "Nuclear Insights" with Saskatchewan experts in social science, nuclear engineering and nuclear medicine. **Bottom:** Fedoruk Centre team discussion.

THE 2025 STRATEGIC PLAN CEMENTS THE FEDORUK CENTRE'S ROLE IN BUILDING CAPACITY IN NUCLEAR SCIENCE, ENABLING INNOVATION AND ENGAGING WITH DIVERSE STAKEHOLDERS.

Having established an initial core of nuclear innovation activities in Saskatchewan, concentrating on nuclear imaging for life sciences, the social science of public engagement with nuclear technologies and building capacity to inform decision-making about nuclear energy in the future, the Fedoruk Centre now aspires to deepen these activities and broaden Saskatchewan's reach to new areas, new users and new partners in the nuclear domain.

Developed in consultation with Fedoruk Centre staff, key stakeholders and the Board of Directors, the **Strategic Plan 2025: Advancing Saskatchewan's Leadership in Nuclear Research and Innovation** will guide the next phase of the Fedoruk Centre's journey. This Strategic Plan will position the Fedoruk Centre to build greater capacity in nuclear research; support a larger and more diverse community of innovators leveraging nuclear methods to advance new products, processes and technologies; and foster respectful dialogue with Saskatchewan's people and policymakers on topics in nuclear science and technologies.

Top: The province of Saskatchewan commits baseline funding for five years, through Innovation Saskatchewan, for cost-shared operation of the Fedoruk Centre. (Hon. Tina Beaudry-Mellor announces commitment, 2019)

Middle: The federal government contributes to SCCS infrastructure upgrades, through Western Economic Diversification, matched by contributions from Innovation Saskatchewan and the Fedoruk Centre. (Hon. Ralph Goodale observes demonstration of radiological handling equipment.)

Left: University of Saskatchewan Professor Humphrey Fonge mentoring a researcher in radiochemistry.

Aspiring to broaden and deepen Saskatchewan's leadership in the nuclear domain

Top left: University of Saskatchewan VP Research Karen Chad chairs the working group of the Canadian Neutron Initiative. **Top right:** Nuclear imaging will help to advance crop resilience to climate change. **Middle:** Hon. Tina Beaudry-Mellor learns how the Fedoruk Centre will enable Saskatchewan researchers to develop nuclear therapeutics to cure disease. **Bottom:** Fedoruk Centre Executive Director, John Root, introduces VPs of Research from 16 Canadian universities to the Canadian Neutron Initiative.

> **Reducing carbon emissions in electricity production and advancing the development of zero-emission small modular reactor technology using Saskatchewan uranium.**
>
> - Saskatchewan Growth Plan 2030

Our Strategy

PURPOSE

Our purpose is to place Saskatchewan among global leaders in nuclear research, development and training through investment in partnerships with academia and industry for maximum societal and economic benefit.

COMMITMENTS

The Fedoruk Centre will concentrate its efforts on three pivotal Commitments:

1. **Building Capacity & Strengthening Research.** Broaden and deepen Saskatchewan's capacity in nuclear research, development and training to advance nuclear imaging, materials science and public policy.
2. **Enabling Access & Supporting Innovation.** Maintain the SCCS in a state of readiness for user access and strengthen efforts to stimulate engagement with partners beyond Saskatchewan universities.
3. **Fostering Education & Public Engagement.** Encourage a culture of respectful, responsive dialogue with the public and policymakers to build an evidence-based understanding of the risks and benefits of nuclear technologies.

Top: Loading a radiopharmaceutical into a shielded delivery container.
Bottom: Cyclotron control room.

KEY ACTIVITIES

Each **Commitment** will be achieved through key activities that comprise the Fedoruk Centre's four business lines:

- **Programs** - partnering with Saskatchewan institutions to establish academic leaders for research and education of highly qualified people, building capacity for Saskatchewan to participate in nuclear science, technology or policy;
- **Projects** - funding research projects led by Saskatchewan-based scientists with target outcomes that advance physical or social science and create conditions for growth of economic activities in the nuclear domain;
- **Facilities** - operating the Saskatchewan Centre for Cyclotron Sciences, maintaining a competitive state of readiness for users to advance their programs of innovation related to nuclear imaging (e.g. instruments, methods, life sciences in plants, animals and humans, medical diagnoses and therapies) and manufacturing state-of-the-art radiopharmaceuticals for clinical applications; and
- **Consultative Services** - establishing resources for the public and policymakers of Saskatchewan to engage in respectful, objective considerations of nuclear science or technology and to strengthen Saskatchewan's presence among global leaders of nuclear innovation.

Our Commitments and Key Activities are focused to achieve specific **Goals** and **Near-Term Initiatives**, with **Guideposts** to help us track progress. Success will be evident in meeting our Commitments and delivering **Outcomes** that benefit Saskatchewan's people, our wellbeing and economic growth.

