CENTENNIAL COLLEGE

INNOVATING THROUGH OUR STUDENTS

Centennial Innovates | Applied Research, Innovation and Entrepreneurship

Annual Report FY 2024–2025

CENTENNIAL innovates | Applied Research, Innovation and Entrepreneurship

LAND ACKNOWLEDGEMENT

Centennial College is proud to be a part of a rich history of education in this province and in this city. We acknowledge that we are on the treaty lands and territory of the Mississaugas of the Credit First Nation and pay tribute to their legacy and the legacy of all First Peoples of Canada, as we strengthen ties with the communities we serve and build the future through learning and through our graduates.

Today, the traditional meeting place of Toronto is still home to many Indigenous People from across Turtle Island and we are grateful to have the opportunity to work in the communities that have grown in the treaty lands of the Mississaugas. We acknowledge that we are all treaty people and accept our responsibility to honour all our relations.

Additional Context
We strive to innovate in a way that honours Indigenous sovereignty and strengthens Nation-to-Nation relationships. We recognize that Indigenous perspectives provide immense value to sustainable development and that reconciliation is integral to holistically advance sustainable and social innovation. Presently, Indigenous communities remain underrepresented in applied research, innovation, and entrepreneurial fields. Educational institutions grounded in Indigenization, equity, diversity and inclusion are foundational to spark meaningful conversations, amplify marginalized voices, hold space for collective action, and empower underrepresented communities to enter these fields.

TABLE OF **CONTENTS**

04 Message from the Dean

06 Centennial Innovates: Our values

08 #1 in Canada for student engagement

10 2024–25 by the numbers

12 Our eight innovation areas

14 Highlights of the year

16 Our students innovate for a better world

18 Our students fuel local technology development

30 Our students build future equitable and resilient communities

42 Our students embody an entrepreneurial mindset

52 Our students shape our future workforce

58 Our students nurture a thriving planet

64 Reliving our 2024 Centennial Innovates Symposium

66 We are proud of our students

68 Our dedicated team

Innovating through our students

"Colleges must seek to create graduates who are dedicated advocates for continuous innovation."

As we hit the mid-year point in 2025, we have experienced massive economic disruption in an age of tariffs and protectionist trade policies. While some hints of this activity could be seen in advance, the enormity of the situation and the impacts have been surprising. When we add to this the continued advancements in AI, the green transition and the effects of an aging population — we come to the conclusion that there will be significant transformations to the job market by 2030. In short — we live in an age of tremendous uncertainty. How then can we educate our students for career success when we have so much uncertainty about the nature and types of jobs that will be in demand?

At Centennial College — we choose to have a focus on 'all things student'. Our 'Centennial Innovates' activities are focused on maximizing opportunities for student engagement through applied research internships and entrepreneurship venture formation. These opportunities serve to provide our students with the opportunity to work directly with industry technical experts, to showcase their skills, and acquire new skills as they work in project teams. According to the World Economic Forum Future of Jobs Report in 2025 — critical skills for new graduates include analytical thinking, with 7 out of 10 employers seeing this as an essential skill in 2025. Other highly demanded skills are flexibility and agility, leadership and social influence. Our entrepreneurship activities allow students to exercise their skills in critical thinking, flexibility and social influence as they work in teams to develop solutions to sustainability-related problems facing the world.

How can we educate our students for career success? Colleges must seek to create graduates who are dedicated advocates for continuous innovation. Not only must students be trained and exposed to best-practice methodologies, they must embrace entrepreneurship best practices associated with a continuous refinement of a value proposition. When students become dedicated advocates for continuous improvement, they become lifelong advocates of innovation in the workplace, and within society. As these graduates begin to infiltrate Canadian companies, they will instill this commitment towards continuous innovation in the workplace.

Centennial Innovates through our students!

MESSAGE FROM THE **DEAN**

Jonathan Hack
Dean, Centennial Innovates - Applied Research, Innovation and Entrepreneurship

At Centennial Innovates – the Applied Research, Innovation, and Entrepreneurship department of Centennial College – **we believe that innovation is a driving force to making the world better.**

INNOVATION LIES AT THE NEXUS OF ALL OUR ACTIVITIES.

View our Centennial Innovates introductory video

OUR VALUES

SUSTAINABILITY
We strive to innovate solutions that generate long-term social and environmental benefits and that contribute holistically to sustainable development.

STUDENT-CENTRIC
We believe that students gain critical career skills by engaging in applied research and entrepreneurship. Our goal is to provide every Centennial student with this type of experience.

COLLABORATION
We actively pursue and create synergies with diverse stakeholders to maximize value creation and strengthen partnerships.

CURIOSITY
We seek answers to meaningful questions and take opportunities to learn, explore, investigate and connect with the world in new ways.

INDIGENIZATION, EQUITY, DIVERSITY, AND INCLUSION
We highly value cognitive diversity. We know that outcomes are enhanced only when many voices come together, and that a community only thrives when the furthest behind is equitably empowered.

CONTINUOUS IMPROVEMENT
We strongly believe that continuous improvement is what creates lasting change, as opposed to striving for perfection.

We champion **quality, sustainable innovation** at Centennial College and work daily to grow our college's capacity for innovation through applied research, engagements with industry, internally-funded innovation initiatives and through entrepreneurship.

We strive to position Centennial as a Canadian college leader in quality innovation and show the world how CENTENNIAL INNOVATES.

CANADA'S TOP 50 RESEARCH COLLEGES 2024 RESEARCH Infosource Inc.

Quality innovation for quality education.

Since 2021, Centennial College has provided more paid research internships than any other College in Canada, achieving the top rank for the 4th consecutive year in Research InfoSource's annual report of the Top 50 Colleges in Canada.

We continue to be #1 in Canada for student research engagement.

4 QUALITY EDUCATION

We believe that quality innovation and quality education go hand in hand. Quality innovation strengthens the educational value and relevancy of an institution, and quality education expands an institution's innovative capacity.

At Centennial College, innovation is not simplly about adopting the latest teaching and learning methodologies, but also about how they can be used to improve wellbeing, further technology development, advance equity, promote sustainability, enhance creativity, and cultivate forward-thinking individuals and industries who actively seek opportunities to improve the world.

We provided 709 students with paid applied research internships in 2024–25.

A new reality upon graduation
Through their engagement with Centennial Innovates, our student researchers and entrepreneurs develop new essential skills and an innovation mindset that will support their success post-graduation.

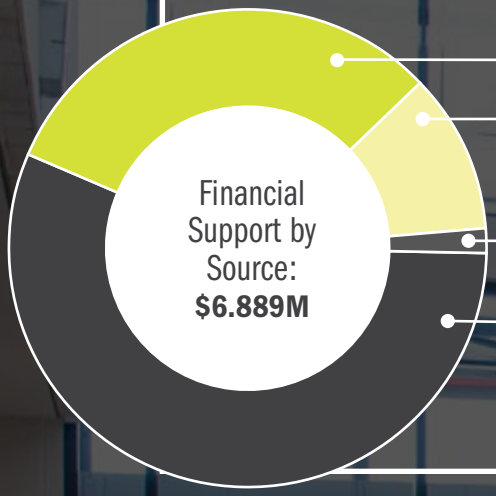
As Canada continues to navigate through increased uncertainty in our trade relationships, increased focus will be evident in all sectors of the economy on the importance of continuous innovation. Students will be facing a new reality upon graduation — one where traditional export markets are no longer receptive to our products, and industry will need to pivot quickly to optimize solutions for new markets and new customers.

We believe that a commitment to continued innovation is the single most important value that any organization can have — and we believe that a commitment to continued innovation is essential for continued competitiveness in our country. The best way to equip our students is through experience — the experience of being deeply involved in innovation projects alongside industry experts who can lend their expertise and guidance on best practices and methodologies.

Visit the Centennial Innovates website

2024–25 BY THE NUMBERS

SOURCES OF FINANCIAL SUPPORT



Our financial support has increased by $1.1M since last fiscal year. Our major supporters include the Natural Sciences and Engineering Research Council of Canada (NSERC), Mitacs, the Canadian Foundation for Innovation (CFI), the Federal Economic Development Agency for Southern Ontario (FedDev Ontario), and a donation from philantropist Diane Blake specifically for sustainability-driven innovation. **Our granting council research income as % of total college research income is the highest across all Canadian colleges.**

#1 **IN CANADA for providing paid student internships in applied research consecutively for 4 years (Research Infosource, 2024).**

#20 **OVERALL in Canada's Top 50 Research Colleges (Research InfoSource, 2024).**

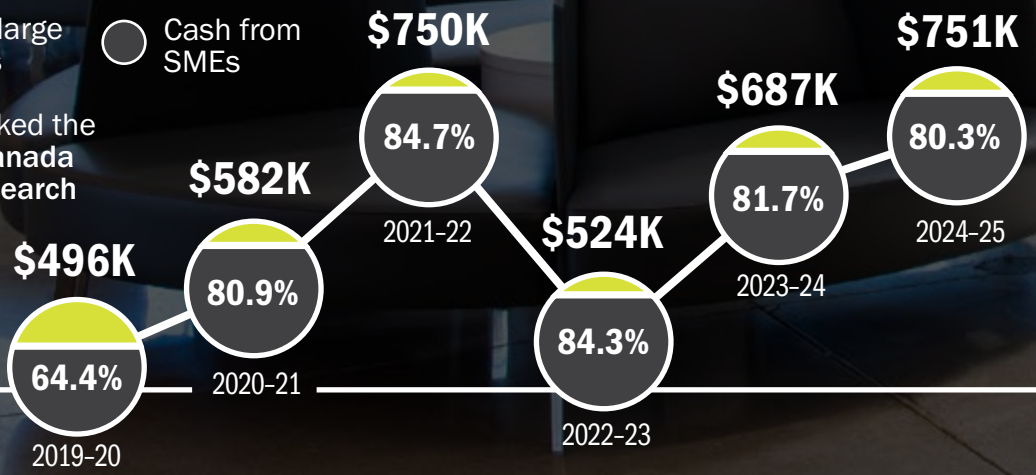
RESEARCH PARTNERS' CASH CONTRIBUTIONS

We work with diverse industry and community partners across many sectors. This year, we received a **total of $751K** in cash contributions from research partners, the largest sum in the past six years. **80.3% of our partners' cash contributions came from small- and medium-sized enterprises (SMEs).**

