



**A PLATFORM FOR INNOVATION** | Annual Report 2017–2018



National Research  
Council Canada

Conseil national de  
recherches Canada

Canada



## **INNOVATION IS THE PROCESS OF MAKING NOVEL IDEAS REAL.**

It may start with inspiration, but it takes so much more to get to the finish line: experience, expertise and advanced technical capabilities.

That's what the National Research Council provides. Working with our partners, we're delivering a national platform for innovation. We conduct research, support small and medium-sized companies to help them scale up and compete and we connect Canadian innovators to leading R&D capabilities. We also enable cross-sector partnership and collaboration here at home.

In all these ways, we enable bold new initiatives that advance scientific knowledge and generate new technologies of benefit to Canada — and valued around the world.

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## MESSAGE FROM THE PRESIDENT

In the fall of 2016, we undertook a multi-year initiative of renewal at the National Research Council (NRC), beginning with a deep and far-reaching consultation process we called the NRC Dialogue. It was gratifying last year to see the Dialogue transform into plans and concrete actions — and for our direction to be affirmed by the Government of Canada's five-year commitment of \$1.24 billion to the NRC in Budget 2018.

Over the course of 2017–2018, progress was made on the first wave of Dialogue actions, with some significant accomplishments already achieved. We have begun to consolidate 37 research programs into 26 more focused programs that will deliver greater impact across all our activities. We are completing a strategy to help innovative firms access international markets so they can grow; we are hiring more high-calibre post-doctoral students to ensure our own long-term success. The visions we're developing for the future of our research centres and the Industrial Research Assistance Program (IRAP) place an even greater focus on research excellence. And we are planning enhancements to our facilities to ensure continued quality and relevance in support of our agenda.

The new course for the NRC set by the Dialogue process was captured in early 2017 by a refreshed mission, rearticulated values, and the vision to contribute to a better Canada and world through excellence in research and innovation.

I believe the key to such excellence lies in working collaboratively with companies of all sizes, universities and colleges, and provincial governments both here in Canada and abroad. Some examples of our collaboration included our involvement in the Government of Canada's Innovation Superclusters Initiative, by making ourselves available to develop R&D programs that will support the five selected superclusters proposals; supporting the launch of a one-of-a-kind radio telescope in British Columbia led by a coalition of universities; joining forces with the Public Health Agency of Canada to develop a

vaccine for a disease particularly prevalent in children in Canada's North; and the advice and funding we provided to Canadian small and medium-sized firms.

These initiatives underscore the role we play as a national platform for innovation for all of Canada.

We have accomplished much — and there is much more to come. The Dialogue activities we completed in 2017–2018 were just the first of three planned waves. We are continuing to move ahead, and the stable funding provided by the government in Budget 2018 will allow us to do so with confidence — and to perform to our full potential in supporting priorities such as the Innovation and Skills Plan.

Those who helped contribute to our success last year are too many to mention. I personally must thank our outgoing Council Chair, Tom Jenkins, and the Chair of our Departmental Advisory Committee (DAC), Richard Dicerni, for their leadership and guidance, advice and support.

I also thank Carolyn Cross, Stephen Mooney, Karimah Es Sabar and Raymond Leduc, whom concluded their terms as members of the Council.

There is one final thanks I must give, and that is to the people of the NRC: the staff, scientists, engineers and industrial technology advisors who have poured themselves tirelessly into this renewal and, through their actions, made it possible for us to be selected as a collaborator of choice by our partners.



Iain Stewart, President



## THE NRC AT A GLANCE

2017–2018

### OUR VISION

A better Canada and world through excellence in research and innovation.

### OUR MISSION

To have an impact by advancing knowledge, applying leading-edge technologies and working with other innovators to find creative, relevant and sustainable solutions to Canada's current and future economic, social and environmental challenges.

### OUR VALUES

**Integrity** • Behaving at all times ethically, honestly and objectively; being impartial and transparent with our colleagues, collaborators, stakeholders, clients and the people of Canada; and exercising sound stewardship of our resources.

**Excellence** • Pursuing excellence in all that we do — in our research and innovation, in our collaborations, in the execution of our programs, in our support to firms and in our delivery of our common corporate services.

**Respect** • Valuing and respecting the knowledge, expertise and diversity of our colleagues, our workplace, our collaborators, our stakeholders and our clients to have an impact on Canada and the world.

**Creativity** • Harnessing our imagination, passion for excellence, scientific exploration, technology and innovation to generate new knowledge, new technologies, new business processes and new collaborations for a better NRC and a better world.