PURPOSE

To place Saskatchewan among global leaders in nuclear research, development and training through investment in partnerships with academia and industry for maximum societal and economic benefit.

COMMITMENT | 1

BUILDING CAPACITY & STRENGTHENING RESEARCH

Broaden and deepen Saskatchewan's capacity in nuclear research, development and training to advance nuclear imaging, materials science and public policy.

GOALS

1.1 FUND RESEARCH PROGRAMS & PROJECTS
to support and expand research activities led by Saskatchewan-based scientists in nuclear imaging, materials science and public policy.

1.2 BUILD CAPACITY
by training users for safe practices in a regulated facility, and by providing an environment in which expert users can enrich their students with hands-on experience with specialized methodologies.

1.3 EXPAND RESEARCH
by proactively attracting, training and retaining a community of non-expert users–from diverse disciplines, sectors and locations–to apply nuclear science to advance their research initiatives.

OUTCOME

THRIVING RESEARCH ENVIRONMENT.
Saskatchewan will be defined by a growing and highly productive community of researchers using nuclear methods to solve complex problems.

COMMITMENT | 2

ENABLING ACCESS & SUPPORTING INNOVATION

Maintain the SCCS in a state of readiness for user access and strengthen efforts to stimulate engagement with partners beyond Saskatchewan universities.

GOALS

2.1 PROVIDE ACCESS TO EXPERTISE & INFRASTRUCTURE
to accelerate technology development with specialized knowledge from nuclear methods.

2.2 SUPPORT PRE-CLINICAL RESEARCH
by providing users with access to the Fedoruk Centre's specialized facilities and GMP - compliant laboratories to advance the development of radiopharmaceuticals for clinical research.

2.3 GROW THE PORTFOLIO OF PRODUCTS & SERVICES
with a focus on producing and supplying (current and new) isotopes, as well as offering nuclear-oriented training and consulting services to individuals and institutions.

OUTCOME

ACCELERATED INNOVATION.
Innovators will be able to leverage nuclear methods to advance technologies with the potential to generate health, environmental and economic benefits for Saskatchewan.

COMMITMENT | 3

FOSTERING EDUCATION & PUBLIC ENGAGEMENT

Encourage a culture of respectful, responsive dialogue with the public and policymakers to build an evidence-based understanding of the risks and benefits of nuclear technologies.

GOALS

3.1 GENERATE EVIDENCE-BASED KNOWLEDGE RESOURCES
and share information with interested parties on the safety, potential risks, applications and benefits of nuclear science and technologies.

3.2 SERVE AS A NEUTRAL RESOURCE
for policymakers seeking to understand technical information to support decision-making and assessment of new initiatives related to nuclear science and technology.

3.3 PARTICIPATE IN PUBLIC DIALOGUE
as a trusted channel for expertise on nuclear topics and technologies (e.g. nuclear power generation, small modular reactors, neutron scattering).

OUTCOME

INFORMED STAKEHOLDERS.
With access to credible evidence and expertise, the people of Saskatchewan will be able to make well-informed decisions in the nuclear domain.

COMMITMENT | 1

BUILDING CAPACITY & STRENGTHENING RESEARCH

The Fedoruk Centre is committed to broadening and deepening Saskatchewan's capacity in nuclear research, development and training to advance nuclear imaging, materials science and public policy.

Advancing Saskatchewan's leadership in nuclear research requires highly qualified personnel, specialized infrastructure and technologies, and significant financial resources. The Fedoruk Centre is responding to these needs by investing in research projects, partnering with Saskatchewan institutions to establish new programs, and providing training opportunities for both new and expert users. This Commitment will allow the Fedoruk Centre to build a productive community of users and researchers advancing nuclear research in areas of strength (e.g. nuclear imaging) and in new domains that align with provincial interests and internal capabilities such as materials research with neutron beams.

GOALS

1.1 Fund Research Programs and Projects to support and expand research activities led by Saskatchewan-based scientists in nuclear imaging, materials science and public policy.

1.2 Build Capacity by training users for safe practices in a regulated facility, and by providing an environment in which expert users can enrich their students with hands-on experience with specialized methodologies.

1.3 Expand Reach by proactively attracting, training and retaining a community of non-expert users—from diverse disciplines, sectors and locations—to apply nuclear science to advance their research initiatives.

The Fedoruk Centre enters partnerships with Saskatchewan institutions to build capacity in the province for nuclear research, development and training. Here is the signature of a partnership agreement with the Johnson Shoyama Graduate School of Public Policy for a cluster of projects (L-R) David Rayner (USask), Doug Moen (JSGS), Tom Kishchuk Chair of Fedoruk Centre Board, and John Root, Fedoruk Centre Executive Director.

