

# SUNNYBROOK RESEARCH INSTITUTE STRATEGIC PLAN 2022-2026

*Inventing the future of health care*



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*Inventing the future of health care*

## VISION

Sunnybrook invents the future of health care.

## MISSION

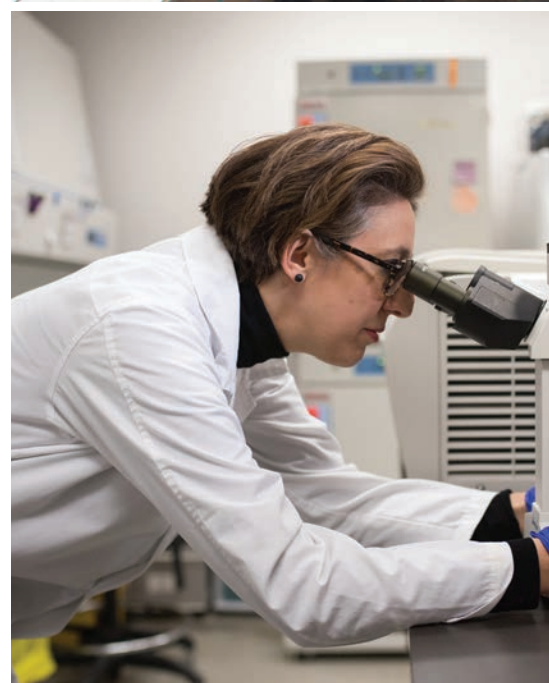
Integrate research with health care delivery across Sunnybrook to drive clinical excellence, innovation and commercialization.

## VALUES

Excellence  
Collaboration  
Accountability  
Respect  
Engagement

## PARTNERSHIPS

Our vision and mission will only be possible with the close collaboration of Sunnybrook, Sunnybrook Foundation, our patients, donors, the University of Toronto, the Toronto Academic Health Sciences Network, the Ontario Hospital Association, community and industry partners and the Provincial and Federal governments.







# Message from the Vice President, Research and Innovation, Sunnybrook Research Institute

I am pleased to share with you the new Sunnybrook Research Institute Strategic Plan 2022-2026.

This plan was developed at a unique time— amidst the far-reaching challenges of COVID-19, a global awakening to social justice and perhaps one of the most exciting years yet for science.

Over the past 12 months, we embarked on the ambitious task of reflection and prioritization, beginning with a formal external review, followed by a series of questionnaires, focus groups and conversations with stakeholders across the organization and beyond.

At SRI, we are fortunate to have a talented team of world-renowned researchers conducting discovery science, translational research, clinical trials, health-services research, and education and practice-based research. Together, we set out to create a plan that was accessible, inclusive and actionable, and one that would propel SRI forward for the next four years.

As a leading academic health sciences centre, Sunnybrook's purpose is to provide a high standard of care to the more than 1.3 million patients the hospital cares for each year. But with our vision to invent the future of health care, we are committed to much more. Our passion for innovation is fundamental in our drive to continually improve patient care. Sunnybrook Research Institute remains at the forefront of this work and we will continue to lead the organization's efforts to achieve our vision.

**This plan outlines how we'll get there, beginning with our four new strategic pillars —rooted in our strengths and where we see opportunity to enhance our research impact and organizational excellence:**

- **Personalized and precise diagnostics and therapeutics**
- **Image-guided, minimally-invasive therapeutics**
- **Patient access to research opportunities**
- **Health care system quality and care experience**

Within these foundational pillars, we're committed to driving research and sustainability across three stages of innovation: discovery, translation to patient care, and widespread dissemination through the commercialization of our discoveries and technologies.

We know that none of this will be possible without our people, our strongest advantage, and I'm excited to work closely with our scientists, clinicians, staff, trainees and partners to fulfill our vision to invent the future of health care.

We look forward to sharing our progress with you.

**Dr. Kullervo Hynynen**  
*Vice President, Research and Innovation*  
*Sunnybrook Research Institute*  
*Sunnybrook Health Sciences Centre*