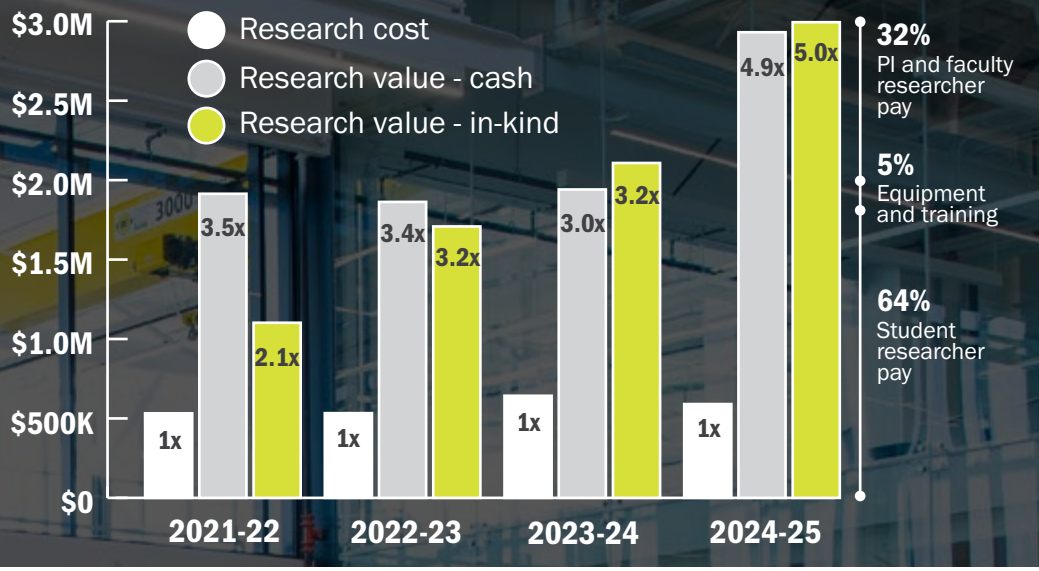
Cash from large enterprises

Cash from SMEs

We are also ranked the **#1 college in Canada for Industry Research Income Growth** (Research Infosource, 2024)

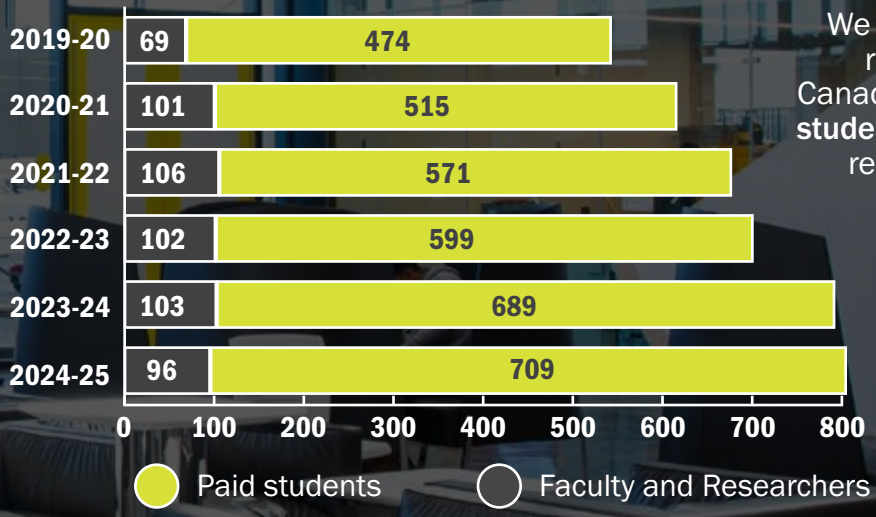


EVERY DOLLAR CENTENNIAL SPENDS ON RESEARCH BRINGS $4.89 BACK.



This year, every $1 of research costs brought back **$4.89 of cash in grants** that go towards paying our student and faculty researchers, equipment, and training. **Our research value-to-cost ratio has reached the highest in recent years, at an average of 4.95x our research costs.**

STUDENT AND FACULTY ENGAGEMENT

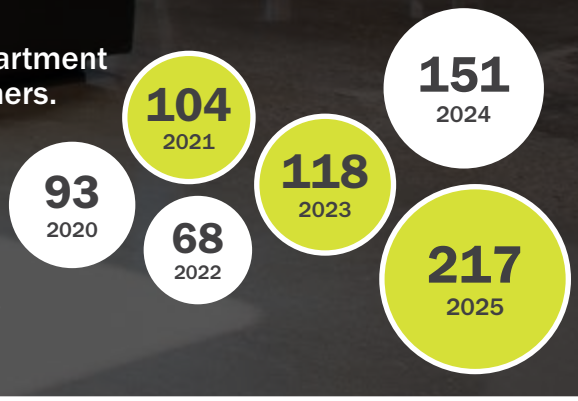


We engage more students in applied research than any other college in Canada, this year having **engaged 709 students in paid internships** — another record for our department. We also engaged **96 faculty researchers** across each of Centennial's academic schools.

Our student interns put in a total of 95,833 hours in applied research, up from 64,128 hours last year.

RESEARCH PARTNERSHIPS

We hit the highest number of partnerships in our department history this year, at 217 industry and community partners. These partners span diverse industries and sizes — from world leaders such as Bombardier and ABC Technologies, to local SMEs such as Sekond Skin Society and Quantuity Analytics. At the heart of every partnership is a commitment to empowering our students with experiential learning, hands-on skills development, and career opportunities.



OUR 8 INNOVATION AREAS

WEARABLE, INTERACTIVE AND MOBILE HEALTHCARE TECHNOLOGIES

Bringing valuable expertise, cutting-edge technology and flexible solutions to the digital health technology sector.

TRANSPORTATION AND LOW-CARBON MOBILITY

Advancing equitable, sustainable transportation systems with a focus on low-carbon mobility and connected, autonomous, electric and hydrogen-powered vehicle technologies.

AEROSPACE AND AVIATION

Applying emerging technologies for aerospace design, maintenance, repair and overhaul and developing next-generation landing gear.

ADVANCED MANUFACTURING

Using new technologies to increase efficiency, optimization and productivity in the manufacturing sector.

INNOVATION AND ENTREPRENEURSHIP

Developing change-leaders with a sustainable entrepreneurial mindset and actionable lifelong skills through social and impact entrepreneurship programming.

EXPLAINABLE DATA ANALYTICS

Developing intelligent systems for small- and medium-sized enterprises (SMEs) and empowering them to make informed business decisions.

SOCIAL INNOVATION

Uplifting communities through research and developing effective solutions to social and environmental problems.

SUSTAINABLE ENERGY SYSTEMS

Innovating next-generation energy storage, optimization, and microgrid technology with expertise in solar and wind renewable energy.

We deliver high-quality research and entrepreneurial activity aligned with the Sustainable Development Goals to advance sustainable innovation.

Check out our innovation areas in more detail

sus·tain·a·ble in·no·va·tion
innovation that generates long-term social and environmental benefit

HIGHLIGHTS OF THE YEAR

Centennial College joins trailblaizing zero-emission vehicle project

Centennial College has made the list of Pre-Qualified Partners in the Automotive Parts Manufacturers' Association (APMA)'s **Project Arrow 2.0** — Canada's first, original, full-build zero-emission concept vehicle. The initiative will drive collaboration among top automotive suppliers and postsecondary institutions to accelerate the adoption of zero-emission vehicles. Our involvement is a significant achievement as we continue to position Centennial as an innovation leader in sustainable transportation.

Centennial College joins national Lab2Market entrepreneurship consortium

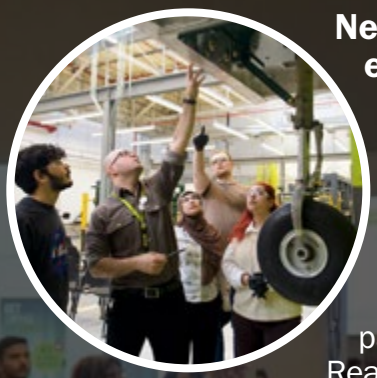
Centennial College joins the national **Lab2Market** network as the only college from Ontario invited to a pan-Canadian consortium of 50 reputable institutions led by Dalhousie University, with the goal of growing entrepreneurial skills and innovation commercialization across the country. With our excellent expertise and reputation in the innovation and entrepreneurship domain, Centennial is poised to play an active role in the consortium, offering entrepreneurial training, mentoring, and support through workshops, bootcamps and immersive learning programs. We look forward to this opportunity to influence the commercialization process in Ontario and ensure that innovative research reaches its full potential in both the academic and market communities. Read more on page 43.