GUIDEPOSTS

- Growth in research productivity in nuclear imaging, materials science and public policy
- Increase in the number of trainees accessing Fedoruk Centre's facilities and participating in training initiatives
- Diversification and growth in revenue from a broadening base of clients and users

COMMITMENT | 2

ENABLING ACCESS & SUPPORTING INNOVATION

The Fedoruk Centre is committed to maintaining the SCCS in a state of readiness for user access and strengthening efforts to stimulate engagement with partners beyond Saskatchewan universities.

With the increasing demand for radiopharmaceuticals in healthcare and the Fedoruk Centre's track record in reliably supplying FDG to regional hospitals, the Fedoruk Centre has an opportunity to broaden its product portfolio and expand its reach to additional healthcare providers, facilities and institutions. The Fedoruk Centre also plays a key role in supporting academic and industry partners interested in accessing specialized infrastructure and applying nuclear tools and methods to support pre-clinical research and development of proprietary technologies. This Commitment will empower users of the Fedoruk Centre's facilities by offering access to specialized infrastructure, services and expertise in nuclear methods to develop innovative technologies arising from physical, biological and materials sciences.

GOALS

2.1 Provide Access to Expertise and Infrastructure to accelerate technology development with specialized knowledge from nuclear methods.

2.2 Support Pre-Clinical Research by providing users with access to the Fedoruk Centre's specialized facilities and GMP-compliant laboratories to advance the development of radiopharmaceuticals for clinical research.

2.3 Grow the Portfolio of Products and Services with a focus on producing and supplying (current and new) isotopes, as well as offering nuclear-oriented training and consulting services to individuals and institutions.

Radiopharmaceuticals are manufactured with automated chemical equipment inside hot cells that protect employees from radiation. Employees dress to ensure the product is sterile for clinical applications.

GUIDEPOSTS

- Growth in the number of academic and industry users at the Fedoruk Centre developing, testing or exploring nuclear technologies
- Increase in the usage of Fedoruk Centre's infrastructure (e.g. cGMP-compliant labs) and scientific and technical support for projects advancing novel radiopharmaceuticals toward clinical application
- Increase in the number of isotopes produced for nuclear applications in medical and agricultural technologies
- Diversification and growth in revenue from an expanded portfolio of products and services

COMMITMENT | 3

FOSTERING EDUCATION & PUBLIC ENGAGEMENT

The Fedoruk Centre is committed to encouraging a culture of respectful, responsive dialogue with the public and policymakers to build an evidence-based understanding of the risks and benefits of nuclear technologies.

There is a growing need for access to evidence-based information and opportunities to participate in respectful conversations that explore nuclear topics. For example, Saskatchewan is considering whether and how to introduce nuclear power (e.g. small modular reactors) into the mix of technologies to generate electricity without burning fossil fuels. As a second example, university leaders are currently exploring an opportunity to establish a pan-Canadian, university-led program to take over the management of Canada's neutron scattering capability. The Fedoruk Centre is well-positioned to convene stakeholders, share objective information and help translate technical knowledge into an understanding of the risks and socioeconomic impacts of greatest interest to broad audiences. This Commitment will maintain and strengthen the Fedoruk Centre's position as a go-to resource for information on nuclear technologies and support evidence-informed decision-making among the public and policymakers.

GOALS

3.1 Generate Evidence-Based Knowledge Resources and share information with interested parties on the safety, potential risks, applications and benefits of nuclear science and technologies.

3.2 Serve as a Neutral Resource for policymakers seeking to understand technical information to support decision-making and assessment of new initiatives related to nuclear science and technology.

3.3 Participate in Public Dialogue as a trusted channel for expertise on nuclear topics and technologies (e.g. nuclear power generation, small modular reactors, neutron scattering).

The Fedoruk Centre facilitates public conversation about radiation in our everyday lives at a second event "Nuclear Insights" with speakers (L-R), Prof Ekaterina Dadachova (USask), Prof Esam Hussein (U Regina), and Prof Zisis Papandreou (U Regina) with moderator Larissa Shasko from the Johnson Shoyama Graduate School of Public Policy.

GUIDEPOSTS

- Growth in the number of resource materials (e.g. briefs, factsheets) developed and events hosted by the Fedoruk Centre to share information and foster dialogue
- Growth in the number of stakeholders accessing resource materials and attending events to learn about nuclear topics
- Emerging clarity around vision, decision and plan for a new pan-Canadian, university-led framework for materials research with neutron beams in Canada

Near-term Initiatives

The Fedoruk Centre will focus its efforts on near-term initiatives that will advance the Commitments and Goals. The following table lists examples of near-term initiatives and demonstrates how each can advance multiple Goals.

