

EARTH & SPACE SCIENCE & ENGINEERING

CIVIL ENGINEERING

INTERDISCIPLINARY IMPACT

MECHANICAL ENGINEERING

ELECTRICAL ENGINEERING & COMPUTER SCIENCE

# PUSHING THE WORLD FORWARD

## LASSONDE SCHOOL OF ENGINEERING ANNUAL IMPACT REPORT

Sept. 1, 2021 to Aug. 31, 2022



# Discover how Lassonde is empowering future engineers and scientists to create a better world



Sogand Talebi, master’s student, Earth & Space Science & Engineering

## LASSONDE BY THE NUMBERS

10,000

Lassonde alumni

5,283

students — a 276% increase since 2013 — from **130** countries

4

departments offering 12 undergraduate and 7 graduate programs

3

organized research units

144

full-time faculty members



## RANKINGS

**Top 10** in Canada for Telecommunications Engineering, thanks to the work of faculty members in the Department of Electrical Engineering & Computer Science, among others. (ShanghaiRanking 2022)

**Top 12** in Canada for Electrical and Electronic Engineering (ShanghaiRanking 2022)

**Top 10** in Canada for Computer Science (Times Higher Education, 2022 and ShanghaiRanking 2022)

Home to Canada’s only **Space Engineering program**

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RESEARCH STATS

483

contributions Lassonde faculty members made to academic journals, conferences and books

14

research chairs

2<sup>nd</sup>

in Ontario for quantity of inter-institutional collaboration on physical sciences and engineering

85%

of research output involved inter-institutional collaboration on physical sciences and engineering

4

early researcher awards

20

Lassonde faculty members in the world's top 2% of cited researchers

19

new faculty members hired

\$14M

in research funding generated



ARTICLES

Lassonde School of Engineering Dean, Jane Goodyer, reappointed

Dynamic, Driven, Diverse: A decade in, Lassonde continues to empower creative problem-solvers to advance positive change



Lassonde School of Engineering celebrates 10 years of creating positive change



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**RANKINGS/NOTEWORTHY FACTS**

**481 students** received **98 prestigious awards**, scholarships, bursaries and Governor General's Academic Medals that supported their success through funding and recognition of their achievements.

**\$55+ million** donated to Lassonde since its inception, which has opened doors to higher education access and completion, particularly for those from underserved communities.

**\$2.4 million** in funding to students made a significant difference in their lives by reducing the cost of education and lightening the financial burden of student loans.

**15 Lassonde Scholars** were chosen for their academic excellence, passion for extracurricular activities and dedication to making a positive social impact.

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## MESSAGES

### Jane Goodyer

Dean, Lassonde School of Engineering

At its heart, engineering is about turning ideas into reality. But at the Lassonde School of Engineering at York University, what matters even more is the quality of those ideas, and how we put them into action.

At Lassonde, we care about using the knowledge, methods and tools of engineering and science to actualize human ingenuity and create a better world. As we celebrate our School's 10th anniversary, this is an appropriate time to reflect on our achievements and impact, what we have learned along the way, and the strides towards excellence we continue to make in research, academic programming and partnerships.

### Greatlove Bariboloka

Undergraduate student (third year)  
Software Engineering



As the Lassonde School of Engineering marks its 10th anniversary and shares stories about its momentum and milestones from 2021 to 2022, it's clear there is plenty to celebrate. The projects and achievements described in this report have a special meaning for me as a Lassonde student. I've enjoyed countless opportunities to grow and excel in the area of software engineering, and to build connections in a welcoming community.

### Raghavender Sahdev

Graduate, Master of Computer Science (2018)  
Founder and CEO, NuPort Robotics  
Forbes Top 30 Under 30 – Manufacturing and Industry (2023)



I would like to offer my congratulations to the Lassonde School of Engineering on your 10th anniversary, and commend the significant progress you have made in 2021-22 in the areas of engineering education, research and community impact.

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VOICES OF  
LASSONDE





# LEADING IN CREATING SOLUTIONS FOR A JUST AND SUSTAINABLE WORLD



EARTH & ATMOSPHERIC SCIENCE

We supported the ingenuity and expertise of our faculty as they pursued interdisciplinary research internationally that tackled real-world problems in health care, transportation, clean water and sanitation, emergency preparedness, materials design and more. Many of these efforts helped Lassonde contribute to the United Nations' Sustainable Development Goals (SDGs).

