



## Medicine

### Advancing Nuclear Medicine

Nuclear medicine uses nuclear materials and techniques to diagnose, image and treat diseases, ranging from cancers to heart disease, in ways that are not possible with other technologies. For example, the development of cobalt-60 radiation therapy by Saskatchewan researchers – including Sylvia Fedoruk – revolutionized the treatment of deep tissue cancers. The Fedoruk Centre will work with biomedical researchers and clinicians to advance the state of nuclear medicine in the areas of:

- **Methods**
- **Instrumentation**
- **Detection and diagnosis**

## Materials

### Developing Materials with Nuclear Methods

Using nuclear techniques, such as beams of neutrons, scientists can probe existing and new materials to gain unique insights into molecular structure and composition. From nanomaterials to metal alloys, geology to biology; advancing our knowledge of materials with nuclear methods can bring positive impacts with wide-ranging applications for:

- **Energy**
- **Environment**
- **Health**
- **Transportation and communication**

## Energy

### Improving Nuclear Energy Systems

Rising prices of fossil fuels, the sustainability and stability of their supply, and the impetus to curb greenhouse gas emissions have driven the search for alternative sources of power – with nuclear energy being a viable option. Saskatchewan, as one of the world's leading producers of uranium, has a role to play in the continued development of nuclear energy. The safety of current reactors in the wake of Fukushima, the need to replace aging power plants and distribution grids, ensuring the safety of workers in the uranium mining industry, and the promise of new small reactor systems present challenges and opportunities for engineering and research, including:

- **Improved safety systems**
- **Solutions to engineering challenges**
- **New nuclear energy systems including small reactors**

## Environment

### Understanding Environment, Science and Society

Increasing understanding of the relationships between the nuclear domain and the physical and social environment is central to the ongoing development of nuclear science and related technology. The Fedoruk Centre's activities are focussed on helping Saskatchewan build and maintain a globally recognized community of expertise that can engage the broader community in evidence-based conversations about nuclear issues. This promotes examination of the interconnected issues related to nuclear science, and can inform public policy, fostering:

- **Links between nuclear science, society, public policy, and environmental issues**
- **Fact-based dialogue and engagement**
- **Discussions of the benefits and risks of nuclear technology**

# Key Activities

The Fedoruk Centre engages in three key activities:

**Programs** – to establish multi-disciplinary clusters of academic activity in Saskatchewan, within the nuclear domain, by supporting the appointment of new academic leaders and to support the inclusion of nuclear components in existing courses or programs, providing students with opportunities for learning or accreditation in fields related to nuclear science, technology or policy;

**Projects** – to support research and development projects that engage partners from academia, industry and other research institutions, with target outcomes including ongoing and new business activity within Saskatchewan, in turn creating a venue for young Canadians to pursue careers at the leading edge of nuclear technology; and

**Facilities** – to provide good stewardship of selected nuclear infrastructure, ensuring it is maintained in a competitive state of readiness for access in support of research, development and training, with a new cyclotron as an initial example.

Proposals for programs will be sought from Saskatchewan-based academic institutions. Project proposals are sought through semi-annual calls for proposals. Open to research teams led by a researcher from one of Saskatchewan's publicly-funded research institutions, project proposals are assessed by an external project advisory committee with input from expert reviewers. Research groups will report annually on their progress to their peers and the Fedoruk Centre in a publicly accessible forum.

# Purpose

The Sylvia Fedoruk Canadian Centre for Nuclear Innovation aims 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.

# Impact Areas

The Fedoruk Centre is working to build a network of experts and manage facilities that will enable Saskatchewan people to generate, interpret and apply knowledge, and make positive impacts in four areas:

- Advancing nuclear medicine, instruments and methods;
- Advancing knowledge of materials through nuclear techniques for applications in energy, health, environment, transportation and communication;
- Improving safety and engineering of nuclear energy systems, including small reactors; and
- Managing the risks and benefits of nuclear technology for society and our environment.

The Fedoruk Centre does not perform its own in-house research, development or training. Rather, we deliver on these impact areas through the work of Saskatchewan-based research leaders, in partnership with other researchers or organizations from throughout Canada or internationally, by supporting their proposals for programs, projects or access to research facilities managed by the Centre.



Located on the University of Saskatchewan campus in Saskatoon, the Sylvia Fedoruk Canadian Centre for Nuclear Innovation is an independent, not-for-profit corporation of the University of Saskatchewan. The Fedoruk Centre is funded by the Government of Saskatchewan.

Find out more at:  
[Fedorukcentre.ca](http://Fedorukcentre.ca)

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Materials.  
Energy.  
Environment.



Advancing Knowledge.  
Building Partnerships.



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