# Sunnybrook Research Institute



**360+ Scientists**



**11 Canada Research Chairs**



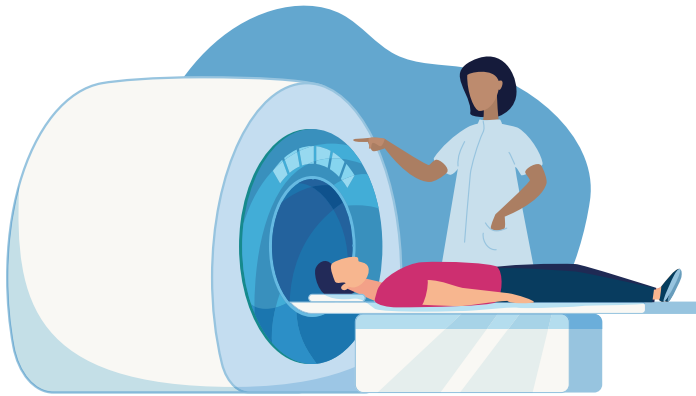
**10 Research Programs**



**3 Scientific Platforms**



**500 active clinical trials**



**Centre of Excellence in  
Focused Ultrasound**



**20 start-up companies  
established**



**28 patents granted in 2021**



**250,000+ square feet of  
state-of-the-art research space**

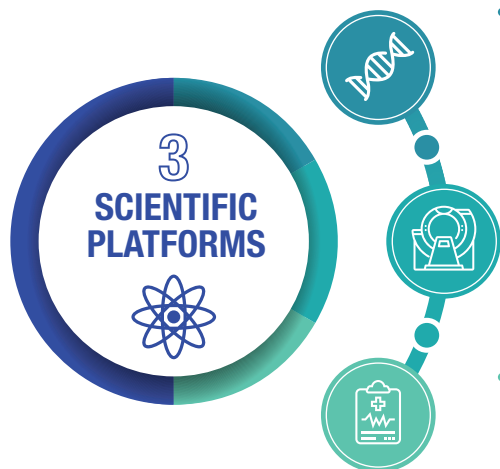


**200+ students & trainees**

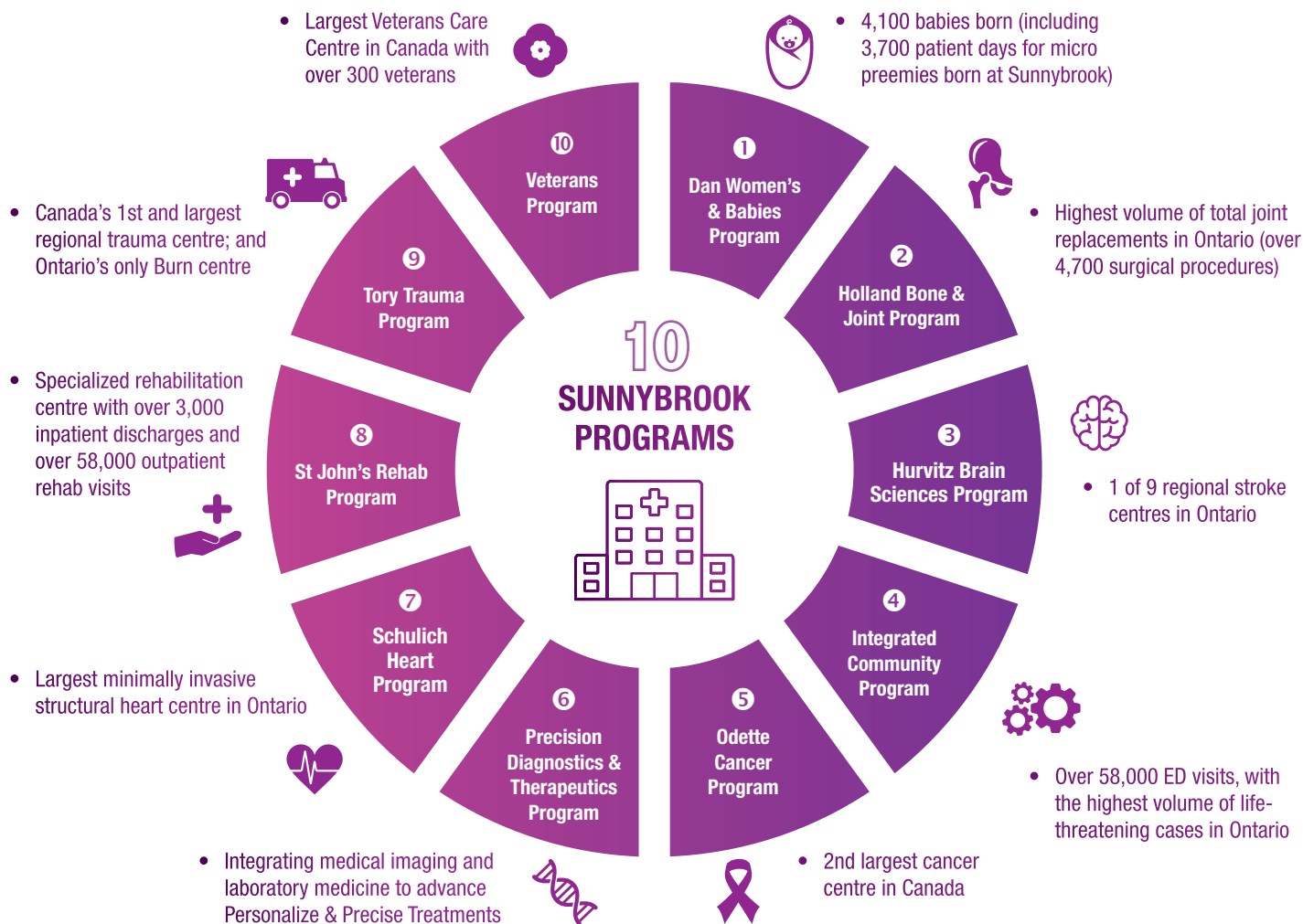


# Our Platforms and Programs

Scientists at Sunnybrook Research Institute are organized by platform and program. Researchers are grouped into three platforms, which are areas of common scientific expertise organized around similar methods. Research teams are organized by clinical programs. They work together to answer scientific questions of mutual interest.



- Scientists working in Biological Sciences aim to understand the functions and interconnections of molecules, cells, organs and systems. With a better understanding of the mechanisms of healthy and disease physiology, we can improve diagnosis and prognosis; and make treatment more personalized.
- Scientists in the Physical Sciences use physics, mathematics and engineering to develop and improve ways to visualize molecules, cells, tissues, organs and whole organisms. They also create image databases and devise new ways to extract and interpret information from images. Their aims are to develop and improve imaging technologies to diagnose and assess disease, and to guide and monitor therapies.
- Scientists in the Evaluative Clinical Sciences explore the causes, consequences and treatment of disease, using a variety of methods including randomized controlled trials, meta-analyses, survey studies, and administrative database studies. Their aim is to improve patient care and ensure health care resources are used efficiently.



\*Data from FY19/20



# Sunnybrook Research Institute

## Stages of Innovation

### DISCOVER

innovative approaches to prevent, diagnose, and treat disease.