Transit Innovation Hub established to test new technologies with transit agencies

The new **Transit Innovation Hub** at Centennial Innovates allows transit agencies to leverage our facilities and expertise to evaluate new technologies prior to deployment — from Camera Mirror Systems, collision avoidance systems and blind spot optimizations to Automatic Driving Assistance Systems, visibility improvement designs and other designs that improve the health and safety of bus operators and passengers. Currently, we are working with the Toronto Transit Commission (TTC) and York Region Transit on various projects. Read more on page 30.

WIMTACH and Innovation Hub to move back to Progress Campus after years off-site

Our Wearable, Interactive and Mobile Technology Access Centre in Health (WIMTACH) and our Innovation Hub, two of Centennial Innovates' main R&D centres, are moving back to Progress Campus after many years at an off-site commercial office space on Milner Ave. This exciting move will bring these innovation spaces to a more accessible, centralized, and student-integrated location — steps from the Centennial Innovates office and the heart of campus life and resources.



New equipment at Landing Gear Innovation Lab expands aerospace research capabilities

Our Landing Gear Innovation Lab (LGIL), a dedicated aerospace applied research space investigating next-generation landing gear technologies, has just completed its installation of several new equipment this year — including a rotaty actuator test rig and two small-scale drop test towers. These equipment will significantly expand the LGIL's innovation capabilities for partners in the aerospace and aerospace-adjacent industries.
Read more on page 28.

"Centennial Innovates opened the door for me to grow beyond the classroom. As a student researcher, I was able to work on real projects that demanded creative problem-solving and collaboration. I learned so many hands-on skills which I can directly translate into industry. That experience helped me earn a position as the Landing Gear Lab Technician—a role where I now contribute directly to applied research and testing. Receiving the Excellence in Applied Research, Innovation and Entrepreneurship Scholarship is a milestone I'm deeply proud of. It's a reminder of how far I've come and a motivation to keep striving, innovating, and contributing to meaningful work in aerospace and beyond."

- Adnan Sheikh, Aerospace Manufacturing Engineering Technology, SETAS; Aerospace Student Researcher; Landing Gear Innovation Lab Co-op Student Technician

OUR STUDENTS INNOVATE FOR A BETTER WORLD.

We are committed to advancing the United Nations **Sustainable Development Goals (SDGs)**. Over the past 4 years, the Centennial Innovates team has mapped each of our innovation projects and activities to the SDG framework.


Our students build future equitable and resilient communities.
Our students nurture a thriving planet.
Our students shape our future workforce.
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

OUR STUDENTS FUEL LOCAL TECHNOLOGY DEVELOPMENT.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Portable lung ultrasound systems

Deep Breathe

Development and validation of a portable lung ultrasound system

Deep Breathe Inc. based in London, Ontario, is revolutionizing lung health diagnostics using a deep learning-based approach. WIMTACH and Deep Breathe collaborated to develop a portable lung ultrasound system that integrates AI for accurate, autonomous detection of specific lung conditions such as pneumothorax (collapsed lung due to air leak inside the chest wall) by detecting lung sliding artifacts. Through this collaboration, the system will be miniaturized and its components enclosed in a portable case, enabling on-site operation in remote locations without the need for bulky laboratory equipment.

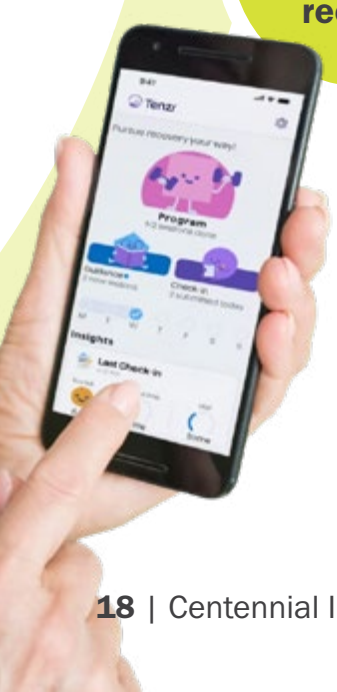
One student engaged

> **"We are creating from scratch... I learned the entire process of making an application from this [project]...This internship helped me to set a tone for what my future job would be like... It adds a great value, especially to someone who is starting fresh in the field."**
>
> **- Maharsh Patel,**
> Software Engineering Technology - Artificial Intelligence, SETAS; WIMTACH Student Researcher

Safer electronic medical records

Tenzr Health

Research and development of a secure and scalable EMR integration solution for remote therapeutic monitoring in muscoskeletal rehabilitation



Tenzr Health provides Remote Therapeutic Monitoring (RTM) for musculoskeletal (MSK) rehabilitation. Their platform integrates different features to improve patient adherence and recovery outcomes. Despite its success in increasing treatment compliance, challenges remain in scalability, interoperability with healthcare systems, and regulatory compliance. WIMTACH's collaboration with Tenzr Health developed a secure and scalable EMR integration solution to improve data exchange between clinicians and patients, enabling seamless monitoring and engagement in MSK rehabilitation while ensuring security, accessibility, and compliance for patients.

Five students engaged

Principal Investigator:
Tenzin Jinpa, WIMTACH

WIMTACH: Centennial's largest R&D hub

Centennial College's first Technology Access Center — **the Wearable, Interactive, and Mobile Technology Access Centre in Health (WIMTACH)** — continuously drives research, innovation, and technology development in fulfilling its mandate from the Natural Sciences and Engineering Research Council of Canada (NSERC) to support small- and medium-sized enterprises (SMEs).

WIMTACH helps companies scale by catalyzing their product and technology development and adoption through a wide spectrum of services including but not limited to applied research collaborations, funding acquisition, commercialization, networking, customized trainings and ideation events like hackathons.

To ensure high-quality service, WIMTACH's core technical team has expertise in diverse areas including software engineering, artificial intelligence, machine learning, natural language processing, electronics, mechanical design, and project management.

WIMTACH is the number one in-house employer of students in the college, hiring and engaging student researchers and faculty members from various technical, academic, and industry backgrounds in applied research projects. To date, WIMTACH has supported hundreds of both for-profit and not-for-profit organizations in research and innovation, thousands of paid student researchers and faculty members, and hundreds of developed and commercialized products for our industry partners. WIMTACH will continue to be a strong economic force in Canada, driving companies to improve their revenue and generate more jobs in the country.

WIMTACH IN 2024-2025

3 GOOD HEALTH AND WELL-BEING

- **140** INDUSTRY PARTNERS SERVED
- **195** SERVICES PROVIDED
- **175** TRAINING CONTRACTS PROVIDED
- **48** NEW PRODUCTS, PROCESSES AND SERVICES DEVELOPED
- **48** EXISTING PRODUCTS, PROCESSES AND SERVICES IMPROVED
- **58** APPLIED RESEARCH PROJECTS CONDUCTED
- **42** COLLEGE FACULTY AND **437** STUDENTS ENGAGED

WIMTACH's students boast a 100% hiring rate post-graduation.

Video introduction to WIMTACH

STUDENT **TESTIMONIAL**

“Centennial Innovates has actually been the stepping stone to me landing a good job in Canada by just making me industry-ready and confident. This is the best opportunity an international student will get while studying. Although I am not in the technical team ... [now] I understand tech language and I get experience of everything.”

Check out Stefanie’s success story

Stefanie Saldanha
Marketing Research and Analytics, TBS

WIMTACH-CEDA Student Researcher

Student power in hackathons

Centennial students develop solutions for industry and community

A distinctive offering for our partners is the **hackathon**: an intensive two-to-three-day challenge where students across Centennial College come together to bring their creativity, skills, and fresh perspectives to real-world challenges across diverse disciplines.

In 2024–25, WIMTACH organized and hosted seven hackathons, engaging 172 students in meaningful experiential learning. Our hackathons ranged from improving foam printing and cutting technology with Foamite to designing innovative AR/VR game ideas with Special Compass; from developing culturally appropriate and accessible emergency education materials with the City of Toronto to exploring the use of AI in virtual clinic environments and conversational healthcare technology with the Scarborough Health Network.

The largest hackathon partnership this year was a two-part Scarborough Eldercare Support Network (SESN) hackathon, co-hosted with the Scarborough Retirement Residence. 55 students took part in the challenge to develop innovative e-textile and software application solutions focused on fall prevention and pain detection for retirement home residents, espeically for people living with dementia.

> **“It was an incredible experience attending my first-ever hackathon! Despite it being everyone’s first hackathon in my group, we secured first place with our innovative ideas and solutions. I had an amazing time working hands-on to tackle real challenges in fall prevention and pain management, alongside with my fantastic teammates I met at the event.”**
>
> **- Dikshya Limbu,** Software Engineering Technology, SETAS; WIMTACH Student Researcher; SESN Hackathon 1st Place team member

Check out WIMTACH’s weekly **success stories blog**

Development of a minimum viable product (MVP) for Sekond Skin Society

Accessible, community-based wellness

Sekond Skin Society is a startup from Waterloo, ON that built a fitness community designed around accessibility and inclusion to empower all bodies and abilities through accessible movement. They collaborated with WIMTACH to design and develop a miminum viable product (MVP) for their mobile application -- not only as an extension of their web application, but to build accessible features that will offer enhanced and more personalized experience for all.

The disability-friendly app will serve a wide range of users who require varying degrees of adaptive fitness classes including people who are Deaf or hard of hearing, people who are blind or have low vision, wheelchair users, people with frequently changing needs such as chronic fatigue or other diagnosis, and older adult users.