Launched in March 2018,  
our updated vision, mission  
and values were developed  
in consultation with  
NRC employees:

22 town hall sessions

1,200 town hall participants

640 online survey responses

173

buildings  
located on

22

sites

564,000 m<sup>2</sup>

of NRC facilities  
across Canada

3,700

scientists, engineers,  
technicians and other  
specialists, including

255

industrial  
technology  
advisors


● IRAP

● Research Facilities

## AREAS OF RESEARCH

### Emerging Technologies

Advanced electronics and photonics

Astronomy and astrophysics

Digital technologies

Metrology

Security and disruptive technologies

Nanotechnology

### Engineering

Construction

Energy, mining and environment

Ocean, coastal and river engineering

### Life Sciences

Aquatic and crop resource development

Human health therapeutics

Medical devices

### Transportation and Manufacturing

Aerospace

Automotive and surface transportation

## PARTNERSHIPS

Last year we partnered with:

8,288 small and medium-sized enterprises (SMEs) (funding and advice)

1,000 companies (R&amp;D contributions)

152 hospitals

72 universities and colleges

34 federal departments

39 provincial/municipal governments

36 countries

\$1,020,000,000 annual expenditure, including \$192,300,000 in funding for SMEs







## A SOURCE OF SCIENTIFIC EXCELLENCE

Each year, the Royal Society of London presents just three scientists with the Royal Medal, an award that dates back to 1826 to recognize “the most important contributions to the advancement of natural knowledge.” Dr. Paul Corkum of the NRC was one of those three in 2017, honoured for his major contributions to laser physics and his pioneering role in developing the field of attosecond science.

One attosecond is to a conventional second as one second is to the age of the universe. It’s a measure of the speed at which electrons navigate subatomic and molecular dimensions — a world being explored by Dr. Corkum and the quantum physics team at the NRC’s ultra-fast laser laboratories in Ottawa. Powered by the NRC platform, Dr. Corkum became one of only a few Canadian scientists to win the Royal Medal, joining a list of past recipients that includes scientific luminaries such as Charles Darwin and Michael Faraday.

“I believe a medal is given for a subject, not to a person,” explained Dr. Corkum. “While Darwin received the medal, it was actually the theory of evolution that won it. This medal shows the growing importance of being able to make very fast measurements and examine how materials respond to intense light. It’s a collective effort. I just happen to be the guy who personifies it.”

That collective effort happens at the Joint Attosecond Science Laboratory (JASLab), jointly run by the NRC and the University of Ottawa. It’s home to some of the world’s most advanced laser technology, which researchers use to produce light pulses that can measure the fastest processes in atoms and molecules. It attracts the world’s best laser scientists to Canada, eager to work with the “father” of attosecond science and lay the groundwork for new physics theory. For example, the JASLab team is currently looking into whether very intense light can control the movement of electrons, which would have huge implications for computing, engineering and medicine.

## AN INTERNATIONAL REPUTATION IN SCIENCE

In 2017-2018, NRC researchers published 940 times in high impact peer review journals such as *Nature Communications*, *Nature Physics*, *Nature Astronomy*, and *Advanced Materials*.

By partnering with the University of Ottawa, young researchers and post-doctoral students are given an unparalleled opportunity to train at a world-class photonics lab, building up Canada’s future research capacity. This partnership was further enhanced when the university’s Advanced Research Complex opened in 2014 (which the NRC helped design), creating even more opportunities for quantum photonics collaboration between the NRC and academia in the National Capital Region.

“Canada can’t always compete with big American or German labs in terms of funding,” said Dr. Corkum. “By setting up these joint laboratories, the NRC not only kept Canada in the game but maintained its lead in this new area of science. To me, it’s the perfect example of the NRC as a platform.”

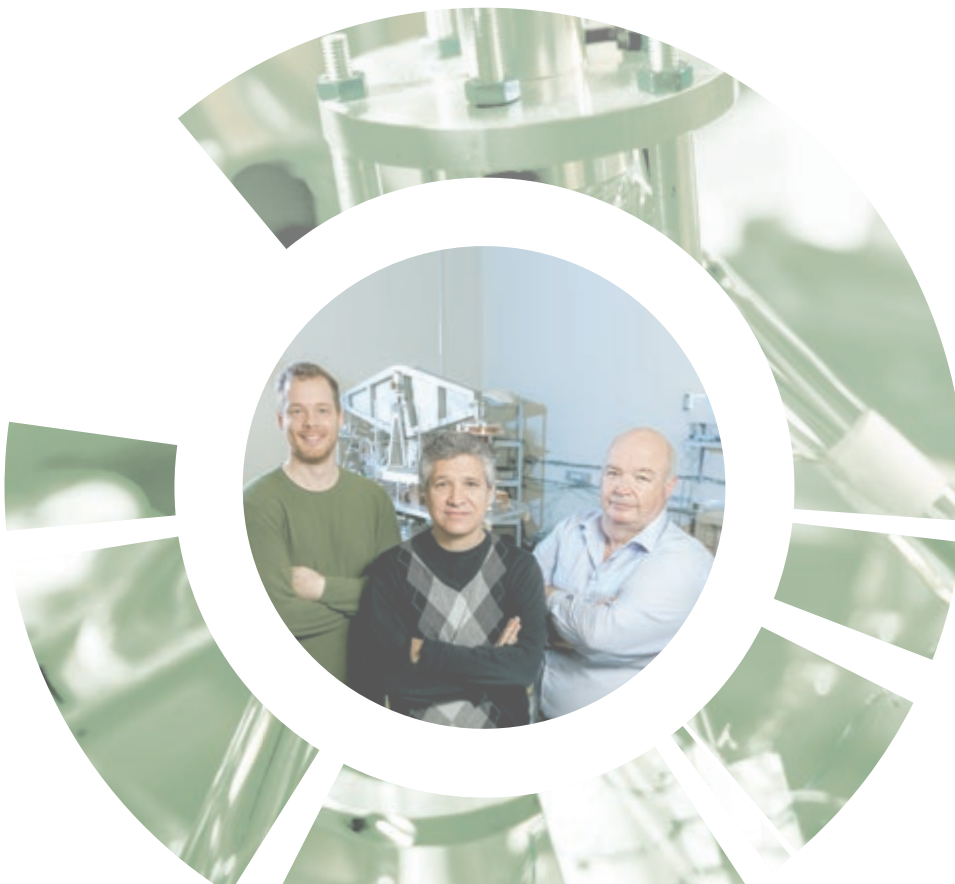
### **Precise calculations for a more precise kilogram**