### TRANSLATE

innovation to improve patient care



### COMMERCIALIZE

discoveries to improve health outcomes and enrich the health care system and the Canadian economy



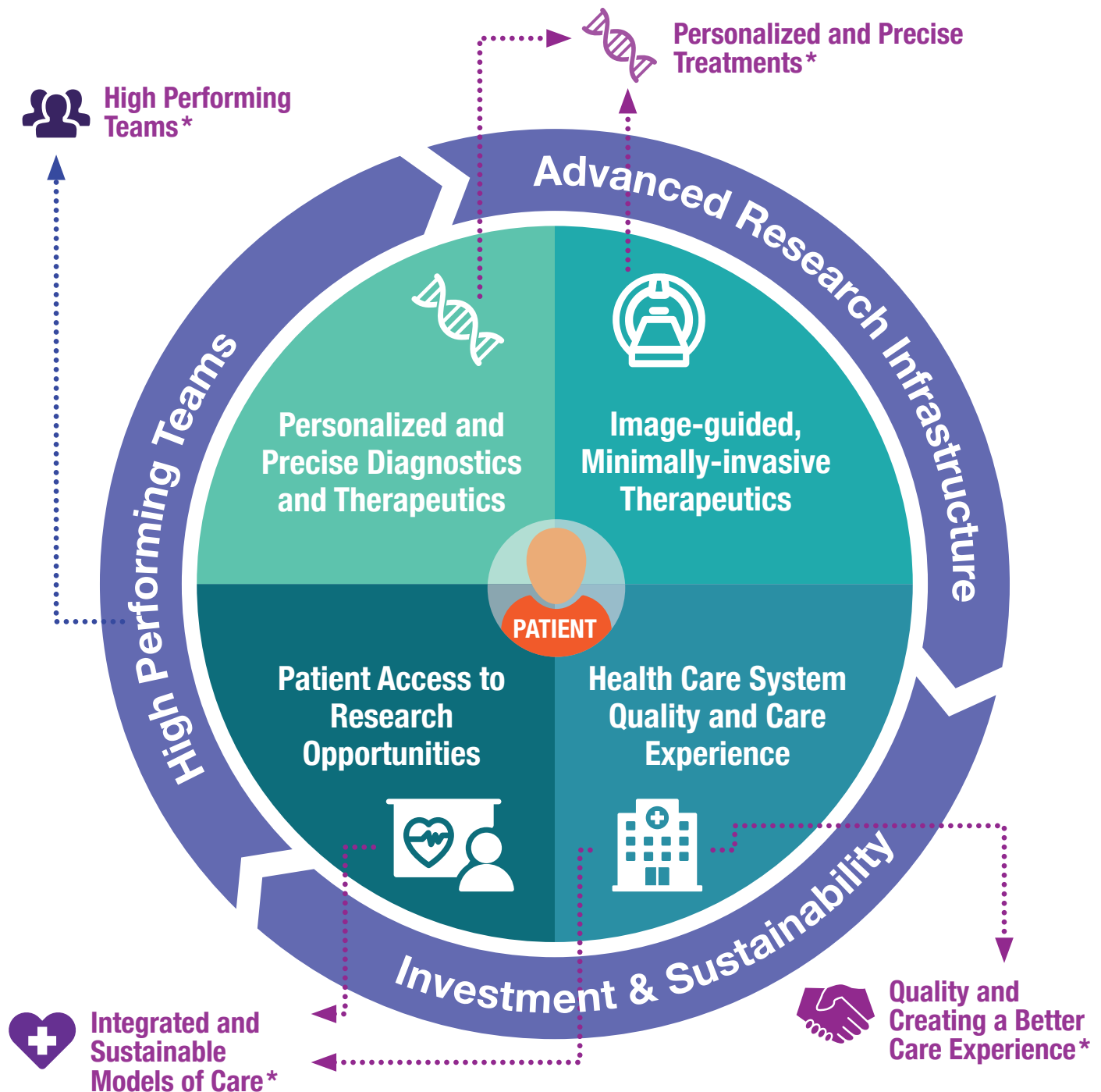
# Sunnybrook Research Institute Strategic Pillars & Enablers

The 2026 strategic plan introduces four new Strategic Pillars to advance Sunnybrook Research Institute forward in the years ahead. These pillars are based in our strengths and where we see opportunity to help invent the future of health care.