Seven students engaged

Principal Investigators:
Prof. Vijayalakshmi Tiruchengode Angamuthu, SETAS

"We wouldn't be where we are right now without having partnered with WIMTACH."

- Lee-Anne Reuber, CEO and Founder of Sekond Skin Society

Angular-based front-end development and comprehensive content management for Winters' cloud-based platform

Winters Instruments, who has been in the medical supply business by manufacturing quality-built instrumentation for all markets since 1953, has collaborated with WIMTACH on multiple projects. One project involved creating a cloud-based web and mobile platform with a modern content management system (CMS), allowing Winters to streamline product inventory management and improve customer interactions. Following this, another project aimed to enhance their current web application by adding more functionalities and adopting new code language for better user experience as they aim to increase their user base scope and product outreach.

Improved user experience

These successful projects had a transformative impact on Winters Instruments, enabling the company to establish a stronger digital presence. The advanced web and mobile platform enhanced customer interactions and streamlined inventory management. As a result, Winters adopted the same digital framework for all its global branches, unifying its operations and increasing efficiency worldwide. WIMTACH also developed Winter's mobile application ensuring their presence for mobile users and increasing their accessibility in the market.

Four students engaged

Principal Investigators:
Prof. Eduardo Santana, SETAS

Visit the WIMTACH website

WIMTACH is the #1 TAC in Canada for student engagement

"I am pleased to announce the successful completion of the second five-year term of WIMTACH this year. Over the past five years, WIMTACH has played a transformative role in supporting small and medium-sized enterprises (SMEs) in developing and launching innovative products. It has significantly strengthened SMEs in the healthcare sector, particularly in areas such as medical imaging, wireless and mobile health, wearables, and digital health innovation platforms. These technologies have enabled in-home care, advanced monitoring, diagnostics support systems, and data collection and analytics. We have assisted companies like Mindful Garden, who developed an AI model to predict delirium, and Wosler Diagnostics, who created a sonographic platform for improved remote healthcare. Additionally, for Cloud DX, we designed a digital mat to prevent falls among seniors, enhancing market presence.

In this term, WIMTACH trained over 1,000 students and secured $9.5 million in funding, helping 514 clients — mainly SMEs. These businesses engaged in advanced healthcare technologies (68%), health and wellness products (13%), and other sectors (19%).

We also supported 20 healthcare institutions in adopting technology and optimizing services, collaborating with partners like Scarborough Health Network and Markham Stouffville Hospital. Our initiatives with the KITE Institute and local colleges have bolstered Ontario's health technology ecosystem.

The Centre of Explainable Data Analytics (CEDA) offered vital support to GTA retail sector clients adjusting to COVID-19 impacts, conducting over 500 trainings and establishing itself as a key resource for small retailers.

Message from Dr. Purnima Tyagi, Director, WIMTACH & Social Innovation

The Social Innovation Research Center (SIRC) collaborated with community partners on projects addressing social and economic issues, including an app for food banks and efforts to enhance emergency preparedness with the City of Toronto. These initiatives reflect our commitment to impactful research and community engagement."

CEDA: leveraging AI for retail transformation

The **Centre for Explainable Data Analytics (CEDA)**, established in 2021 as part of WIMTACH at Centennial College, is a research and innovation center dedicated to advancing intelligent systems for small and medium-sized retailers through collaborative projects. These retailers have faced and continue to face fierce competition from larger players and local counterparts, which was more pronounced during and after COVID-19. Supported by NSERC, CEDA focuses on cost-effective, explainable, user-friendly, responsible and innovative analytics and AI solutions that enable them to thrive in a highly competitive market, driving increased revenue and profitability.

Leveraging expertise in advanced analytics, AI, software engineering, and cloud technologies, CEDA builds innovative solutions that address the unique business and technical needs of retailers. Additionally, CEDA offers specialized training for industry partners on the innovative applications developed, ensuring seamless adoption and effective use. CEDA provides valuable experiential learning opportunities for students, preparing them for careers in the fast-paced and highly competitive job market. By participating in these projects, Centennial College faculty members get the opportunity to stay updated on emerging industry needs and cutting-edge technologies, integrating this knowledge into their teaching to ensure students are equipped with the most relevant skills and industry-aligned expertise.

CEDA hosts regular training sessions for students, professionals, business owners and entrepreneurs, equipping them with knowledge and skills in analytics. Through its initiatives, CEDA not only enables technology adoption and transformation among Canadian businesses but also nurtures the next generation of innovators.

Enhancing synthetic face image generation

Exploring the challenges associated with high-quality synthetic face image generation and identifying control factors influencing the process

Applied Recognition Corp. (ARC), based in Oakville, Ontario specializes in face recognition technologies and affordable, seamles biometric systems. However, they face a challenge sourcing high-quality human face image datasets to train and test their models.

To address this, ARC partnered with WIMTACH-CEDA to research limitations of existing AI tools for generating synthetic face images. The team is now conducting a second project to analyze the impact of different control factors and parameters on synthetic image generation. This will not only help ARC improve its datasets and algorithm training, it also tackles major ethical issues in AI and biometrics such as data scarcity, privacy, and bias. High-quality synthetic image generation will reduce reliance on real data, aligning with Canadian privacy laws like PIPEDA. These advancements will boost the reliability of facial recognition systems used in sectors like security, banking, and healthcare.

Two students engaged

Principal Investigators:
Tenzin Jinpa, WIMTACH and Prof. Amit Jain, SETAS

Customized payroll management system

SEYON TAX

Development of a customized analytics-enabled cloud-based payroll management system for small businesses

Seyon Tax is a private Canadian tax and accounting firm based in Toronto that offers services including tax preparation, payroll management, and financial advisory for individuals and businesses. To address challenges in delivering timely and accurate payroll services, the firm partnered with WIMTACH-CEDA to develop a comprehensive, scalable payroll management system with a goal to streamline payroll processing, integrate with existing financial platforms, ensure compliance, and enhance reporting capabilities.

Our team designed a clickable prototype using Figma for a cloud-based application featuring automated payroll calculations, compliance tools, and robust reporting capabilities. By integrating advanced automation and analytics, the system will enhance operational workflows, improve compliance, and reduce manual effort, ultimately lowering operational costs for Seyon Tax and its clients.

10 students engaged

Principal Investigators: Tenzin Jinpa, WIMTACH and Prof. Palak Mejpara, SETAS

Handwriting to text for business efficiency

aeroqube

Text extraction from the handwritten text from table using third-party OCR API to populated the pre-defined table structure

Aeroqube Inc is a Canadian software development firm delivering technology solutions that enhance business efficiency. With experience in artificial intelligence and machine learning development, mobile and web applications, and custom software, Aeroqube combines agile methodologies, purposeful engineering, and a focus on user experience and performance.

In collaboration with WIMTACH-CEDA, Aeroqube is developing a proof-of-concept (POC) that uses advanced optical character recognition (OCR) to extract handwritten text from a pre-defined table and save it in a structured table format on the cloud. The goal is to build a user-friendly solution that ensures accurate and efficient text extraction, with Aeroqube providing support throughout the process.

One student engaged

Principal Investigators: Tenzin Jinpa, WIMTACH and Prof. Amit Jain, SETAS

"My internship at Centennial Innovates has been an incredible opportunity to bridge my academic knowledge with real-world applications. I worked on diverse projects spanning public and private healthcare, retail, and food-tech industries, collaborating with professors and fellow student researchers from various fields. This experience sharpened my skills in data science and machine learning, allowing me to contribute to innovative solutions like groundbreaking machine learning and large language model orchestration that addressed real-life business challenges across Canada and the USA. This experience directly led to my current role as AI/Data Lead at Kulture Rebellion, one of CEDA's clients, where I now focus on advancing bio-transformation in precision fermentation using the techniques I honed during my internship."

- **Chung Ping Mak (Hugo)**, Software Engineering Technology - Artificial Intelligence, SETAS; WIMTACH-CEDA Student Researcher

Innovating the skies: aerospace applied research

Centennial College has a longstanding history of excellence in the aerospace and aviation sector. Our aviation maintenance and manufacturing programs across our School of Transportation (SOT) and School of Engineering Technology and Applied Science (SETAS) have been running for over 50 years. Our aerospace applied research projects offer industry partners a valuable partnership by leveraging Centennial College's expertise and equipment at our Downsview Campus.

Ontario and the Greater Toronto Area (GTA) have a significant aerospace industrial presence, including original equipment manufacturers (OEMs) that produce aircraft, Tier 1 suppliers that deliver subsystems to the OEMs, and various lower-tier companies that design and build components integrated into the aircraft. Notably, the GTA has a unique landing gear cluster with three major companies: Safran Landing Systems, Collins Aerospace, and Héroux-Devtek, all of which manufacture landing gear for large commercial and military aircraft.

Students in the Aerospace Manufacturing Program acquire a range of skills as part of their curriculum, including computer-aided design (CAD), strength of materials, finite element analysis (FEA), and computational fluid dynamics. In addition to integrating these skills into their curricular capstone projects, students also have the invaluable opportunity to apply them in aerospace-related applied research projects. Through applied research, our student researchers develop essential soft skills such as teamwork, effective presentation of their work to industry partners, and project and time management to ensure timely delivery of high-quality projects.