In October 2017, the International Council for Science proposed a new, more accurate definition of a kilogram — with research by NRC scientists providing a key value in its calculation. The new definition, which will be adopted at the 2018 General Conference on Weights and Measures, is part of an ongoing worldwide effort to have all measurements in the International System of Units based on fundamental laws of nature instead of imprecise physical artifacts.

Specialists from the NRC's Metrology team contributed a value of Planck's constant — a measure of action in quantum mechanics that determines mass — with the lowest uncertainty ever achieved: 9.1 parts per billion. That's equivalent to accurately counting the hairs of 1,100 people to within a single hair. To achieve such precision, the team had to account for imperceptibly small effects that could influence its Kibble Balance (which measures weight using electromagnetic force), including gravitational changes caused by the moon and volumes of groundwater from melting snow.

### **NRC specialist contributors to the kilogram project**

Below, from left to right: Richard Green, Carlos Sanchez, and Barry Wood.



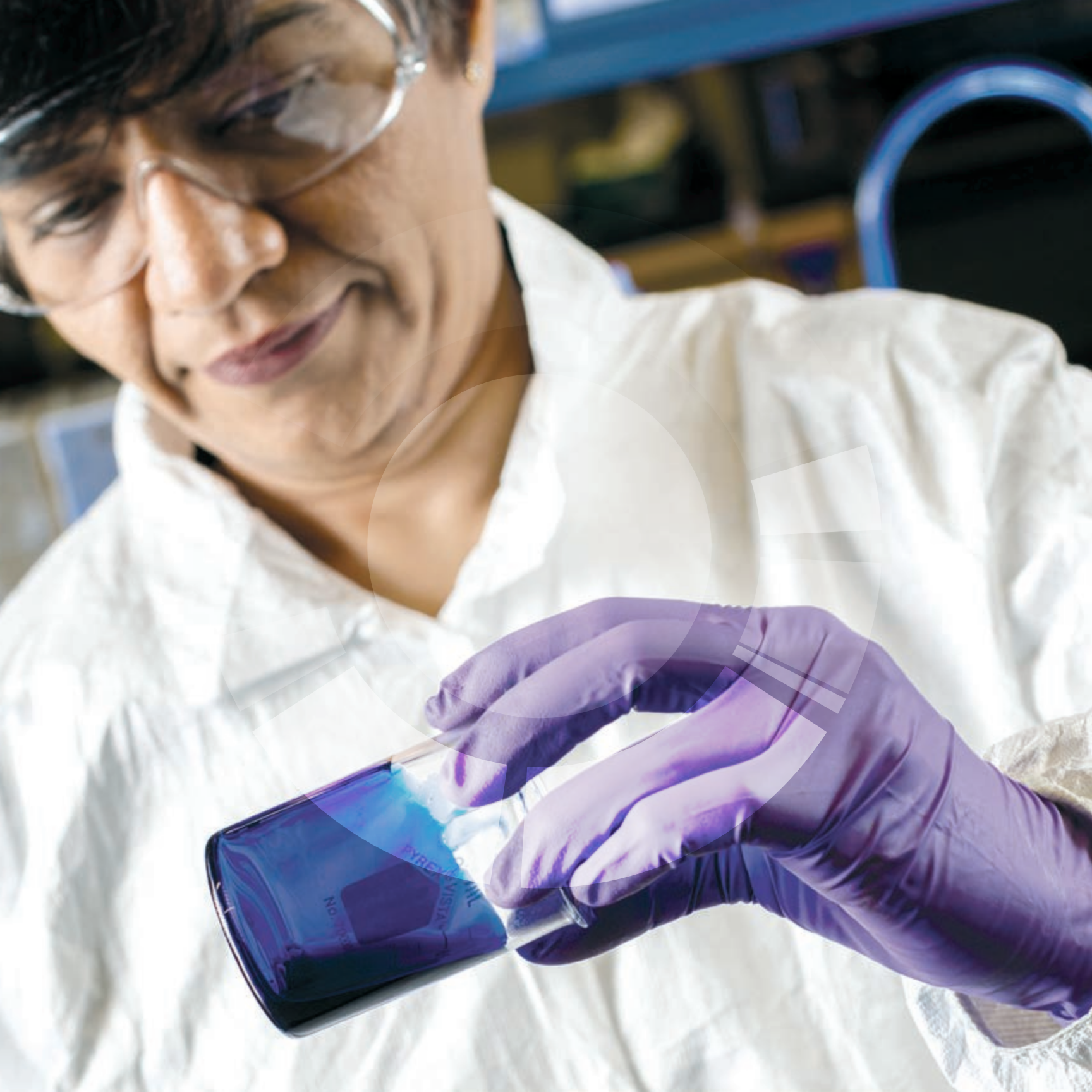
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### **GENDER-BASED ANALYSIS PLUS AT THE NRC**