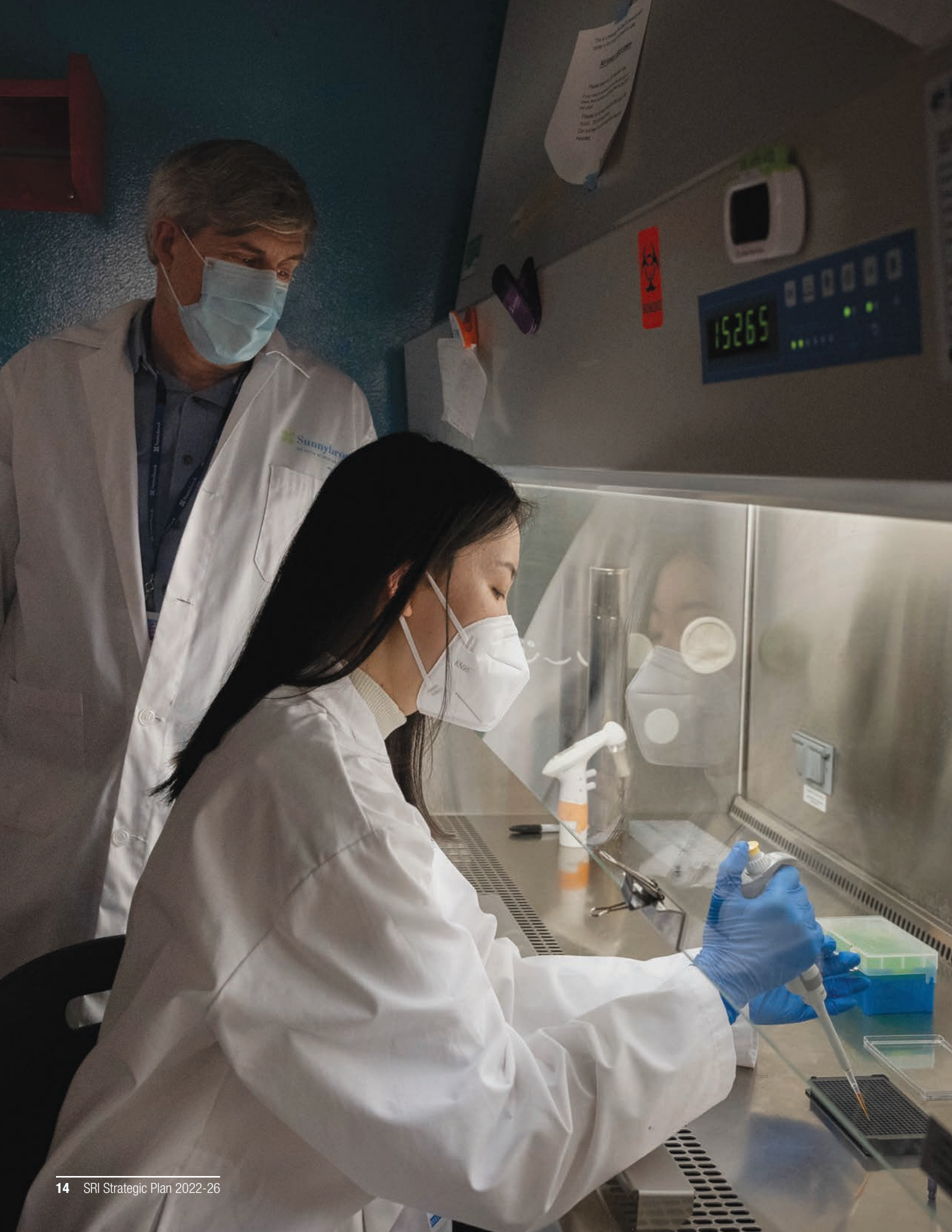


# Alignment of Sunnybrook's Research and Hospital Strategic Plans

## Sunnybrook Research Institute Strategic Pillars



\*Sunnybrook Health Sciences Centre Strategic Directions



# Strategic Pillar 1:

## Personalized & Precise Diagnostics and Therapeutics



- **Discover and develop personalized and precise diagnostics and therapeutics**
- Sunnybrook Research Institute will continue to focus on a range of experimental approaches and techniques to understand the mechanisms of healthy and diseased physiology. By understanding these mechanisms, we can improve diagnosis and prognosis; and make treatment more specific, selective and personalized.
- **Objectives:**
  - » Accelerate research and development in molecular diagnostics and therapeutics to improve patient care.
  - » Translate, implement and evaluate Personalized and Precise Diagnostics and Therapeutics into clinical care.
  - » Commercialize innovations in Personalized and Precise Diagnostics and Therapeutics.

### Research in action: Personalizing cancer therapy through imaging

Many cancer treatments have historically taken a “one-size-fits-all” approach. However, every patient’s cancer is different and being able to better understand differences in drug response can improve treatment success rates and reduce side effects.

Dr. David Andrews, director of Biological Sciences at SRI, and his lab are developing image-based screening techniques that enable them to monitor how cancer cells respond to various treatment combinations at scale.

“ Starting with cancer cells from patients, we test hundreds of drug combinations and monitor how the samples respond by automated microscopy,” says Dr. Andrews.

“ With this information we can guide drug development and clinical trials, and eventually identify optimal drug combinations for individual cancer patients.”



# Strategic Pillar 2:

## Image-guided, Minimally-invasive Therapeutics



- **Increase the impact of image-guided, minimally-invasive therapeutics**

- Sunnybrook Research Institute will continue to focus and invest in personalized and precise treatments through the use of image-guided, minimally invasive therapeutics. This includes the use of medical imaging technologies such as MRI and ultrasound to both see and treat diseases such as cancer, Alzheimer's and cardiovascular disease.

- **Objectives:**

- » Invent and develop novel imaging and image-guided therapy techniques to improve patient care.
- » Translate, implement and evaluate image-guided therapy into clinical care.
- » Commercialize new technologies in imaging and image-guided therapeutics.

### Research in action: Targeting tumours with precision accuracy

Sunnybrook is home to the MR-Linac, the first machine in the world to combine radiation and high-resolution MR imaging to more precisely target tumours and monitor their response to radiation with unprecedented accuracy.

Patients treated on the cutting-edge machine are part of a global clinical trial known as the MOMENTUM (The Multiple Outcome Evaluation of Radiotherapy Using the MR-Linac) study which is an international registry study tracking all patients treated on the device.

“ Every day a patient comes in for treatment, the team uses that day's image to plan exactly where to focus the radiation,” says Dr. Arjun Sahgal, site lead for the trial and scientist in the Odette Cancer Research Program at SRI.

“ For brain tumours, we have observed that thirty to forty percent of the time, we're either making a change in the medicine or the actual radiation because of the ability to see the tumour each day”



# Strategic Pillar 3:

## Patient Access to Research Opportunities



- **Increase patient access to cutting-edge research opportunities**
- As a leader in clinical research, Sunnybrook Research Institute will continue to work collaboratively with our hospital partners to expand research opportunities for more patients across all of our 10 programs. This will ensure patients who walk through our doors have access to some of the most innovative therapies and procedures.
- **Objectives:**
  - » Advance investigator-led studies across all 10 hospital programs.
  - » Enhance clinical trial infrastructure and expand opportunities for patient participation.
  - » Collaborate with academic, patient, community and industry partners to facilitate transformative practice change.



### **Research in action: Advancing focused ultrasound treatments for depression**

In 2012, Sunnybrook researchers pioneered focused ultrasound for the treatment of essential tremor. The scalpel-free surgery utilizes sound waves to reach areas deep inside the brain to lesion cells that are responsible for the tremor. A few years later, the treatment was approved by the FDA and Health Canada, and today more than 250 patients at Sunnybrook have received the life-changing treatment.