Our Landing Gear Innovation Lab — opened in 2020 — has undergone significant changes in the past 12 months, particularly with the installation and commissioning of a drop test tower. Students participated in the design and manufacturing of the landing gear mounting fixture as well as the force plate platform base. In both instances, students used CAD tools to design the parts, applied FEA to validate their strength, and defined the manufacturing and installation processes. By learning and integrating these skills, students become better prepared for their first job opportunities upon graduation.

IN 2024–25, OUR AEROSPACE APPLIED RESEARCH ACTIVITY ENGAGED:

- **18** STUDENT RESEARCHERS
- **8** FACULTY RESEARCHERS
- **6** INDUSTRY PARTNERS
- **5** PROJECTS COMPLETED
- **2** ONGOING PROJECTS

STUDENT **TESTIMONIAL**

Hear from our aerospace student researchers

Bipul Jha
Aerospace Manufacturing Engineering, SETAS

Aerospce Student Researcher

INNOVATING THROUGH OUR STUDENTS

“Experience with Centennial Innovates? I would say that is one of the best things that I’ve done in Canada right now...Not only have I gained valuable technical skills like Ansys simulations, MTS testing and 3D printing, but I’ve also honed by soft skills in team management and communication. These experiences will shape my career in aerospace engineering, and I’m excited to apply them in the real world.”

COMPLETED

Our Landing Gear Innovation Lab is now complete.

The Centennial College **Landing Gear Innovation Lab (LGIL)** is a 6,500-square-foot dedicated aerospace applied research facility, located adjacent to our Bombardier Centre for Aviation and Aerospace at Downsview Campus. Supported by $2 million in public funding, the LGIL opened in 2020 and was developed in collaboration with key industry partner and world-renowned landing gear manufacturer Safran Landing Systems.

The high-ceiling lab houses two landing gear test rigs for the Bombardier Challenger 300 and CRJ-200, linear and rotary actuator test rigs, an environmental chamber, aerospace-grade hydraulic power unit, as well as a workroom and computer lab with full design and prototyping capabilities.

Over the past few years, the lab's equipment and capabilities have continuously expanded to fulfill our original vision for the space. We consulted with and listened to industry partners to ensure our developments aligned with their needs. We are proud to share that the LGIL is now fully equipped and ready to serve the aerospace industry.

New drop test towers

Small-scale drop test towers complete the LGIL

This year, we completed the installation of two small-scale drop test towers to simulate aircraft landings for landing gear testing. The design and installation process had significant student involvement, saving costs and providing hands-on experience for our LGIL student researchers.

The fully-customized towers feature a portable advanced force measuring platform and data acquisition system with high-speed cameras to capture and measure precise forces and impact dynamics. This unique equipment complements the already-available equipment at the Lab, allowing industry partners to simulate landing gear impact for small-scale aircraft and eVTOLs.

eVTOL durability testing

READY FOR INDUSTRY

Design of a vertical drop test jig for eVTOL battery drop testing

MOSTAVIO

Centennial Innovates is developing a structural jig to perform vertical drop tests on battery packs for electric Vertical Takeoff and Landing (eVTOL) aircraft. These tests are essential to assess the structural integrity of battery packs through free-fall drops—a key requirement in future design validation and safety certification processes aligned with Federal Aviation Administration (FAA) standards. This work is being conducted in close collaboration with MOSTAVIO, an advanced air mobility company developing a 2–3 passenger autonomous eVTOL vehicle. The rig would be able to stimulate a 50-ft free fall for MOSTAVIO's new Kevlar-based battery compartment, helping validate how their new design performs under industry-standard impact testing and providing critical data to guide next-stage refinements and safety certification efforts.

As a first step, the test will be conducted on a smaller scale using Centennial College's existing 15-ft drop tower at the Landing Gear Innovation Lab (LGIL)—a structure originally designed by Centennial students for a separate application. The team has adapted the platform through detailed analysis and engineering calculations to ensure it can safely and effectively simulate the test conditions. The project is currently in the assembly phase, with components being integrated into the 15-ft drop tower. Testing and data collection are scheduled for completion by the end of April 2025. These initial results will offer valuable insight into the performance of MOSTAVIO's novel battery pack design and lay the groundwork for full-scale 50-ft drop testing later this year.

Four students engaged

Principal Investigators: Profs. Charanpreet Singh Sidhu and Keyvan Ghazaie Alamdari, SETAS

Learn more about the equipment and facilities at the LGIL

OUR STUDENTS BUILD FUTURE EQUITABLE AND RESILIENT COMMUNITIES

10 REDUCED INEQUALITIES

Introducing the Transit Innovation Hub

Under the leadership of Dr. Wenzi Ckurshumova, Associate Director, Research and Innovation, the Transit Innovation Hub was established to provide a dynamic platform for transit agencies to test and evaluate new technologies aimed at improving public transportation systems and driver and passenger safety. The Hub fosters collaboration among transit agencies, technology developers, and researchers, ensuring that innovations are tested in real-world conditions. These partnerships generate valuable insights and refinements before full-scale integration into public transit systems.

Transit Innovation HUB

Message from Dr. Wenzi Ckurshumova, Associate Director, Research and Innovation

"When Paulo Santos, the Acting Dean at the School of Transportation, offers to drive the research bus...you realize transportation research is in our blood — a core part of our mission to create sustainable, smart and energy-efficient transportation solutions for the future. Through our applied research program, we help drive forward innovation in the automotive and transportation industries, fostering the development of technologies that will shape the future of smart mobility in Ontario and beyond.

In 2024, we became part of SmartTO — Smart Mobility Applied Research and Testing-Toronto, a regional technology development site within the Ontario Vehicle Innovation Network (OVIN). We empower startups and SMEs to develop, test and prototype advanced automotive technologies and smart mobility solutions through accessing our state of the-art equipment, innovative labs and talent.

This year, we became a pre-qualified partner in the Automotive Parts Manufacturers' Association (APMA) Project Arrow 2.0, Canada's first full-built zero emission concept vehicle. Project Arrow 2.0 will feature cutting-edge technologies, including fully electric drivetrains and advanced materials, all designed to push the boundaries of innovation in the automotive industry. This project will help set the stage for the development of next-generation vehicles that are not only sustainable but also represent the cutting-edge of Canadian automotive engineering and design. As we move forward with Project Arrow 2.0, Centennial College is proud to contribute to the creation of Canada's future of zero-emission mobility, driving innovation and sustainability every step of the way."

Designing the bus of the future

Improving safety-by-design for buses

Centennial is working with the Toronto Transit Commission (TTC), Amalgamated Transit Union (ATU) International and ATU Local 113 on the “Bus of the Future” collaborative applied research project. Supporting the Bus Design Innovation Program at the TTC, these projects are aimed at developing and implementing new bus designs that provide a healthier and safer environment for operators, passengers and pedestrians—such as upgrades to operator barriers, new air ventilation systems, improved camera, mirror and vision systems to reduce blind spots, enhanced ergonomic driver seating, and accessibility improvements to enhance the safety and independence of passengers with disabilities.

This year’s collaboration included projects to enhance driver visibility as well as the testing of driver seat technologies that reduce the vertical vibrations perceived by bus drivers, which was done at the world-famous Hemi-Anechoic Chamber and Multi-Axis Shaker Table at the ACE facility at Ontario Tech University.

Video: Centennial Innovates in Transportation

SmartTO
THE FUTURE OF MOBILITY

The Ontario Vehicle Innovation Network's latest Regional Technology Development Site

In May 2024, the Ontario Vehicle Innovation Network (OVIN), with support from the Ontario Government, announced $1.5 million in funding to York University in partnership with Centennial College to support small- and medium-sized enterprises (SMEs) and startups in developing and testing innovative automotive technologies and smart mobility solutions. As the first academic RTDS, SmartTO offers a comprehensive suite of innovation services through access to industry-leading resources such as specialized equipment, supports for testing and piloting, business and technical advisory services, and opportunities for collaboration with regional partners.

"Working with York University and the Ontario government through OVIN build[s] Ontario's strength in connected, autonomous, SMART and electrified vehicles – presenting a unique opportunity not only to train our future workforce in these emerging technologies but also to lead in their innovation." - **Dr. Craig Stephenson, President and CEO, Centennial College**

50 NDAs SIGNED

80+ ENGAGEMENTS COMPLETED

35 TECHNICAL PROJECTS COMPLETED

10 PROTOTYPES BUILT

336 EVENT ATTENDEES

"Leveraging these types of partnerships is going to give us a huge competitive edge relatively quickly within an actual marketable product..we're very grateful."- Nicola Kostic, SmartTO Client