At the NRC, we are currently formalizing our gender-based analysis plus (GBA+) framework, accountability and reporting mechanisms, including:

- Establishing a Responsibility Centre for GBA+ in the NRC's Policy and Governance division;
  - Providing guidance to our Vice-Presidents, who will be accountable for the inclusion and implementation of GBA+ commitments in NRC programs as part of the operational planning process in 2018-19; and
  - Developing a tracking and reporting mechanism for GBA+ commitments and their implementation by NRC programs.
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## WHERE CANADIAN INNOVATORS ACCESS CUTTING-EDGE TECHNOLOGY AND FACILITIES

By having specialized laboratories and testing facilities located across the country, we provide businesses and institutions access to unique research infrastructure and technical capabilities. Access to such infrastructure and resources help de-risk research and enable “blue sky” R&D opportunities that bring amazing homegrown ideas to life.

### An end-to-end facility for photonics innovation

The Canadian Photonics Fabrication Centre (CPFC) in Ottawa, one of the world’s largest facilities for engineering, prototyping and pilot-run production of photonic devices, chips and integrated circuits for advanced optical telecommunications networks allows Canadian companies to get novel products and solutions to market faster, more affordably and with less risk.

The CPFC designs, tests and fabricates highly specialized chips that cannot be reverse-engineered — capabilities that earned the NRC the 2017 Supplier of the Year Award from MACOM, a world leader in semiconductor technologies. Since 2005, the CPFC created over 170 high-value jobs and contributed millions in gross domestic product to Canada’s economy by helping companies design better photonic devices and manufacture them cost-effectively.

### Technology to solve the mysteries of the universe

Some of our partnerships are very specialized — like the newly completed Canadian Hydrogen Intensity Mapping Experiment (CHIME) radio telescope near Penticton, British Columbia, which was established in collaboration with the University of British Columbia, McGill University and the University of Toronto.

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## A PLATFORM FOR TECHNICAL CAPABILITY

### Building the foundation for collaboration

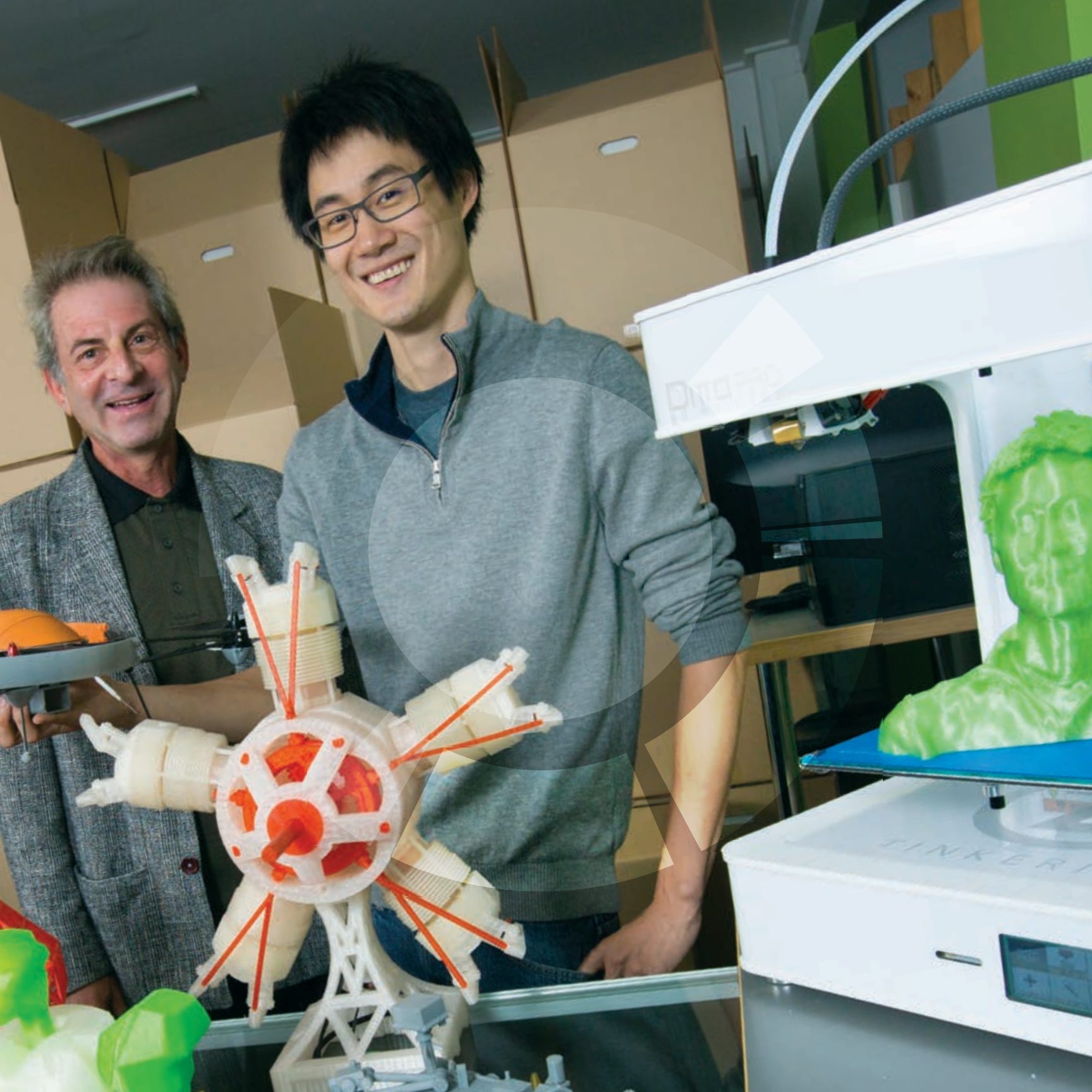
In 2017, we worked to finalize agreements with several universities to create dedicated collaboration centres around research themes of mutual interest. These collaborations will help form a common research agenda between the NRC and its academic partners, which will lead to new discoveries, patents and commercialization.