Now, the focused ultrasound clinical trials team is taking a similar approach with treatment-resistant major depression. In their Phase I trial, they demonstrated that focused ultrasound is safe and effective in improving symptoms of patients with treatment-resistant depression. In the trial, focused ultrasound was used to target and cause a lesion in a brain pathway known to be active in depression.

With the Phase II trial now underway, they're one step closer to bringing the novel treatment to clinical practice, as they assess how effective the treatment will be.

**“ Focused ultrasound is a promising option for patients with treatment-resistant depression as part of a broader treatment plan that can be personalized for each individual,” says Dr. Anthony Levitt, co-investigator and Chief of Sunnybrook’s Hurvitz Brain Sciences Program.**

**“ We’re looking forward to offering this and other direct-to-brain approaches to more patients as part of a comprehensive and innovative approach to treatment resistant mood and anxiety disorders”**





# Strategic Pillar 4:

## Health Care System Quality and Care Experience



- **Optimize the health care system to improve value inclusive of quality, patient experience and cost**
- Being uniquely positioned within Sunnybrook Hospital and with a close affiliation with the Institute for Clinical Evaluative Sciences (ICES) enables our researchers to produce high-impact evidence that has shaped public policy for decades. We will continue to invest in this important work to optimize health care delivery at a hospital and system level.
- **Objectives:**
  - » Study the components of care delivery and their impact on population health and patient outcomes.
  - » Inform and drive public policy.
  - » Improve health system outcomes with an emphasis on equity.

### Research in action: Transitioning care between the emergency department and primary care

Sunnybrook scientists are helping to build and implement solutions to improve transitions of care for patients in the community.

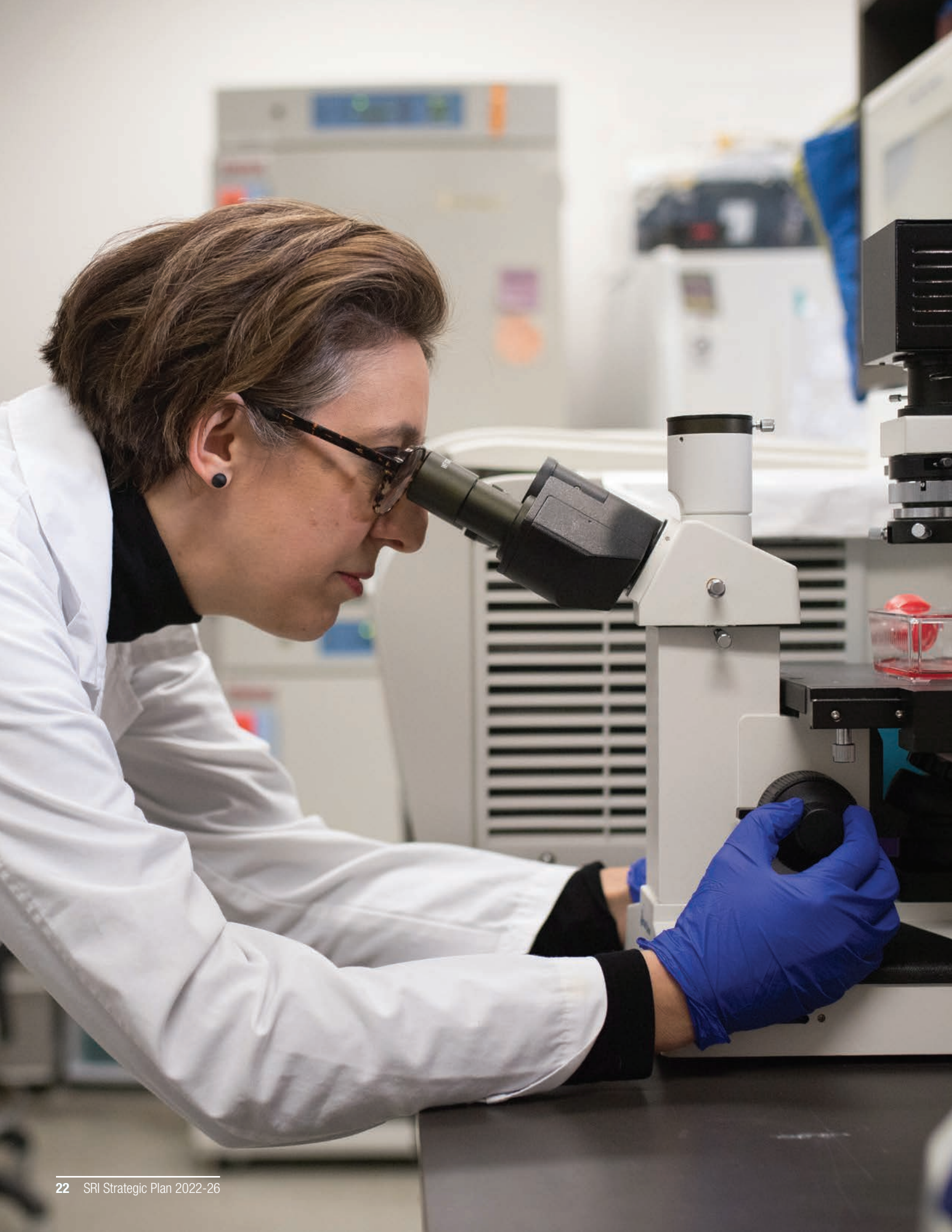
Dr. Clare Atzema, Program Research Director for the Integrated Community Program, is leading a large-scale research project to develop and pilot an online booking tool that emergency physicians can use to book primary care follow-up appointments for patients, so they can avoid hospitalization.

“ In the ED, we see a number of patients with exacerbations of chronic diseases, like COPD or heart failure,” says Dr. Atzema. “In many cases, the default option is to hospitalize these patients after treating their acute exacerbation unless we know they will be followed-up with in a timely manner. We can avoid hospitalizing these patients at the end of an ED visit, if we can be assured another healthcare provider will reassess the patient later that week, for instance. ”

Avoiding hospitalization allows patients to return to their own homes, avoiding the risk of a prolonged hospital stay and the financial cost of hospitalization.