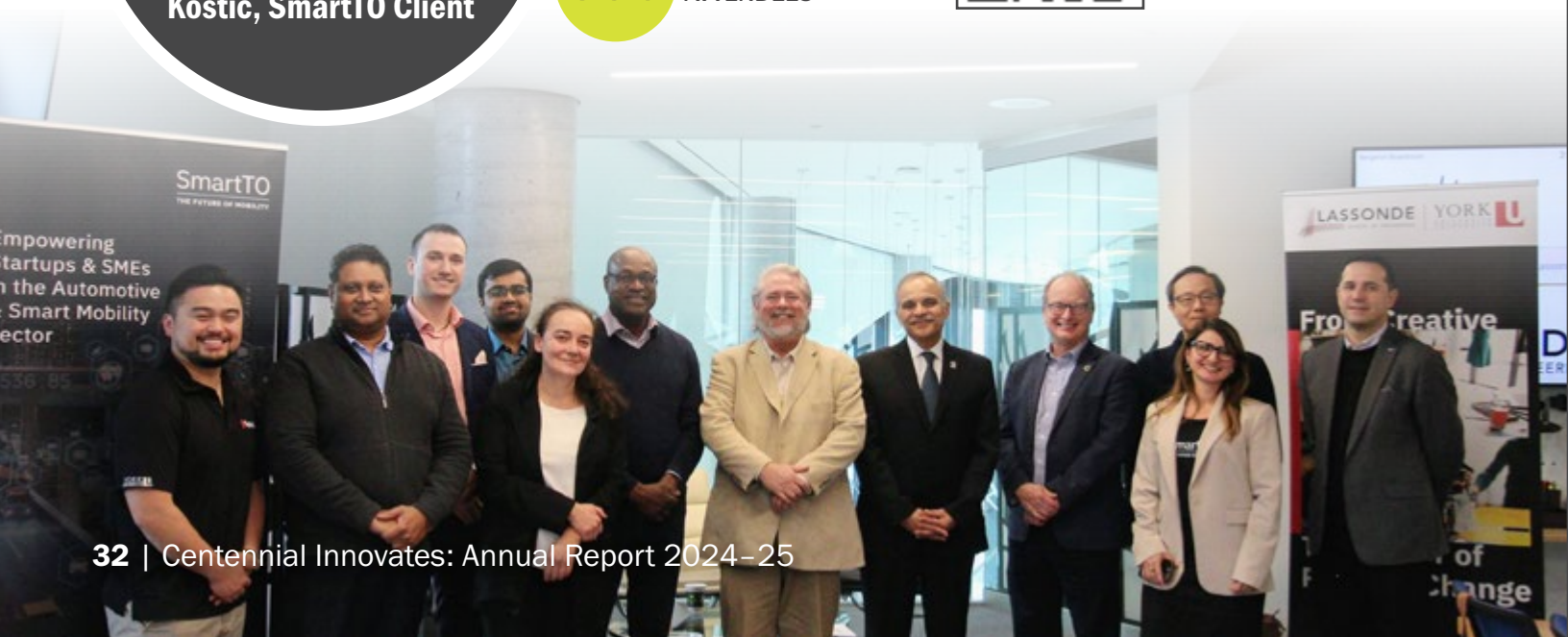
OVIN AUTONOMOUS · CONNECTED · ELECTRIC

Ontario

CENTENNIAL COLLEGE

YORK UNIVERSITÉ UNIVERSITY

Visit the SmartTO website



Advancing EDI in the automotive sector

Driving Innovation: Transforming the Next Era of Automotive Innovation

On October 9 2024, Centennial Innovates held their 5th Inclusive Excellence Breakfast Series in partnership with SmartTO, attended by over 65 diverse faculty, staff, students, government representatives, industry partners, SMEs and community members. The event featured a keynote from Kay Layne — an experienced automotive journalist passionate about EDI advocacy. She spoke about the challenges, opportunities and future needs of the mobility sector from an EDI perspective — including biases in AI systems, opportunities for human-centered design, and the power of inclusive innovation (i.e. self-driving cars empowering mobility forcommunity members who are blind or low-vision). She also addressed the pivotal role of diversity in driving success in this rapidly evolving field. Our Dean Jonathan Hack opened the event, sharing his observations on equity in the automotive sector having worked 23 years at General Motors in various positions and environments. Paulina Karwowska-Desaulniers, Executive Director of SmartTO, closed by sharing how SmartTO is shaping the future of mobility in Toronto and supporting diverse technology development, testing and validation projects for local SMEs.

SmartTO's Demo Day

Culmination of the SmartTO Innovation Challenge & Smart Mobility Tech Accelerator programs

On March 26 2025, SmartTO hosted its inaugural SmartTO Demo Day, drawing over 140 leaders from government, academia, venture capital, and the startup ecosystem. Co-hosted with YSpace and held at the Index Exchange at The Well in Toronto, the event spotlighted startups delivering high-impact solutions across transportation, accessibility, and infrastructure with over $100,000 in prizes awarded to the top six and Megalab Group as the lead sponsor.

> "I find it to be really refreshing to see that we've had this sort of circling of the wagons here in Canada and focus on Canadian innovation, Canadian technology. It's been a wonderful experience, and it's programs like this that are really...energizing us founders here to continue to develop here in Canada." **- Cameron Waite, CEO, Real Life Robotics**

Relive SmartTO Demo Day with our recap video

Smart Mobility Tech Accelerator (SMTA) winners:

- Kiwi Charge – Hands-free EV charging for multi-unit buildings
- Aeroport AI – AI for optimizing airport ground operations
- Kevares Autonomous Services – Robotics for municipal services

SmartTO Innovation Challenge winners:

- Moon Trades Technologies – AI terrain analysis for infrastructure
- Wireless PNC – AI-powered wireless EV charging
- Fortran Traffic Systems – Simplifying traffic signal operations

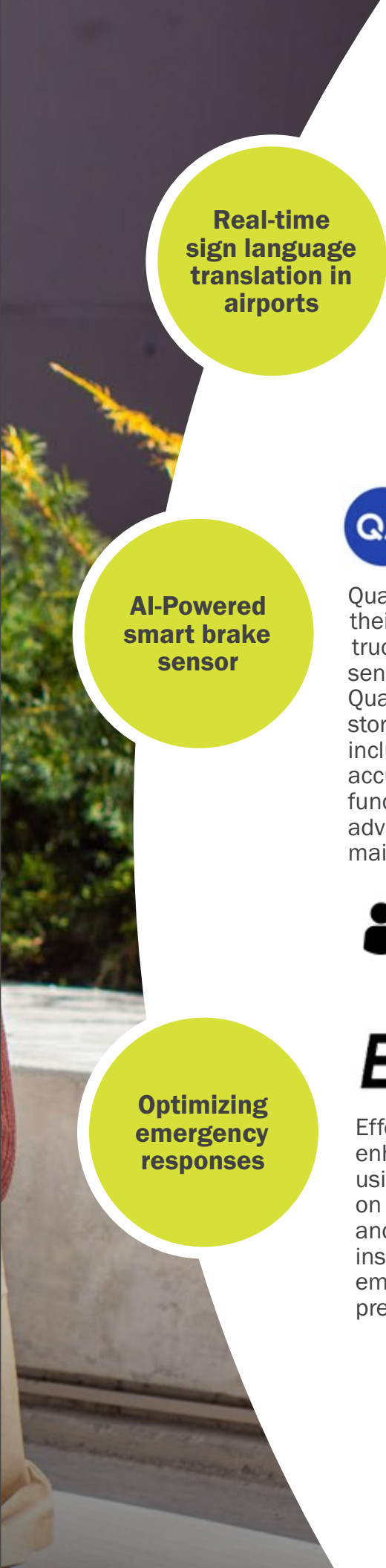
STUDENT **TESTIMONIAL**

“[Being] a newcomer to Canada, this project opened the door for me to the real world. The AI field is all about innovation, because every day people are coming up with new ideas, new technologies, as AI is being integrated into many fields. As a researcher at Centennial Innovates, what we’re doing is that we’re implementing AI-driven tools...to minimize the cost, energy, time, and to reduce waste. For me, it’s about helping humanity more. Because of this project, I am actually learning a lot of new aspects such as applying my knowledge and what I’ve learned in a practical field and real-world experience. Every week we have deliverables in our external meetings [with the industry partner] so I am now able to speak publicly and know how to explain clearly all the work I’ve done. I’m really grateful to have this opportunity here at Centennial. Many companies are looking for Canadian experience...because of this now I’m able to find or get a job after graduation.”

INNOVATING THROUGH OUR STUDENTS

Ghizlane Ez-Zarrad
Software Engineering Technology - Artificial Intelligence, SETAS

AI Student Researcher; SETAS 2025 Technology Fair - ICET 1st Place team member; SESN Hackathon 1st Place team member; SHN - AI Hackathon 1st Place team member



Real-time sign language translation in airports

Accessible transportation for the Deaf

Centennial College and SmartTO are collaborating with Deaf AI to redefine transportation accessibility for Deaf and hard of hearing community members. This project aims to provide real-time American Sign Language translation for emergency announcements on airports.

One student engaged

Principal Investigator:
Prof. Alireza Moghaddam, SETAS

AI-Powered smart brake sensor

Commercial truck smart brake sensor system with mobile integration

Quantuity Analytics collaborated with Centennial College to enhance their AI-powered smart brake sensor system for commercial transport trucks. The Centennial research team helped optimize their brake sensor design as well as develop a companion mobile application, the Quantuity Analytics Brake Test App, where sensor data is displayed and stored for user access and maintenance tracking. Recent improvements include refining the machine learning model to achieve over 90% accuracy, updating firmware for sensor stability, and expanding app functionality for better customization and administration. These advancements position the system for real-world testing in truck maintenance workshops as it moves into its next development phase.

One student engaged

Principal Investigator:
Prof. Alireza Moghaddam, SETAS

Optimizing emergency responses

Advancing emergency services technology through AI-driven research and development

EffectiveAI is an Ontario-based company founded on a vision of enhancing operational efficiency and effectiveness in public safety using cutting edge technology. They are collaboaring with WIMTACH on a project to help the company shift from traditional methods and procedures in managing standby ambulance into a data-driven insights. Ultimately, this project aims to ensure timely and effective emergency interventions, advancing public safety and setting a precedent for future technological advancements in the field.