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Consisting of four cylindrical reflectors and a powerful correlator, CHIME is one of the largest astronomical research instruments in the world. With a novel design that features no moving parts, it looks and operates like no other radio telescope.

In 2017, CHIME began to survey the largest volume of the universe measured to date, mapping faint cosmic radio signals to better understand the universe’s expansion. Using the NRC’s Dominion Radio Astrophysical Observatory as the platform for this collaboration, its radio-quiet zone free from radio frequency interference and electromagnetic pollution gives researchers a tool for generating new insights into the nature of dark energy and gravitational waves, and for conducting new tests of Einstein’s theory of general relativity.







## FUNDING AND ADVICE TO BUILD CANADA'S BUSINESS INNOVATION CAPACITY

The Industrial Research Assistance Program (IRAP) helps small and medium-sized enterprises (SMEs) access the technologies and skills needed to build their innovation capacity and accelerate business growth. Established over 70 years ago, it's one of the federal government's longest-running innovation-support programs, providing financial assistance and advisory services to over 8,280 SMEs each year.

### Helping small companies get their big break

In 2017–2018, NRC IRAP provided a total of \$192.3 million in funding to support more than 2,000 SMEs across Canada. In part, those funds contributed to the creation of over 6,500 jobs on projects that began last fiscal year, including 2,140 positions for youth as part of our commitment to the federal government's Youth Employment Strategy.

To encourage even more companies to take advantage of NRC facilities and equipment, NRC IRAP launched a pilot program in which it covered 75 percent of laboratory access fees for high-potential SMEs. In total, \$5 million in discounts were awarded to more than 87 companies. The program received excellent feedback and will continue in 2018.

As part of the funding allocated to the NRC in Budget 2018, \$12.4 million was provided to lower access fees charged to SMEs and universities and colleges — a significant step forward in building Canada's innovation capacity.

### Guiding entrepreneurs through the innovation process

Some entrepreneurs need additional support beyond the funding they receive — and we are proud to offer experienced coaching and guidance to help get their innovations to the next level. NRC IRAP's 255 industrial technology advisors (ITAs) provide SMEs with expert business and technical advice, assist with literature and patent searches, and connect them to other Canadian innovation programs and services. In 2017–2018, ITAs delivered advisory services to 19,000 firms.

NRC IRAP also lent its expertise to the federal Innovation Superclusters Initiative, which brings together companies,

## A PLATFORM FOR FUNDING AND ADVICE

### Using blockchain to build a more open government

In January 2018, NRC IRAP launched the government's first-ever live trial of blockchain technology: a secure, unalterable public digital ledger. Through the Build in Canada Innovation Program, NRC IRAP is using Canadian-made blockchain software to publish real-time data on contribution agreements with SMEs — and in doing so, exploring blockchain's potential use for the open and transparent administration of government contracts.

### Providing mentorship to a high-tech real estate enterprise

NRC IRAP is helping build up some of Canada's most innovative digital companies. In 2015, ITAs provided coaching that helped entrepreneur Lauren Haw acquire Toronto-based real estate service firm Zoocasa. NRC IRAP also delivered financial support that enabled the firm to acquire the best technology to power its online tools. Zoocasa has since grown from a team of five to more than 50 employees — and plans to expand into other major markets across Canada.

### Linking companies to services that help them grow

NRC IRAP continues to partner with more than a dozen government departments to deliver several innovation programs. It is one of 10 organizations contributing to the Accelerated Growth Service, directing companies to the government services and supports they need to grow and expand. It also co-delivers the Global Affairs Canada CanExport program, which helps SMEs better manage export development costs such as business travel and market research.

universities and research institutions to propose strategies for innovation and job creation. That involved providing technical support to Innovation, Science and Economic Development Canada as it reviewed and selected the proposals to be funded, and contributing to the definition of the superclusters' strategic goals.



## BRIDGING THE GAP BETWEEN THE LAB AND THE MARKETPLACE

We provide organizations with the means to turn innovative ideas into real products and solutions that will benefit Canadians and the entire world. Through joint research and real-life demonstrations, projects can start generating data and results sooner. With that traction comes credibility — and better odds of attracting investors that will help those companies scale up and grow.

### From pilot to launch of the world's first commercial algal biorefinery

In December 2017, Stelco Steel signed an agreement to deploy Pond Technologies' process for absorbing industrial carbon dioxide emissions using algae, which can then be converted into high-value bioproducts such as animal feed, biofuels and fertilizer. That was soon followed by a separate agreement that will see Markham District Energy develop customer-facing projects for its worldwide market using Pond's technology.

