

**PRESIDENT'S REPORT TO  
McMASTER UNIVERSITY'S BOARD OF GOVERNORS  
MARCH 1, 2018**

**The McMaster Nuclear Reactor: Its History and its Future**

McMaster's Nuclear Reactor began operations in April 1959 and was the first research reactor on a University campus in the British Commonwealth. It remains the most powerful research reactor at a Canadian university. The initial focus was on nuclear physics, and shifted to neutron scattering with the arrival of Bertram Brockhouse, who joined McMaster in 1962, and went on to win the 1997 Nobel Prize in Physics for his work. Over time, the use of the reactor for applied work has increased to include nuclear dating techniques, using neutrons to analyze samples, neutron radiography, and isotope production for clinical and industrial applications. Following funding cuts and other issues, the University considered shutting down the reactor in 1995; ultimately this decision was not taken and instead a new commercial plan was developed, which included paying off the reactor's operating debt, building a decommissioning fund, and reinvesting in the facility.

Since that time, both the research and educational capacity of the reactor has gradually increased, and was further expanded with the award of a Knowledge Infrastructure Program grant to McMaster in 2009. This funding allowed for renovations and upgrades to the nuclear reactor and adjacent nuclear research building to accommodate new laboratories and research and training space, and enabled the increased commercial production of medical and industrial isotopes. In 2012, McMaster was awarded a Canada Foundation for Innovation grant to establish a Small Angle Neutron Scattering facility at the reactor, which further expanded its research capacity.

The McMaster Nuclear Reactor supports research across a range of disciplines, from biological and medical research and the production of medical isotopes, to material composition and neutron and gamma scattering. Researchers and students study nuclear safety, including testing and analyzing new Canadian ore deposits, and qualifying the detectors used to control the safety of nuclear power plants. The reactor's neutron beams allow researchers to study the structure and dynamics of atoms. This research led to the first solution to the structures of high temperature superconductors, support for forensic sciences used for national defence, the production of radiotracers used to develop environmentally tolerant food sources, and the analysis of mineral samples to help in the development of natural resources. The aerospace industry also makes use of the neutrons produced by McMaster's reactor to test for flaws in turbine blades and check for the corrosion of aircraft components. Radioanalytical laboratory services are also available to support environmental monitoring, natural resource development, and polymer analysis.

In terms of production activity, McMaster's reactor is one of only two producers of iodine-125, a radioisotope used to treat prostate cancer, and currently produces 60% of the world's supply, responsible for treating 400 prostate cancer patients per day. In addition to the development of medical isotopes, research at the reactor supports the design and validation of specialized irradiation devices to supply medical isotopes.

The McMaster Nuclear Reactor is a central feature of Canada's scientific landscape. With the impending closure of the National Research Universal reactor at Chalk River Laboratories—currently Canada's primary facility for neutron-based research—McMaster's reactor will be the country's sole nuclear research facility above low thermal power. Plans are underway to increase its capacity in order to support research programs that will be lost with the closure of the Chalk River facility. Currently the reactor operates at 25% of its capacity; the University is seeking a limited-term partnership with the Government of Canada to provide the transitional funding needed to increase this operating capacity to 100%, while developing the revenue streams that will make this level of operation self-sustainable by the end of the funding period. The government's investment would be used to support a larger complement of reactor operations and radiation safety staff, increased reactor fuel consumption and management fees, additional facility maintenance costs, and logistical support staff.

With the closure of the National Research Universal reactor, the importance of McMaster's reactor as a research and training site will also increase. The University's reactor plays a vital role in educating large numbers of undergraduate and graduate students and highly qualified personnel in the area of medical and power nuclear technologies, and is expecting to absorb approximately half the 250 researchers, including 30 students, from over 60 departments in 30 universities who currently use the Chalk River facility for research and training purposes. Increasing the operating capacity of McMaster's reactor in the way we envisage will also enable it to support a broader range of neutron beam experiments, including a significant portion of the world-leading materials science research that is currently conducted at the National Research Universal reactor.

I am delighted to welcome Chris Heysel, Director, Nuclear Operations and Facilities, Bruce Gaulin, Director of the Brockhouse Institute for Materials Research, John Luxat, Professor and Industrial Research Chair in Nuclear Safety Analysis, and John Valliant, Professor of Chemistry and CEO, Centre for Probe Development and Commercialization, as the guest speakers at our meeting. I look forward to hearing them speak in more detail about the operations of the McMaster Nuclear Reactor, future plans for the facility, and the critical and groundbreaking research and production work they are engaged in.

## **CAMPUS UPDATE**

### **Prime Minister hosts Town Hall at McMaster**

Prime Minister Justin Trudeau hosted a packed town hall meeting at McMaster on January 10, the second in a series of cross-country question and answer sessions that extended from Halifax to Edmonton. It was the Prime Minister's second visit to McMaster in five months; he helped students move into residence during a visit to campus in August.

### **Tobacco and Smoke-Free Campus**

McMaster is now officially Ontario's first 100% tobacco and smoke-free campus. Widespread consultation and planning was undertaken during the Fall, in preparation for the implementation of the new policy on January 1. The new designation is in effect on the Hamilton campus, inside and on the grounds of the Ron Joyce Centre in Burlington, and at all McMaster-owned properties.