Four students engaged

Principal Investigator:
Tenzin Jinpa, WIMTACH

Visit the SIRC website

Highlights from our Social Innovation Research Centre (SIRC)

The **Social Innovation Research Centre (SIRC)** supports the development of collaborative research projects with faculty at the College and community partners to develop innovative solutions to social, economic, and environmental issues. We excel in partnership development and managing teams of faculty and students to conduct applied research that has community impact. We link the expertise of faculty and staff at Centennial College with the expertise of our partners to address systemic inequities. We support faculty and our community partners through every stage of the research process — partnership building, project ideation, grant writing, budget development, research project management, and knowledge mobilization.

GET READY *To Feel Included*

SIRC IN 2024–25

11 **MILESTONES ACHIEVED** IN COMMUNITY PROJECTS

42 **STUDENTS** ENGAGED INCLUDING **11 EMPLOYED STUDENT RESEARCHERS**

22 **COMMUNITY PARTNERS** ENGAGED, FROM 9 LAST YEAR

4 **FACULTY AND STAFF** ENGAGED

"I joined the SIRC in July 2024 with a passion for working with communities and leading community-based research. Since coming to Centennial College, I've had the pleasure of leading diverse teams of College faculty, students, and community partner organizations, who work together to tackle some big social problems. One of the highlights this year can be seen with the successful completion of our community needs assessment for the Technology for Food Justice Project. During our community needs assessment, we had a team of six student researchers set up survey booths at six different food bank locations across Scarborough. The students successfully collected 199 surveys from food bank clients, and conducted follow-up interviews with food bank operators."

- **Dr. Amanda Wedge, Manager, Social Innovation Research**

Technology for food justice

Developing a web-based and mobile application for food bank users and food bank operators

This project continues the work built during the SIRC Hackathon with the Scarborough Food Network and four of its member organizations where we developed a prototype for a web-based, mobile-friendly application that both delivers centralized, real-time, organized, and accessible information to food bank users about available food resources as well as provides a platform for food bank operators to effectively communicate, coordinate and collaborate. The hackathon's success led to a three-year $360,000 grant from NSERC's Community Social Innovation Fund to build this platform, followed by a rapid growth of new partnerships.

To ensure the tool is responsive, inclusive, and meets the diverse needs of the community — particularly those who face challenges navigating or accessing information about food banks in Scarborough — we are currently conducting a comprehensive community needs assessment. Our research team is gathering data directly from food bank users and operators to identify the features and functionalities that are most needed. Student researchers are gaining valuable hands-on experience by partnering with community organizations, conducting surveys at food bank locations, and analyzing the resulting data.

Six students engaged

Principal Investigators: Profs. Linor David, SCHS and Viji Angamuthu, SETAS

Check out a video feature of the SACHAYS-Centennial partnership

"The involvement of Social Innovation Research Centre helps with our organization's capacity building, economic growth, and technology development through several key mechanisms. [This includes] conducting research and helping identify gaps and barriers to our community's mental health wellness and well-being. In a collaborative approach, Centennial uses their potential to utilize their technical capacity to bring awareness to social developments that are beneficial and relevant to the economic growth of the community. Centennial Innovates serves as a digital hub to foster engagements among innovators, community organizations, and stakeholders how to use technology to better understand where communities are experiencing lower thresholds. Having a hands-on approach can accelerate the development of impactful solutions beneficial to organizations, groups, and people."
- Philestena McLeod, Founder & Executive Director, AGATA Resource Centre

Using artificial intelligence to develop accessible software for people with Intellectual and Developmental Disabilities

Accessible software for individuals with IDD

This project utilizes artificial intelligence (AI) technology and an ability-based and user-centered design approach to develop technology that better suits the needs of individuals with intellectual and/or developmental disabilities (IDD). We are currently conducting a series of co-development workshops with a group of individuals with IDD known as Community Living Toronto Influencers, their caregivers, and our research team to better understand how each participant interacts with technology and the issues they face when using it. AI can revolutionize technology for individuals with IDD by focusing on personalized features and adaptable interfaces. This project's outputs include AI-driven technology designed for individuals with IDD, a best practices manual for co-development workshops, and a short film about the initiative. The project will benefit people with IDD by both providing an opportunity to participate in valued social roles as well as by creating a learning platform to support them in improving their digital literacy and that will ultimately support their autonomy and self-determination.

Three students engaged

Principal Investigator: Prof. Johanna Niles, SCHS

Culturally appropriate emergency education

Educational resources to support community members in the case of an emergency

This project focuses on developing culturally appropriate and accessible educational materials to support communities responding to climate-related emergencies in Toronto, such as heat waves, flooding, prolonged power outages, or extreme cold. We hosted a hackathon in November 2024, where 32 students created preliminary material addressing different climate-related emergency responses. From here, our team is continuing to develop a portfolio of creative educational materials that will help communities respond to emergency situations in Toronto. When completed, the City of Toronto will distribute and use these resources to support and strengthen community resilience to climate-related emergencies. Through collaborative design processes with community partners and members including lived experiences from Indigenous, Black, racialized, and other equity deserving groups, we will ensure that our materials reflect the diversity that makes Toronto so unique.

> "Our partnership with Centennial College has enabled innovative engagement with Community Leaders that supports the City of Toronto's goal of investing in people and neighbourhoods as we build a more resilient city. The collaborative expertise Centennial has provided directly contributed to community capacity building with Indigenous, Black and equity-deserving communities that supports place-based community development, as well as critical contributions to systems-level decision making."
> **- Rebecca Wallace, Community Development Unit, City of Toronto**

32 students engaged

Principal Investigator: Prof. John Caffery, SCHS

Action Canada
for Sexual Health & Rights

Gender-affirming, life-affirming

Centering gender-independent, trans, nonbinary and intersex youth in puberty education with adaptive interactive media

There is a large body of research that evidences the need for online resources for GIaNT youth because of their specialized needs and safety. In collaboration with community partner Action Canada for Sexual Health and Rights, SIRC created an online interactive resource for gender-independent, intersex, non-binary, and trans (GIaNT) youth. This resource provides an avenue to explore questions of identity and puberty at an emotional and social register and to get critical puberty and sexual health educational materials in an environment that is affirmative of gender diversity. This year marked the completion of this project, culminating with the completion of the Online Educational Resource (OER) for GIaNT youth.

Two students engaged

Lead Researchers:
Kat Newman-Seymour, Roya Haghiri-Vijeh, Purnima Tyagi, Amanda Wedge

Explore the online educational resource for GIaNT youth

STUDENT **TESTIMONIAL**

“My involvement with Centennial Innovates’ Social Innovation Research Centre has polished my social research skills, communication skills, and problem-solving skills. I receive ample support from my Project Manager and PI to ensure smooth project execution and personal success. I enjoy working in SIRC, being surrounded by like-minded researchers who always strive to explore innovative approaches to solve complex research questions.”

Pui Yan Liu
Office Administration – Health Services, TBS

SIRC Student Researcher

Celebrating cultural diversity

Centennial Innovates held its first Inclusive Excellence Celebration for Lunar New Year on February 28, 2025. Over 30 students, faculty and staff came together to celebrate the Year of the Snake. The event was a wonderful success, filled with laughter, friendly competition, and collective learning about cultural traditions.

Attendees received red envelopes, shared cultural snacks and candies, and rivaled each other in the Lunar New Year Trivia and the Chopsticks Challenge where winning teams won their own 福 (Fú) decorations and pairs of chopsticks. They were also able to write their own 福 squares, blessing scrolls, and even make their own origami snakes. Everyone also enjoyed delicious Chinese food—including turnip cakes, spring rolls and fried rice.

OUR STUDENTS EMBODY AN ENTREPRENEURIAL MINDSET

Defining an entrepreneurial mindset
When people hear "entrepreneurship," they often think of starting a business. But entrepreneurship is more than launching a startup — it's a mindset. At its core, it's about identifying opportunities, generating ideas, and taking action to create value. This mindset is built on a foundation of creativity, innovation, originality, critical thinking, problem-solving, initiative, and resilience. It also involves essential skills like resource development, risk assessment, project planning, leadership, and management.

Adding purpose: a sustainable entrepreneurial mindset
Just as important as entrepreneurial thinking is a sustainability mindset — an approach rooted in the belief that innovation should serve not only economic goals, but also environmental and social good. That means being intentional about the long-term consequences of ideas and actions, and striving to develop solutions that are ethical, inclusive, and responsible.

Why it matters
Cultivating a sustainable entrepreneurial mindset not limited to aspiring entrepreneurs, and is also more than career readiness; it's about future-proofing yourself to thrive in any context. Whether you're self-employed, freelancing, or working in a corporate environment, entrepreneurial thinking empowers you to:

- Stay adaptable in the face of change
- Communicate and collaborate with value
- Think critically and solve complex problems
- Identify opportunities that generate value and positive impact

Entrepreneurship isn't just a career path — it's a lifelong approach to creating value and making a difference.

Visit the COIE website

4 QUALITY EDUCATION

At Centennial College, quality education extends beyond the classroom. Our students receive entrepreneurship education that develops a sustainable entrepreneurial mindset, which we believe is not only essential for shaping a better future, but also key to long-term personal and professional success.

COIE: Fostering entrepreneurship as a lifelong skill

CENTRE OF INNOVATION & ENTREPRENEURSHIP

The Centennial Advantage™

The **Centre of Innovation and Entrepreneurship (COIE)** drives transformative change through agile, experiential, and sustainable entrepreneurship. Using the United Nations' Sustainable Development Goals (SDGs) as a framework, the COIE fosters a sustainable entrepreneurial mindset that transforms challenges into opportunities that meet the needs of the present without compromising the ability of future generations to meet their own needs, while developing critical skills such as creativity, innovation, problem-solving, leadership and resilience.