The booking tool, informed by Dr. Atzema’s research on the transition of care between the emergency department and primary care, is currently being piloted at Sunnybrook and two other sites in the city.

“ As the population ages and the number of patients with chronic diseases continues to increase, solutions aimed at supporting patients from hospitals across the care continuum will be critical,” says Dr. Atzema.



# Strategic Enablers

**Enablers are specific organizational capabilities that Sunnybrook Research Institute has that have the potential to support and accelerate all four of our Strategic Pillars**

Our plan will be supported by three strategic enablers:

- 1. Investments & Sustainability**
- 2. Advanced Research Infrastructure**
- 3. High Performing teams**

## 1. Investments & Sustainability

### Strengthen alignment with Sunnybrook Foundation

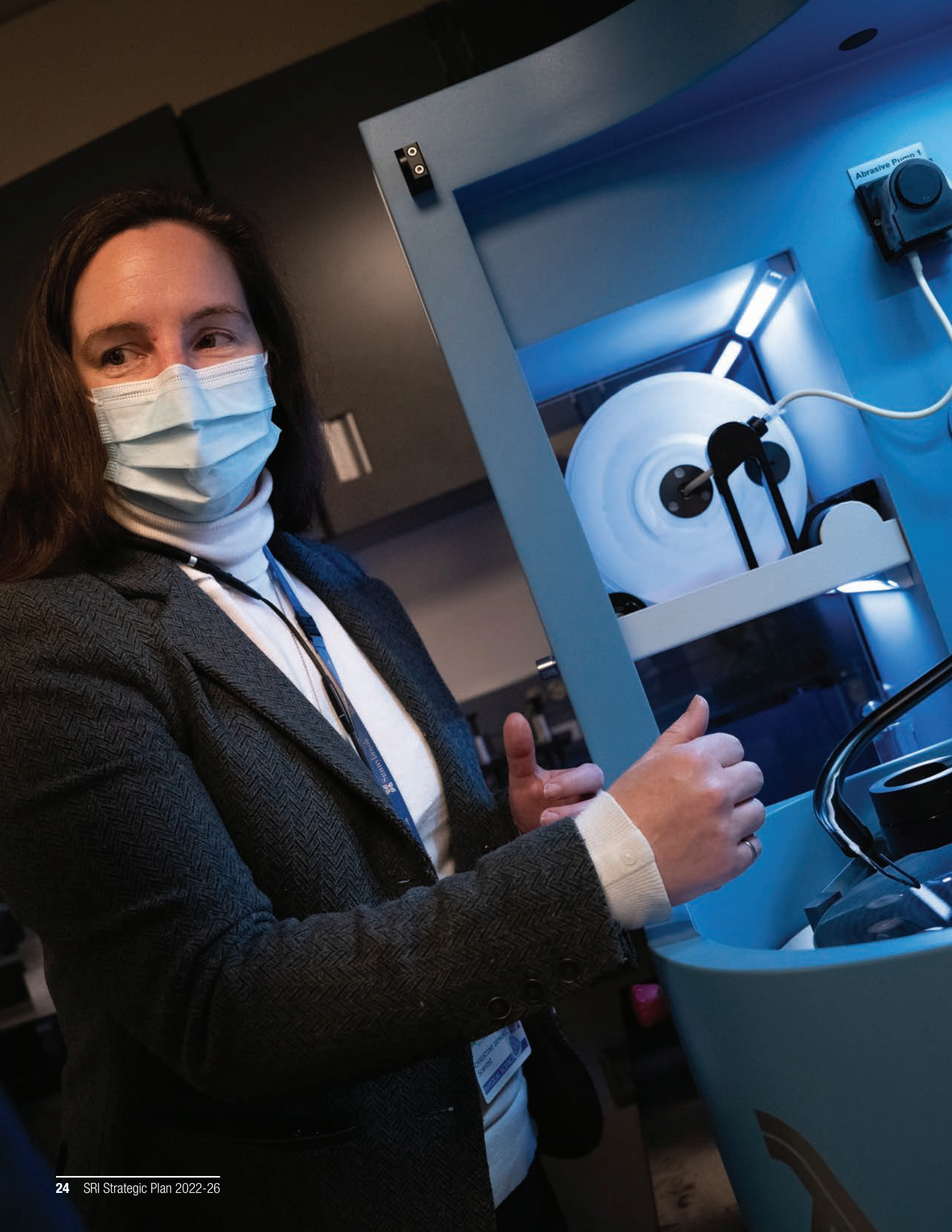
Philanthropy is a key driver of Sunnybrook's research endeavors and generous donors continue to play a vital role in helping us invent the future of health care. Our community's support has been integral to advancing research across SRI, funding research chairs, infrastructure, world-firsts in focused ultrasound and neuromodulation, and new hubs of innovation like the Dr. Sandra Black Centre for Brain Resilience & Recovery, just to name a few. Most recently, community support has helped to launch many of the more than 100 COVID-related studies initiated since the beginning of the pandemic. Increased strategic alignment with the Foundation in the years ahead will enable us to better identify aspirational donor opportunities and grow funding. This will include support for early-stage inventors to transfer more discoveries to the bedside and funding for impactful innovations in care. Increased communication will raise awareness internally and strengthen our reputation externally, to drive funding for research. The effective stewardship of research funds will ensure a continued future of growth, innovation and creativity.



### Optimize funding from governments, granting agencies, and industry

Over the next four years, SRI will continue to work closely with our government partners to advance Canada's image-guided therapy sector through INOVAIT, the SRI-led pan-Canadian image-guided therapy and AI network supported by the Government of Canada's Strategic Innovation Fund. We'll also optimize funding from our Provincial and Federal governments through improved internal support and processes for grant submissions. Working closely with our partners, we'll advocate toward a fully integrated system of research, clinical care and health policy across the province. Within the private sector, we'll increase opportunities to collaborate with industry as we look to further grow research through financially sustainable structures.