The Pond solution was proven out through a two-year pilot project with St Marys Cement in southwestern Ontario. The company's engineers and NRC researchers worked hand-in-hand to test the carbon-conversion technology at industrial scale. Now, as a commercial solution — the first of its kind — Pond's algal biorefinery could revolutionize the way industrial greenhouse gas emissions are managed.

### Partnering to save lives in Canada's North

Our researchers worked to get a vital innovation into the hands of people in Canada's North. Haemophilus influenzae type A (Hia) is a bacterial infection that can lead to meningitis and other lethal conditions, especially among infants.

While Hia is spreading across the North, the market is too small for pharmaceutical companies to address. As a result, the Public Health Agency of Canada (PHAC) asked us to step in and partner with them on a solution.

## A PLATFORM FOR BRINGING CANADIAN DISCOVERIES TO MARKET

### Contributing to a bioplastics breakthrough

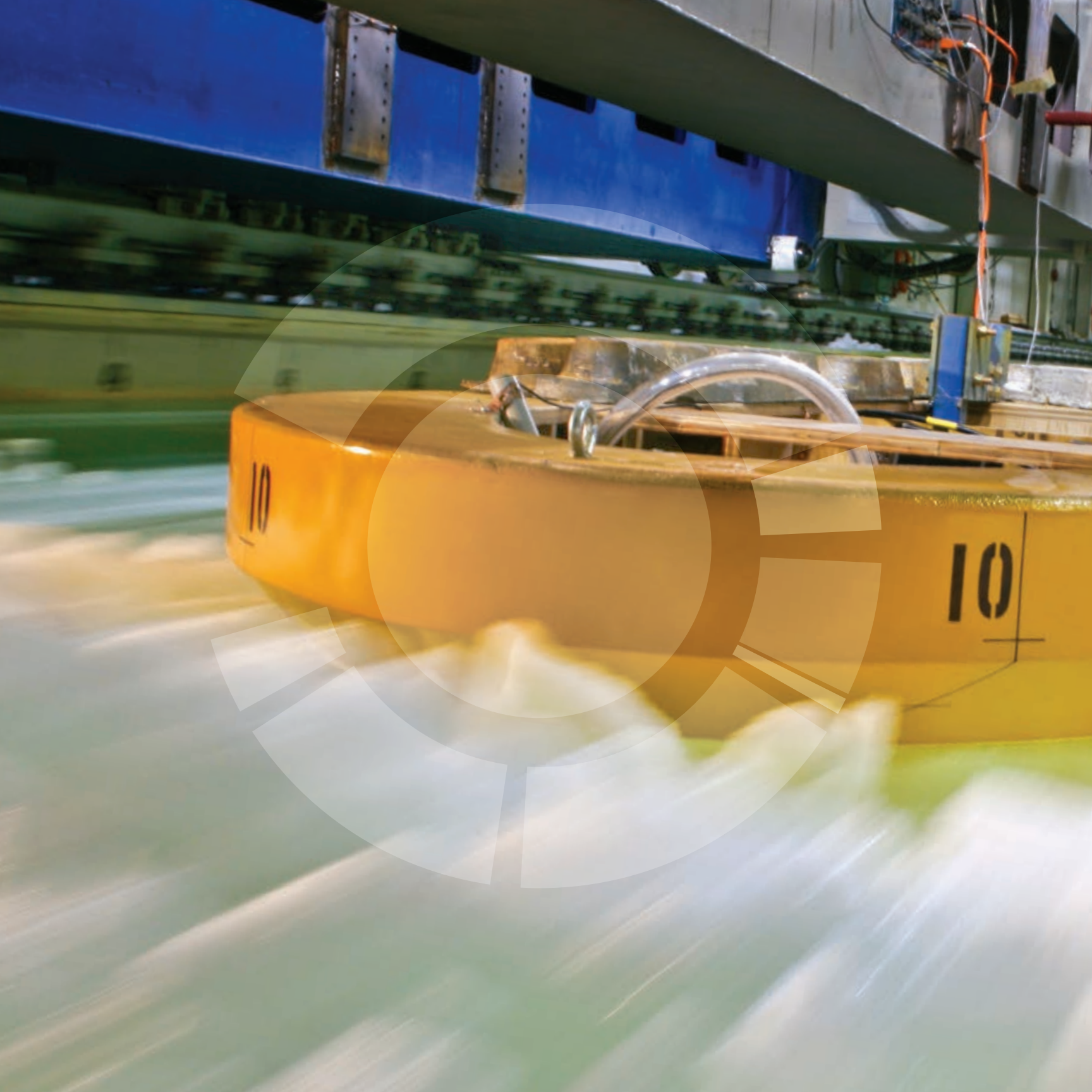
To tackle the growing environmental problem of plastic waste, Bosk Bioproducts sought to create compostable, bio-based plastics through the fermentation of pulp and paper waste. Struggling to refine its technology, it turned to our Polymer Bioproducts team for help. Drawing on a decade of experience working with bioplastics, over the past two years we've helped Bosk develop formulations for several eco-efficient plastic products, which the company plans to market as packaging, containers and filaments for 3D printing.