Through the leadership of Lassonde's three organized research units, involvement in various research initiatives at York and beyond, and meaningful engagement with external stakeholders and communities, we helped transform vital knowledge into practical strategies.

## FAST FACTS/STATS

40%

of Lassonde research publications featured in the **top 10%** of most-cited journals

23

policy documents were shaped for global governments, intergovernmental organizations and think tanks with the help of Lassonde research

139

Lassonde research publications focused on the UN SDGs

1<sup>st</sup>

microfabrication facility opened at York University

## ARTICLES

Professor Isaac Smith leads study mapping carbon dioxide glaciers and using modelling to show they are flowing at Mars's south pole

All aboard! Next stop, the autonomous train

■ UN SDG 9

Study: New Pacific Ocean circulation findings may hold key to better predicting impact of El Niño and La Niña

■ UN SDGs 13, 15

World's tiniest lecture hall presents big thinking on environmental threat

■ UN SDGs 6, 12

How artificial intelligence could predict whether breast cancer patients will benefit from chemotherapy

■ UN SDG 3



Undergraduate researchers tackle UN SDGs at the 2022 Lassonde Undergraduate Research Conference

■ UN SDGs 4, 6, 7, 9, 11

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WE CREATE  
SOLUTIONS







# EMPOWERING OUR PEOPLE WITH PERSPECTIVES, TOOLS AND KNOWLEDGE

Our faculty members used the latest pedagogies and technologies to build knowledge and provide dynamic, interdisciplinary experiences for students. For their boundary-pushing approaches, several were recognized by leading organizations in their disciplines as distinguished educators and researchers.

Our efforts to support our employees in cultivating a better tomorrow encompassed diverse activities and initiatives. These included advancing innovative teaching and learning methods through the Lassonde Educational Innovation Studio and hosting the Canadian Engineering Education Association Conference, where we provided a forum for the exchange of vital knowledge. At the conference, we introduced our inclusive, fully work-integrated education model, which is founded on culturally relevant and responsive pedagogy.

Developing a community of strong and collaborative-minded individuals also involved our students, many of whom were empowered to achieve positive change as Lassonde Scholars.

## FAST FACTS/STATS

# 1,740

hours invested by the Lassonde Educational Innovation Studio to help faculty design their courses, which impacted **15,714** student experiences

# 72

teams participated in the UNHack weekend

# 5

Canadian Academy of Engineering Fellows

# 7

Engineering Institute of Canada Fellows

# 5

Royal Society of Canada Fellows and members

## ARTICLES



**Lassonde hosts Canadian Engineering Education Association Conference: Transforming Learners to Transform Our World**

■ UN SDGs 4, 10

**Professor Ping Wang elevated to Institute of Electrical and Electronics Engineers Fellow**

**Introducing Lassonde's 2021 Lassonde Scholarship Recipients**



**Lassonde Professor Pirathayini Srikantha receives Ontario Professional Engineers Awards Engineering Medal – Young Engineer**

**The Lassonde Education Innovation Studio is bringing education to life in creative ways**

**Dr. John Moores named Science Advisor to President of the Canadian Space Agency**



**Lassonde's Jeffrey Harris elected as a Fellow of CEEA and recipient of the 2022 Ron Britton Engineering Education Vanguard Award**

**Lassonde Professor Jinjun Shan elected as a Fellow of the American Astronautical Society**

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HOW WE  
EMPOWER  
PEOPLE







# CREATING OPPORTUNITIES AND A WELCOMING COMMUNITY

Lassonde’s actions to enhance equity, diversity and inclusion in 2021-22 included allocating seed funding for student- and faculty-led projects focused on furthering School goals such as promoting Black excellence, strengthening Indigeneity and decolonization, enabling the success of first-generation students and making learning experiences more inclusive.

Through our k2i academy, we continued to partner with public school boards to introduce enriching STEM learning experiences to K-12 students. This unique equity-advancing community education initiative helps dismantle systemic barriers for those underrepresented in STEM and paves a pathway to Lassonde programs.