## Increase commercialization results

SRI has an admirable history of moving its technologies to industry and clinical practice. Since 2007, SRI has launched 20 companies in the health care sector, and a further three companies have emerged from those. Companies started out of SRI have attracted more than \$400M to Canada, and have hired and trained over 300 individuals. Most significantly, these companies are having a substantial impact on patient care. In the next four years, we'll invest further in commercialization as we work to move more innovations to the bedside, disseminate our discoveries nationally and internationally, and sustain tomorrow's research through a sustainable revenue source.



## SRI Start-up Spotlight



Notch Therapeutics, a start-up company out of SRI and the University of Toronto co-founded by Sunnybrook Senior Scientist Dr. Juan Carlos Zúñiga-Pflücker, recently raised \$85 million in venture funding. The company is developing a platform to produce immune cells on an industrial scale to treat diseases such as cancer.

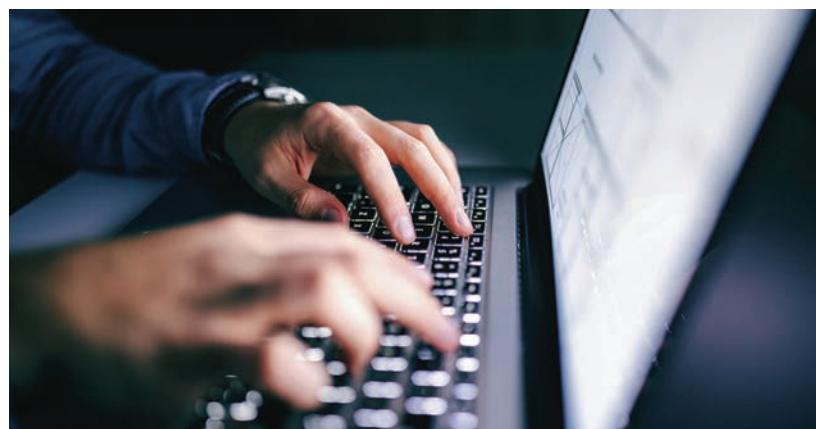
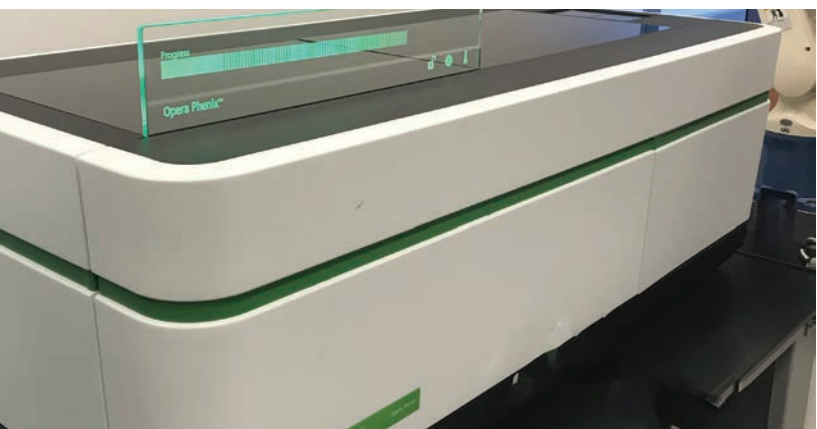
## PROFOUND

Profound Medical developed their flagship technology TULSA-PRO at SRI. The incision-free treatment combines MR imaging and thermal ultrasound to precisely treat patients with localized prostate cancer. The technology is now starting to be offered at hospitals around the world.



## VISUAL SONICS

SRI Senior Scientist Dr. Stuart Foster and his lab created the first ultrasound tool that incorporated high-frequency transducers that made tiny physiological details, such as the blood flow feeding a tumour in a pre-clinical model, visible. FujiFilm acquired VisualSonics in 2010 and today the ultrasound machines are used regularly in labs around the world.



## 2. Advanced Research Infrastructure

Leading-edge infrastructure, technologies and support services are integral to the success of executing our strategic mandate. Sunnybrook is home to world-class research technology including imaging systems such as the MR Linac — combining real-time imaging and radiation treatment and the MR/PET — a hybrid imaging technology that produces highly detailed images of internal structures in the body and provides insight into how well those structures are functioning.