### Going public with innovative cancer treatments

With our funding and support, Vancouver's Zymeworks has evolved into a world-leading developer of antibody and protein therapeutics for treating cancer and other diseases. Not only has the firm grown from seven staff in 2009 to 175 in 2018, last year it also opened its own state-of-the-art laboratory, raised \$58.5 million through its initial public offering (IPO) and signed a licensing agreement with Johnson & Johnson.

Together, we developed a process for growing Hia bacteria, isolating the portion needed for the vaccine, and attaching it to a carrier protein so it can be recognized by the immune system. In 2017, our vaccine was licensed to Vancouver's InventVacc Biologicals for production and clinical trials, a key step toward protecting vulnerable children in Canada's North and around the world.





## A CONNECTOR TO THE GLOBAL RESEARCH COMMUNITY

International partnerships accelerate the pace of innovation. Working closely with counterparts around the world, we connect Canadian and international R&D capabilities to solve global research challenges. This gives innovative Canadian companies access to foreign markets — and to vitally important opportunities to grow beyond our borders.

### Establishing key partnerships with Germany and the United Kingdom

Germany is considered to be one of the most innovative countries in the world, making it a priority partner for our international strategy. In January 2018, we signed memoranda of understanding (MoUs) with the German Aerospace Center (DLR) and the Bavarian Research Alliance — agreements that will lead to enhanced scientific collaborations between Canada and Germany.

We accepted proposals for the new 2+2 program, which is delivered jointly by NRC IRAP, the Natural Sciences and Engineering Research Council, and the German Federal Ministry of Education and Research (through DLR's project management agency). Focused on developing Industry 4.0 technologies, "2+2" refers to how project consortia must include at least one SME and one academic or research institute partner from both Canada and Germany. The projects funded through this program will have strong market potential for both countries, using robotics, cloud computing, artificial intelligence and other technologies to dramatically transform manufacturing processes.

We also played a key role in the MoU signed between Canada and the United Kingdom on science, technology and innovation, helping Global Affairs Canada and Innovation, Science and Economic Development Canada lay the groundwork for and negotiate the agreement. Signed in September 2017, the MoU identifies several priorities that are aligned with NRC investments, including advanced manufacturing, agriculture technologies, clean technologies and quantum technologies.

## A PLATFORM FOR INTERNATIONAL CONNECTIONS

### Opening the door to foreign markets

Canada's National Office for the EUREKA network provides a first point of contact for Canadian innovators seeking access to global value chains and foreign markets through transnational collaborations with one or more of EUREKA's 40+ member countries. In 2017–2018, a total of 28 Canadian innovators (primarily SMEs) launched new EUREKA projects with 42 foreign partners worth a total of €28.94 million. NRC IRAP provided support to 43 Canadian SMEs involved in new and ongoing EUREKA projects.

### Cross-border collaboration to build a better icebreaker — designing ships that can smash through a ridge of ice up to 20 metres deep takes skill and expertise.

Since April 2017, U.S. and NRC researchers have been working at our ice tank facility in St. John's, building scale models of potential ship designs and testing them in a wide range of ice conditions to evaluate their propulsion capabilities, ice resistance and maneuverability. From this research, the U.S. Coast Guard can set the baseline requirements for its new icebreaker. The study has also given a new generation of researchers hands-on experience modelling the vessels that create safe waterways for supplying northern communities and studying climate change.



## WHERE PARTNERS IN INNOVATION COLLABORATE TO SOLVE NEW CHALLENGES

Collaboration is key to leading-edge research that delivers benefits across multiple sectors. We work with thousands of private and public organizations each year, offering universities, industry and all levels of government a unique platform where they can join together and build on each other's expertise. In doing so, we ultimately leverage and complement each other's capabilities.

### Helping industrial R&D consortia break through

The NRC coordinates several industrial R&D groups that bring the private sector, government and academia together to tackle common challenges.

Last year, ALTec — whose 20-plus members and partners include Rio Tinto, Cosma International, Ford, Bombardier, Natural Resources Canada and the Ministère de l'Économie, de la Science et de l'Innovation du Québec — made significant progress in aluminum hot-stamping, a process that allows prototype automotive parts to be fabricated and validated faster and more cost-effectively. ALTec also developed a cloud-based tool that will allow its members to check the corrosion resistance of vehicle assemblies incorporating high-strength aluminum alloys — and see what modifications need to be made to improve structural integrity in Canada's harsh climate.

In collaboration with the Centre technologique en aérospatiale and eight industrial partners, the STAMP Composites group was launched in July 2017. The group is working to develop and demonstrate a stamping process using high-performance thermoplastic composites, which will deliver a cost-effective solution for vehicle lightweighting by reducing cycle times and enabling the mass production of composite structural parts.

### Playing a leading role in printable electronics

With printable electronics, electrical circuits can be printed quickly and inexpensively using ordinary inkjet or screen printers — and the NRC is breaking new ground in this emerging field. Last year, our researchers worked with Montréal's GGI Solutions to co-develop a high-performing conductive ink for printable electronics. In 2017, GGI Solutions licensed the product to the world's largest manufacturer of molecular ink, Sun Chemical, which will produce the ink to be used in the thin conductive features required for printed antennas, displays and photovoltaics.

