$8.57 MILLION

Since 2012, the Fedoruk Centre has awarded $4.16 million to 27 research projects. Combined with matching cash and in-kind contributions from project partners, the total funded value of the projects is over $8.5 million.

INTELLECTUAL PROPERTY

9 Since 2012 researchers supported by the Fedoruk Centre have filed 9 patents and disclosures

1 One spin-off company created

236 248

236 Publications by supported researchers and students since 2012

248 Highly Qualified Personnel have been trained or hired since 2012.

93 have completed their studies

FEDORUK CENTRE'S IMPACT ON THE RESEARCH COMMUNITY

(survey conducted by the The Evidence Network, 2016)

85% of surveyed researchers reported that the Fedoruk Centre positively impacted the attraction of highly qualified personnel with nuclear expertise to Saskatchewan.

88% of researchers attributed a positive impact from the Fedoruk Centre on their ability to conduct collaborative nuclear research

91% of researchers that have developed a nuclear-related technology reported that the Fedoruk Centre had a positive impact on their ability to do so.

IMPACT AREAS

- Advancing nuclear medicine, instruments and methods
- Advancing knowledge of materials through nuclear techniques
- Improving safety and engineering of nuclear energy systems, including small reactors
- Managing the risks and benefits of nuclear technology for society and the environment

PROJECTS SUMMARY (2012-2016)	INVESTMENT
PROJECTS FUNDED	27
PROJECTS COMPLETED	11
TOTAL FEDORUK CENTRE CONTRIBUTION	$4.16 million
FEDORUK CENTRE INVESTMENT BY IMPACT AREA	
• Nuclear Medicine	$2.025 million, 12 projects
• Nuclear techniques for materials research	$453 thousand, 4 projects
• Energy and Safety	$296 thousand, 3 projects
• Society and Environment	$1.39 million, 8 projects
PARTNER CASH CONTRIBUTIONS	$231 thousand, 7 projects *(includes institutional base funding diverted to the projects)*
PARTNER IN-KIND CONTRIBUTIONS	$4.41 million
INDUSTRIAL PARTNERS (PROJECTS)	10 partners on 14 projects

PROGRAM AREA	INVESTMENT
LEADERSHIP IN NUCLEAR MEDICINE Fedoruk Chair in Nuclear Imaging Technology Fedoruk Chair in Radiochemistry Fedoruk Chair in Animal Imaging Investments in radiochemistry equipment	$ 5.6 million
LEADERSHIP IN PUBLIC POLICY AND SOCIAL ASPECTS OF NUCLEAR DEVELOPMENT Centre for the Study of Science and Innovation Policy (CSIP): Fedoruk Fellowships and student support	$ 2 million
LEADERSHIP IN NUCLEAR ENERGY AND SAFETY; NUCLEAR TECHNOLOGY AND THE PHYSICAL ENVIRONMENT • Building Technical Capacity to Understand Siting Issues • CSIP investment (above)	$ 1.1 million

THE FEDORUK CENTRE IS WORKING TO BUILD THE RESEARCH AND INNOVATION CAPACITY NECESSARY TO SUPPORT A VIBRANT NUCLEAR SECTOR IN SASKATCHEWAN.