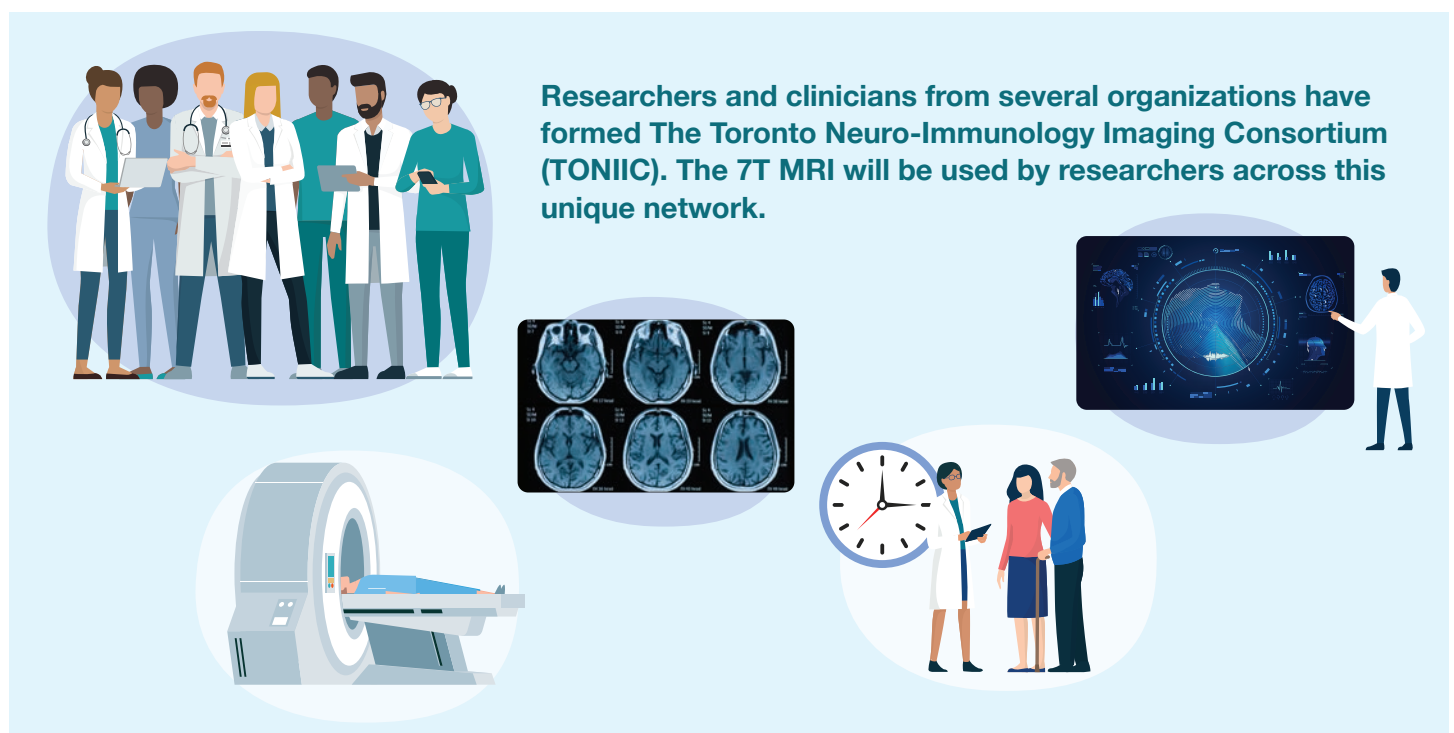
A strong contributor to SRI's commercialization success is our in-house infrastructure which provides the necessary tools to develop technology and direct it toward the marketplace. This includes a state-of-the-art device development lab — a comprehensive facility that includes device machining tools, a cleanroom facility, micro-machining/ micro-fabrication tools and quality assurance device testing apparatuses.

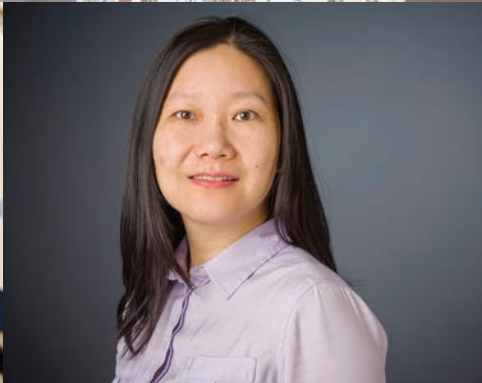
SRI is also home to advanced pre-clinical research facilities, microscopy, cytometry and histology, as well as high-throughput imaging tools and software for cell sorting and analysis.

These valuable facilities are a few examples of the infrastructure that will propel us forward in our strategic plan. As we look ahead to the next four years, we're excited to introduce a powerful new 7-Tesla MRI — the first of its kind in Toronto — as well as improved digital tools and updates to outdated facilities.

### A microscope into the brain

A \$13.9 million grant from the Canada Foundation for Innovation (CFI) and matched by the Ontario Research Fund will bring a powerful new MRI scanner to Sunnybrook Research Institute (SRI) and scientists across Toronto, as part of a new multi-site collaborative research initiative focused on neuroimmunology and neuroimaging for diseases such as stroke, multiple sclerosis and cancer. The 7-Tesla (7T) MRI produces images in unprecedented detail, allowing researchers to see areas of the nervous system never seen before with MRI. The 7T will help support research and improve our understanding of the central nervous system and neurological disorders, including dementia, stroke, multiple sclerosis and others, to develop better treatments in the future.





### 3. High Performing Teams



Our researchers, trainees and support staff are our most valuable asset. We will create a culture of high-performing teams that is inclusive, equitable and diverse to empower our people to invent the future of health care. To optimize research excellence, we'll focus on encouraging collaborative, multidisciplinary teams. With a renewed focus on wellness, equity and antiracism, we'll ensure SRI remains a healthy and safe workplace.

Objectives:

1. **Nurture a culture of wellness, equity and antiracism for all of SRI**
2. **Support multidisciplinary teams with a focus on patient engagement**



To realize these objectives, Sunnybrook Research Institute will:

- Improve recruiting and onboarding processes for new staff, researchers and trainees
- Cultivate an organizational culture of increased community and wellbeing
- Encourage an organizational culture of respect and professionalism
- Contribute to the development and implementation of the President's Anti-Racism Task Force action plan to combat and dismantle racism
- Increase representation of the four federally designated groups (women, Indigenous peoples, persons with disabilities, and members of visible minorities) among SRI Canada Research Chairs
- Encourage collaborative and multidisciplinary teams
- Increase patient engagement in research

## Implementation

As we look ahead to 2026, more patients will have access to research opportunities at Sunnybrook, we will continue to lead in novel minimally invasive and image-guided therapies, more personalized treatments will reach the bedside and the marketplace, and significant contributions will be made to create a more patient-centric health care system. To get there, we'll need to track our successes and our failures. Implementation and monitoring of the plan will consist of reportable metrics on an annual basis and milestones at year one (2023) and year four (2026) to monitor our progress and ensure we're on the path to success. We look forward to sharing our progress with you.

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**St. John's Rehab**

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**[sunnybrook.ca](http://sunnybrook.ca)**

Design/Photography: [sunnybrook.ca/creative](http://sunnybrook.ca/creative)