## A PLATFORM FOR CROSS-SECTOR COLLABORATION

### Putting genomics under the microscope

The NRC is one of eight federal agencies participating in the Genomics R&D Initiative (GRDI), which collaborates with universities and the private sector to conduct genomics research (the study of DNA sequences) in agriculture, health and other areas that will benefit Canadians. In 2017, we helped develop an analytical tool for predicting antimicrobial resistance phenotypes, which will greatly enhance policymakers' capacity to assess the risk of the spread of antibiotic-resistant genes. The GRDI also completed work that will help standardize the way soil and freshwater quality are monitored and analyzed, making it easier to deliver evidence-based environmental management and resource-development decisions.

### Using AI to analyze public health trends

We continued our work to revitalize the Global Public Health Intelligence Network, a tool used by the World Health Organization to analyze global media sources for information on public health crises. Through artificial intelligence and advanced language-processing techniques, we're helping to make it possible to track changes and turning points in ongoing events like infectious disease outbreaks.

### Preserving Indigenous languages with technology

Working in close collaboration with Indigenous community organizations, we are developing speech and text-based technologies to assist with the revitalization and preservation of Canada's Indigenous languages. The tools being created by our computational linguistics and software engineering experts will support Indigenous language educators and students, as well as Indigenous language translators, transcribers and other professionals.

Our success with GGI Solutions can be traced back to the creation of the Printable Electronics Consortium, which we established in 2013 to help ensure Canada can play a leading role in this field. It brings together public and private sector R&D expertise to help Canadian companies get to market faster and access licensing opportunities.





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### **STRONGER ENGAGEMENT WITH THE ACADEMIC COMMUNITY**

The relationships and engagement we forge with universities are critical to building and strengthening Canada's current and future research capabilities. Last year, we reinstated our post-doctoral fellowships program, which gives promising young scientists access to our facilities and opportunities to work on multi-disciplinary teams of expert researchers and technicians. Ten post-doctoral fellows were brought into the NRC in 2018, building our research capacity while also training the next generation of researchers.

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In 2017–2018, the NRC signed more than 200 agreements with universities including a renewal of our longstanding collaboration on nanotechnology with the University of Alberta. To support that collaboration going forward, we jointly launched a Nanotechnology Initiative that will accelerate and expand Canadian expertise and capacity for breakthrough research and discovery in this field. In addition, the NRC initiated the development of R&D collaboration centres with several Canadian universities, with partnerships to be announced in the near future.

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### **THE SPIRIT OF THE NRC**

Isabelle Gingras, Vice-President of Human Resources, retired last year after more than three decades at the NRC.

Starting out answering phones as a summer student, she moved through a succession of roles, playing an instrumental part in designing and implementing our internal resource-planning system, leading the 2010 Classification Renewal Project and receiving an Outstanding Achievement Award for her contributions to the Human Resources function.

Congratulations, Isabelle, and many thanks from all your colleagues.

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## AWARDS AND HONOURS

Members of the NRC's scientific community were recognized last year for their scientific and technological achievements, receiving some of the most respected national and international honours — showcasing the impact our platform has on strengthening innovation across Canada and around the world.

In September 2017, two such honours were given by the Royal Society of Canada, which recognizes leaders and their work in order to help them build a better future in Canada and around the world.

**Dr. Alan Steele**, the NRC's Chief Metrologist, was named a Specially Elected Fellow for his fundamental contributions in developing and implementing a strategy to address Canada's scientific measurement needs.

**Dr. Andrew Sachrajda**, NRC principal research officer in quantum physics, was named Fellow for his fundamental contributions to nanoscience and nanotechnology.



## NRC LEADERSHIP

### Council Members



**Iain Stewart**  
President, National  
Research Council Canada,  
Ottawa, Ontario



**Thomas (Tom) Jenkins**  
Chair of the NRC Council,  
Chair of the Board, Open Text  
Corporation, Waterloo, Ontario



**Stephen Mooney**  
Director, Cold Climate  
Innovation Centre, Yukon  
College, Whitehorse, Yukon



**Karimah Es Sabar**  
Chief Executive Officer and  
Partner, Quark Venture Inc.,  
Vancouver, British Columbia



**Lois Scott**  
Former executive in  
the healthcare sector  
Shediac Cape,  
New Brunswick



**Raymond Leduc**  
President,  
Nova Bus and Prevost,  
Saint-Eustache, Quebec



**Jay Josefo**  
Counsel, Ricketts Harris,  
Toronto, Ontario



**Carolyn Cross**  
Founder, Chairman and  
Chief Executive Officer,  
Ondine Biomedical Inc.,  
Vancouver, British Columbia

## Senior Executive Committee



**Iain Stewart**  
President



**Michel Dumoulin**  
Vice-President,  
Engineering



**Dale MacMillan**  
Vice-President,  
Corporate Services and  
Chief Financial Officer



**Geneviève Tanguay**  
Vice-President,  
Emerging Technologies



**Maria Aubrey**  
Vice-President, Business  
and Professional Services



**Emily Harrison**  
Vice-President (Acting),  
Human Resources



**Roger Scott-Douglas**  
Secretary General



**François Cordeau**  
Vice-President,  
Transportation and  
Manufacturing



**David Lisk**  
Vice-President,  
Industrial Research  
Assistance Program



**Roman Szumski**  
Vice-President,  
Life Sciences



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