Fedoruk Centre
SYLVIA FEDORUK CANADIAN CENTRE FOR NUCLEAR INNOVATION

Medicine | Materials
Energy | Environment

Find out more at:
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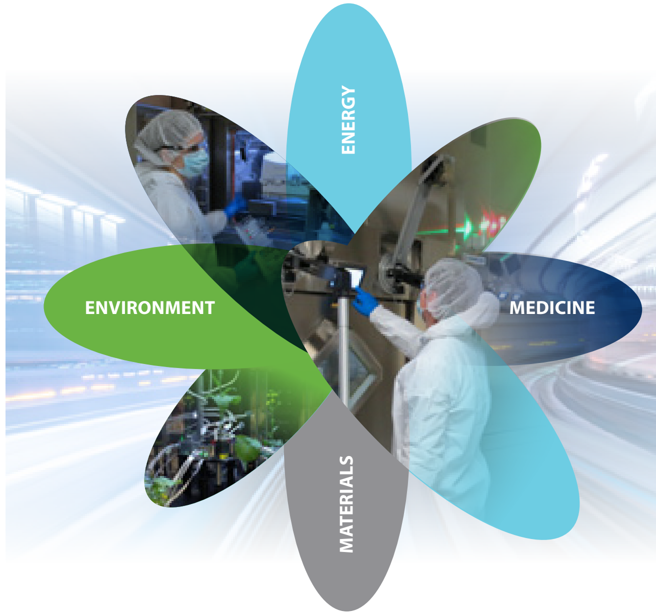
303-111 Research Drive, Saskatoon SK S7N 3R2

2016-2017 Annual Review

Sylvia Fedoruk Canadian Centre for Nuclear Innovation Inc.



ACCELERATING
IMPACT

Fedoruk Centre
SYLVIA FEDORUK CANADIAN CENTRE FOR NUCLEAR INNOVATION

SASKATCHEWAN CENTRE FOR CYCLOTRON SCIENCES

HOW IT WORKS

1 A stream of negatively-charged hydrogen ions (atoms with one proton and two electrons) are injected into a vacuum chamber between two D-shaped plates – called 'dees' – enclosed between the poles of an electromagnet.

2 An alternating positive and negative charge between the dees moves the ion back and forth from one dee to the other. The ion accelerates every time it crosses the gap between the dees, gaining energy. The magnetic field holds the ion within the horizontal plane, resulting in the accelerating ions moving in a spiral path out towards the edge of the dees.

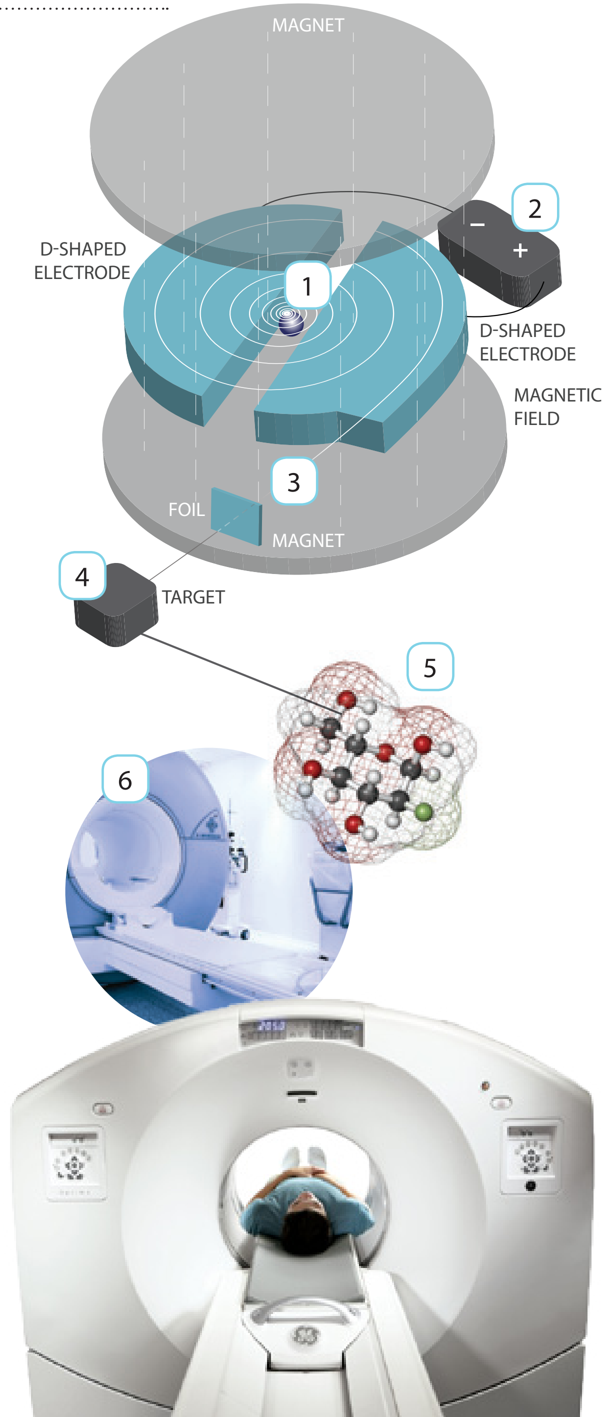
3 At the edge of the dee, the ions pass through a graphite foil that strips away the electrons, leaving a beam of high energy protons that are steered down a beamline to a target.