### **McMaster and Hamilton Partners in successful Supercluster Bid**

Advanced Manufacturing is one of five superclusters that will bring industry, universities and other partners together as Canada unveiled a new, major investment to promote innovation and economic development. Federal Minister of Innovation, Science and Economic Development, Navdeep Bains, announced the winners of Ottawa's \$950 million Innovation Supercluster Initiative, which received more than 50 applications from across the country. The supercluster investment will help both Hamilton and McMaster continue to partner with companies such as ArcelorMittal Dofasco and Linamar to strengthen Canada's manufacturing base through ground-breaking research.

## **Research**

### **McMaster receives \$19M in Health Research Funding**

Twenty-two McMaster researchers have received new research grants totalling \$19 million from the Canadian Institutes of Health Research (CIHR). Filomena Tassi, Member of Parliament for Hamilton West – Ancaster – Dundas, made the announcement of the grants as part of a total of \$145 million of grants to Ontario institutions, during a recent visit to campus. The projects cover a wide range of health research, including immunology and stem cells, obesity and patient care.

### **McMaster Projects awarded more than \$13.4M in Infrastructure Funding**

Four McMaster projects have been awarded more than \$13.4M in funding for equipment needed to facilitate large, collaborative projects. The Ontario Research Fund awards were announced on January 8 and include the Good Bugs, Bad Bugs program, led by infectious disease researcher Eric Brown, the Canadian Centre for Electron Microscopy, led by engineer Gianluigi Botton, and the Canadian Research Data Centre Network, led by economist Mike Veall. Condensed matter expert Graeme Luke also received funding for a project – High-Momentum and High-Luminosity Muon Beamlines for Molecular and Materials Science and Fundamental Muon Physics – which will be led by Simon Fraser University.

### **Celebrating Fifty years: The Bertrand Russell Archives**

This year, McMaster Library is celebrating the 50th anniversary of the acquisition of the Bertrand Russell Archives, which remain the University's largest research collection, and continue to be used by scholars from around the world. The collection, by far the largest on Russell in the world, has inspired a wealth of scholarly activity in a number of areas including peace and religious studies, philosophy, history, political science, literature and mathematics. Work continues on renovating the building at 88 Forsyth Avenue, which will become the new home for the Russell Archives this Spring.

## **Global and Community Engagement**

### **McMaster Community Members Honoured with John C. Holland Awards**

Sharon Nwamadi and Kayonne Christy were both recognized at a recent ceremony celebrating leaders in the local black community. Sharon Nwamadi was awarded the Evelyn Myrie Political Action Bursary. She is a member of the Student Representative Assembly at McMaster, as well as the Neighbourhood Assistance Advisory Council. Kayonne Christy, winner of the Lincoln

Alexander Scholarship, has been active in a number of areas, including co-founding the Black Aspiring Physicians of McMaster, the McMaster Womanist/Black Feminist Principals, and acting as convener and chair of the Race, Racialization and Racism working group of the President's Advisory Committee on Building an Inclusive Community.

### **Fostering Global Engagement at McMaster**

*Higher Education: The Ongoing Tension Between Nationalism and Internationalism*, was the title of a recent panel discussion that explored the importance of global engagement at McMaster and the opportunities and challenges it presents. Each panelist discussed their own unique experiences and spoke about the ways in which internationalism might impact the work, function, and mission of the university. The panel also discussed the importance of providing opportunities for faculty, staff and students to engage at both the local and global level. The event was moderated by Arshad Ahmad, Vice-Provost, Teaching and Learning and the Director of the Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching.

### **Workshop lays groundwork for Future Collaboration with French Research Community**

A joint workshop hosted by McMaster and Le Centre National de la Recherche Scientifique (CNRS) – the European Union's largest fundamental science agency – has laid the groundwork for future partnerships that could lead to new research collaborations, and expanded opportunities for graduate students. The three-day event, held recently on campus, brought McMaster researchers together with more than 30 researchers from some of France's top universities, as well as from the CNRS, to exchange scientific knowledge, strengthen existing partnerships, and develop new research and academic collaborations in the areas of materials science, theoretical chemistry, and pure and applied mathematics.

## **Teaching and Learning**

### **McMaster Engineering Youth Camps receive Federal Funding**

Actua, the national organization that represents Venture and LEAP camps at McMaster University's Faculty of Engineering, was named the largest recipient of funding from the Government of Canada's new CanCode program. CanCode is a \$50 million fund, announced in the federal budget 2017, that is supporting the development of coding and digital skills for youth from kindergarten to grade 12 (K-12). The program aims to equip youth, including traditionally underrepresented groups, with the skills and study incentives they need to be prepared for the jobs of today and the future.

### **Students take Big Ideas to Silicon Valley**

Six engineering students are bridging their big ideas from McMaster Engineering to Silicon Valley as winners of the Big Ideas Contest. The contest, launched by McMaster Engineering Co-Op & Career Services (ECCS), gave students the opportunity to submit their big ideas to solve real-world problems for a chance to win a trip to Silicon Valley. The winners toured some of the top technology companies in the world, including Google and Tesla, learned from key innovators and developed their professional skills.