	GOALS								
INITIATIVES	**1.1**	**1.2**	**1.3**	**2.1**	**2.2**	**2.3**	**3.1**	**3.2**	**3.3**
Consistently empower the Saskatchewan research community by investing in research projects through annual calls for proposals.	●	●	●	○	○				
Deepen capacity in nuclear imaging in Saskatchewan by establishing program partnerships in life sciences.	●	○	○	○	○	○			
Broaden investments beyond nuclear imaging by developing programs and building capacity for materials science with neutron beams or research associated with nuclear energy options.	●	●	●	○		○			
Ensure that the Fedoruk Centre has the technical expertise to support expert and non-expert users in the design and implementation of research projects.		●	●	●	●	●			
Implement a fair and consistent business practice for user access to Fedoruk Centre infrastructure.		●	●	●	●	●			
Convene stakeholders and facilitate the national dialogue to establish a university-led, pan-Canadian framework to govern and manage Canada's program for materials research with neutron beams.							○	●	●
Develop an integrated marketing and communications practice to raise the profile of the Fedoruk Centre and strengthen new and existing relationships with organizations in the nuclear domain.	○	○	●	●	●	●	○	●	●
Build and engage a community of stakeholders seeking information on nuclear science and technologies.		○	○	○	○	○	●	●	●

● Initiative strongly supports the Goal
○ Initiative supports the Goal

Top: The Fedoruk Centre has convened a roundtable of Canadian university executives from 16 institutions across Canada with directors of European neutron-beam facilities in Sweden (ESS) and France (ILL) to establish a new framework for governing, managing and representing Canada's program for materials research with neutron beams. **Bottom:** A Fedoruk Centre funded project explores the impact of 'deliberative engagement' to build public awareness and respectful conversations about nuclear power as an option for a cleaner energy mix in Saskatchewan.

Outcomes

Building on the Fedoruk Centre's key strengths and new opportunities in nuclear research, innovation and public engagement, the 2025 Strategic Plan provides a framework for deepening capacity in its core activities and broadening Saskatchewan's reach into nuclear energy and materials research with neutron beams. Ultimately, the Commitments and Goals will enable researchers and innovators in Saskatchewan to contribute to three key outcomes for the Saskatchewan:

THRIVING RESEARCH ENVIRONMENT

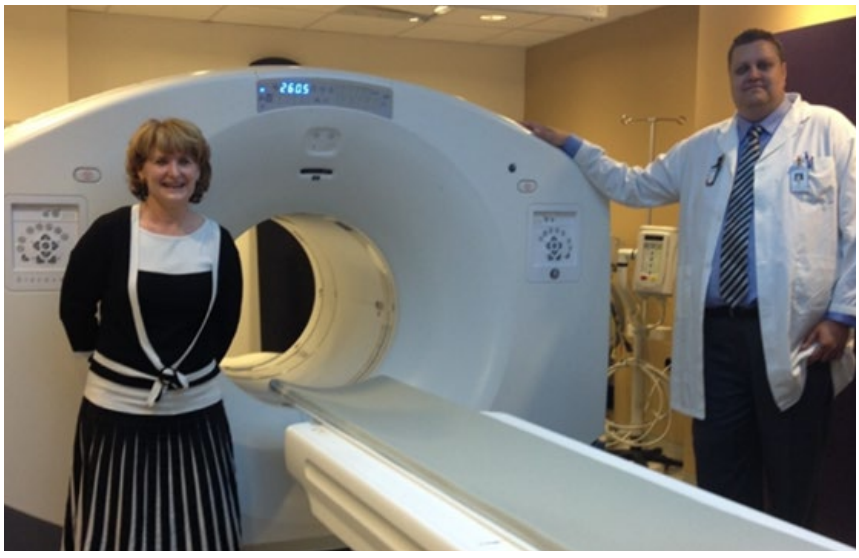
Saskatchewan will be defined by a growing and highly productive community of researchers using nuclear methods to solve complex problems.

ACCELERATED INNOVATION

Innovators will be able to leverage nuclear methods to advance technologies with the potential to generate health, environmental and economic benefits for Saskatchewan.

INFORMED STAKEHOLDERS

With access to credible evidence and expertise, the people of Saskatchewan will be able to make well-informed decisions in the nuclear domain.



Fluorine-18 is attached to glucose, and rushed over to Royal University Hospital every day, so that patients can receive a "PET" scan to diagnose cancer.

University of Regina Professor Aram Temurazyan demonstrates the BioPET

By building capacity for nuclear research, supporting the development of nuclear technologies and engaging the public in evidence-based dialogue, the Fedoruk Centre will enable vital contributions to the health, environmental and socioeconomic wellbeing of Saskatchewan and beyond.

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