4 Target materials can be liquids, solids or gases, depending on the radioisotope being made.

5 When a high energy proton from the cyclotron collides with an atom in the target, other sub-atomic particles are knocked out of the target atom's nucleus converting the atom into a radioisotope.

6 The radioisotope is separated from the target material in the facility's production laboratory. The radioisotope is tagged on to a molecule such as a sugar, creating a radiopharmaceutical. The completed drug is then shipped to a hospital or used in research.

In the hospital nuclear medicine department, the radiopharmaceutical is injected into a patient who is then placed in a PET-CT scanner. As the radioisotope in the radiopharmaceutical decays, it releases energy that is detected by the scanner which generates an image that is used by doctors to diagnose diseases such as cancer.



RESEARCH WING

Operations in the cyclotron facility's research wing are now underway with the installation of a microPET-CT scanner for imaging small animals, a radiochemistry laboratory for the development of new imaging agents, and a small animal holding facility. Plans are now in development for additional facilities, including a dedicated lab for imaging plants.

2,100 PATIENTS

In its first year of supply, over 2,100 Saskatchewan patients have had PET-CT scans using radiopharmaceuticals produced by the Fedoruk Centre.

ONE WEEK

Thanks to the local supply of radioisotopes made possible by the cyclotron, wait times for a PET-CT scan in Saskatchewan are about 1 week.

IMPACTS

THE SASKATCHEWAN CENTRE FOR CYCLOTRON SCIENCES ACHIEVED FULL OPERATIONS.

In June 2016 the province's cyclotron facility started supplying radioisotopes for use in the PET-CT scanner at Royal University Hospital. Since then, over 2000 Saskatchewan and Alberta patients have received PET-CT scans using radiopharmaceutical produced by the Fedoruk Centre. Operations in the cyclotron facility's research wing are also now underway with facilities and equipment to develop new radioisotope-labelled imaging agents and a small PET-CT scanner for research.

PHYTOPET CHANGES THE SCOPE OF PLANT RESEARCH IN SASKATCHEWAN.

The PhytoPET, a system for imaging the uptake of radioisotopes in plants, was unveiled at the University of Regina in January and used for the first time in May at the Saskatchewan Centre for Cyclotron Sciences. One of only a few systems of its kind in the world and the only one in Canada, the phytoPET system allows plant and soil scientists to follow the absorption and movement of radioactive tracers in the soil and in plants. This provides new insights into how plants interact with the soil and respond to environmental stresses – essential information for developing new crops that can adapt to higher temperatures or drought.

LOOKING AT TECHNICAL AND REGULATORY ASPECTS OF SMALL NUCLEAR POWER PLANTS.

Equipping Saskatchewan graduate students with the knowledge required to address complex and inter-related technical, regulatory and legal issues is at the heart of a $1.1 million multidisciplinary project funded by the Fedoruk Centre in January 2017. The aim of the project at University of Regina and University of Saskatchewan is to develop expertise in the engineering, geological, geographical, regulatory and economic factors of building a small modular nuclear reactor in a place that has not previously used nuclear power, using Saskatchewan as its case study.