## FAST FACTS/STATS

### Canada’s 1<sup>st</sup>

fully work-integrated degree program in Digital Technologies, which will address skills shortages in the ICT sector and help traditionally underrepresented groups access and complete a BASc degree

6

projects received Lassonde EDI seed funding to build a culture of equity, diversity and inclusion at the School

14,380

academic advising interactions to support students’ success

37%

of new faculty hires were women

## ARTICLES



### BEST Startup Experience 2022

■ UN SDG 11

### United Kingdom’s Turing Scheme awardees visit Lassonde

■ UN SDG 10

### Lassonde School of Engineering receives \$1M for summer STEM program

■ UN SDG 10

Canada is desperate for tech workers. Here’s one way to solve the problem



### k2i academy launches new Indigenous Engineering, Technology & Innovation by Design program in Blind River, Ontario

■ UN SDGs 4, 10

READ HOW WE CREATE OPPORTUNITIES





The k2i academy is an innovation sandbox where diverse communities and collaborators connect, engage and design solutions to systemic barriers to STEM opportunities, education and careers for those underrepresented in the sector, including women and Black and Indigenous youth.

The academy brings STEM to life by working alongside school boards to offer science and engineering programming in classrooms, providing innovative work-integrated learning experiences, and partnering with community organizations to provide unique, hands-on STEM opportunities.

k2i ACADEMY’S IMPACT SINCE 2020:

\$5M+

in overall funding generated for k2i academy

6,000+

students, teachers and families served through more than **175,000** hours in k2i academy education

\$1.725M

in support received from the Ontario Ministry of Education

490

high school students employed in work-integrated learning opportunities, with **99%** earning a high school credit

300

youths reached through k2i’s collaboration with community organizations

120

undergraduate STEM students were able to work as k2i mentors



READ MORE ABOUT k2i ACADEMY







# BUILDING SUCCESS THROUGH PARTNERSHIPS

At Lassonde, we understand that partnerships are a powerful catalyst for conducting world-leading interdisciplinary research, providing meaningful experiential learning opportunities and solving society’s most pressing challenges. Such engagements help to accelerate important research advancements, including identifying ways to improve crop performance and increasing knowledge of vision science and virtual reality.

We developed and nurtured networks with other institutions and industry organizations both locally and globally to promote progress in diverse sectors, including finance, technology, transportation and agriculture. These efforts included working with Scotiabank to combat global financial crimes, and collaborating with an auto industry leader to develop an electric car prototype. Our tight-knit industry-academia relationships also enabled us to reimagine the future of learning and employment by co-developing the fully work-integrated degree program in Digital Technologies, a uniquely flexible alternative to traditional university degree study.

## FAST FACTS/STATS

**483** contributions by Lassonde faculty members to academic journals, conferences and books; almost 50% were collaborations with international research partners, and 30% involved at least two other institutions

Launched our innovative **Humanitarian Water Engineering Intensive Course**, which focuses on the essential knowledge and skills to supply safe water to populations in precarious situations. The course:

- was developed with three partners: The United Nations Institute for Training and Research; CIFAL York; and the Dahdaleh Institute for Global Health Research, and
- it attracted almost three times the number of applicants for the 30 available spots.

**382** students were employed in co-ops/ internships (589 co-op/internship work terms — a 44% annual increase)

**70** different countries/regions of origin of global scholars with whom Lassonde faculty published research from 2017-2022

**50+** organizations in the public and private sectors with which Lassonde has funding partnerships

**1,600** active employer contacts for co-ops/ internships

**71%** of Lassonde’s research partner institutions were international

## ARTICLES



Professional and Technical training brought together under a newly funded training program in Microsystems in Engineering at Lassonde

Lassonde prof partners with fintech agricultural company to improve crop yield predictions using graph signal processing and deep learning

■ UN SDG 17

Lassonde partners with Scotiabank to fight global financial crime, advance equity, diversity and inclusion in STEM fields

■ UN SDGs 5, 10, 17

York U a ‘living lab’ for auto magnate Frank Stronach’s prototype electric cars

■ UN SDGs 9, 11

Meta endowment establishes first-ever corporate-sponsored graduate fund for sustaining vision research at York



Doug Bergeron Visits Lassonde School of Engineering, meets BEST startup founders

READ HOW WE BUILD PARTNERSHIPS





## LASSONDE SCHOOL OF ENGINEERING

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## LAND ACKNOWLEDGMENT

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been caretaken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

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