COIE offers a dynamic range of programs, engaging over 20 expert presenters and 70 mentors. Signature initiatives include the Global Goals Jam Canada, a best-in-class incubation experience program, the SDG Innovation Lab, the Immersive Innovation Lab offering the VR Pitching Bootcamp, and curricular collaborations to transform the weekend challenge model for the classroom.

Expanding its impact in 2024–25, the COIE continued to lead innovation with its inaugural Climathon 2024 GTA, tackling climate challenges through collaborative problem-solving. It also introduced rapid inclusive decision-making sessions to address corporate and community challenges, along with new sessions exploring AI applications for business, including interviews and presentations. COIE strives to prepare students to tackle real-world challenges in sustainability, innovation, and technology — ensuring they are equipped to thrive in an ever-evolving world.

In 2025-26, COIE plans to expand its programming with a focus on enhancing students' skills development, market readiness, community impact and the reputation of entrepreneurship programming at Centennial College.

Centennial College was the only college in Ontario to join federal Lab2Market network

The Ministry of Innovation, Science and Industry has allocated $95.3 million over five years to the Lab2Market program, a nationwide program fostering entrepreneurial skills and innovation commercialization across Canada. Centennial is the only Ontario college invited to a national Lab2Market consortium of colleges, universities and research institutes, securing access to multi-year funding to provide mentorship, training, and hands-on learning to researchers, advancing scientific and social innovations aligned with the SDGs.

Lab 2Market

5981 REGISTRATIONS | **2315** PARTICIPANTS | **72+** FACULTY AND STAFF ENGAGED

140 SESSIONS DELIVERED IN 2024–25

96 WORKSHOPS

24 SPECIAL PROGRAM SESSIONS (DESIGN JAMS, ACADEMIC COLLABORATIONS, PARTNERED EVENTS AND VR PITCHING LAB SESSIONS)

20 INFORMATION SESSIONS

4.8 AVERAGE SATISFACTION SCORE

COIE provides our student changemakers training on sustainable entrepreneurial mindset development.

“As we embark on another year of innovation and transformation at the Centre of Innovation and Entrepreneurship (COIE), I am excited to reflect on the progress we’ve made and share the new initiatives that are shaping our future. Aligned with Centennial College’s strategic goals, we continue to lead change through innovative, scalable, and sustainable solutions that empower students to become tomorrow’s leaders.

This past year, COIE has seen remarkable strides in expanding its offerings. We introduced a diverse array of programs, including the Sustainability, Purposepreneur and the Artificial Intelligence Series, engaging over 2,300 participants across 140 sessions, including 96 hands-on workshops. Our signature initiatives, such as the SDG Innovation Lab, Global Goals Jam Canada, and the Incubation Experience Program, continue to provide students and community partners with the tools to develop impactful solutions for real-world challenges.

Our commitment to sustainable entrepreneurship is woven into the fabric of our programming, exemplified by our four-session experiential series with the Community Development Worker Program (CDEV) and the Social Entrepreneurship for Employment (SEE) Jam empowering students with tools for social enterprise, while our custom decision-making processes addressed key issues like student food insecurity.

Our Rapid Inclusive Ideation Jam – Aerospace/Aviation in partnership with Rogers Communications and De Havilland Canada saw participating professionals explore 5G-driven aviation advancements, gaining insights into how emerging technologies enhance efficiency and sustainability, while our inaugural Climathon 2024 GTA weekend challenge in partnership with the European Institute of Technology and the City of Toronto, challenged participants to create sustainable building and energy solutions.”

Message from Lalit Guglani, Director, Business Innovation and Entrepreneurship

STUDENT **TESTIMONIAL**

INNOVATING THROUGH OUR STUDENTS

“When I started researching where I could go next, Centennial stood out right away. Not just for the culinary program — but because of its unapologetic commitment to sustainability, community engagement, and social innovation. I joined the Global Goals Jam with this wild little idea called The Pickle Bank — a grassroots preservation project that rescues surplus produce and turns it into a full-circle food justice ecosystem. I learned how to take a vision and build a framework around it. I learned how to pitch, how to refine, and how to not be afraid of taking up space in rooms where innovation lives. Soft skills, hard skills — all of it grew. Especially my belief in myself. Once again, Centennial has lit a spark of confidence that I truly can make a difference.”

Andrea Maurice
Culinary Management, SHTCA

Global Goals Jam Canada
Winter 2025 2nd Place Winner

Climathon Greater Toronto Area

eit Climate-KIC

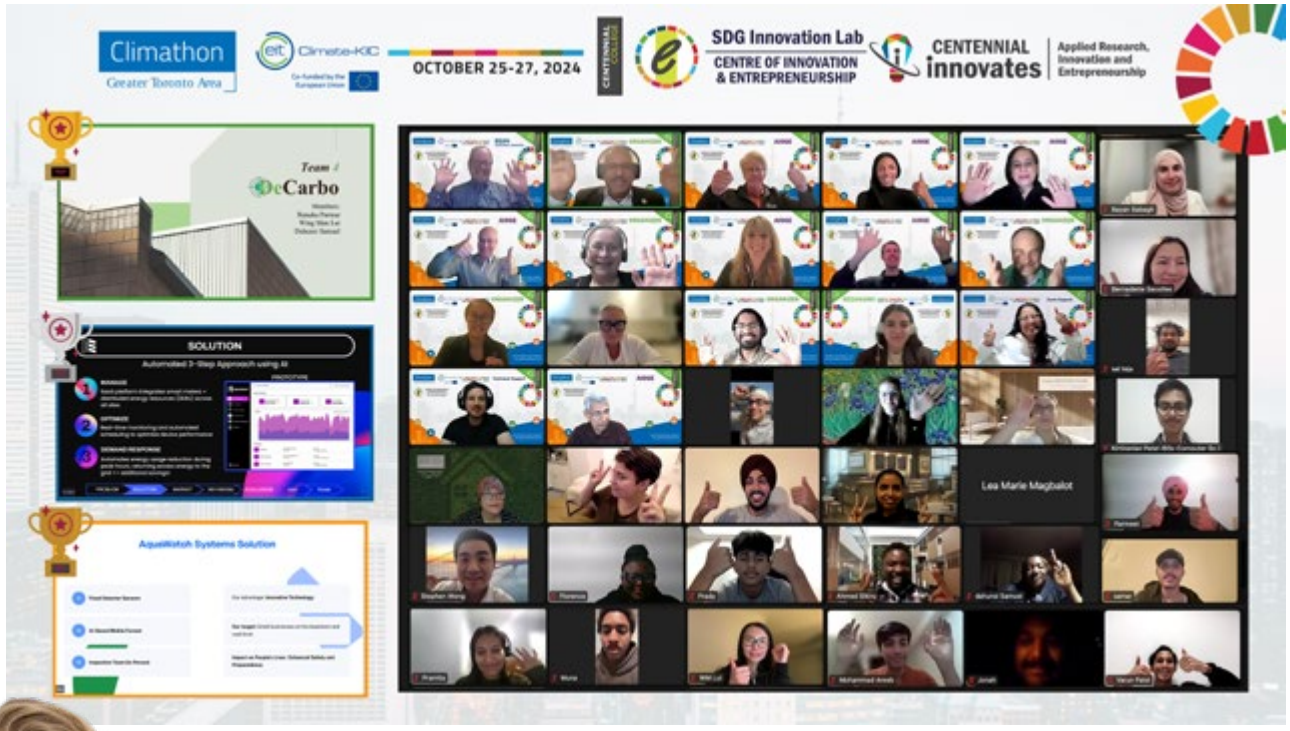
Co-funded by the European Union

Climathon GTA 2024

Our students learn best-practice changemaking techniques at our climate hackathon event

Read the Climathon recap

On October 25-27 2024, COIE held its inaugural Climathon GTA design jam challenge in partnership with the European Institute of Technology and in collaboration with the City of Toronto. Participants across 11 teams spent the weekend in an impactful and action-driven experience focused on climate innovation and changemaking. Centennial students and community members showcased leadership and creativity, actively contributing to critical climate solutions ranging from an app supporting the construction industry's transition toward greener practices to an intelligent energy management software for property managers, as well as an IoT-enabled flood monitoring and response solution. Centennial students demonstrated remarkable leadership and active participation in all three winning teams.



"Climathon was unforgettable! I was paired with an amazing teammate from a completely different background, and together, we formed not just a team of two strangers but a cross-continental collaboration. Working alongside someone with a fresh perspective expanded my view and strengthened our project immensely. The experience left me inspired, empowered, and more committed than ever to meaningful climate action."
- Kateřina Lorencová, Climathon 2024 GTA Participant

Our flagship SDG design jam

Global Goals JAM

CANADA WINTER 2025
MARCH 7–9

Our students excel and shine at the 7th Global Goals Jam Canada

Read the Global Goals Jam W25 recap

CENTENNIAL COLLEGE | CENTENNIAL innovates | Applied Research, Innovation and Entrepreneurship | UNDP | Amsterdam University of Applied Sciences | DIGITAL SOCIETY SCHOOL

COIE held their seventh Global Goals Jam Canada between March 7-9, 2025. Each year, this anticipated event draws participants from across the world to design innovative solutions in a facilitated, mentored and transformative experiential learning environment to foster changemaking and sustainable innovation skills.

Over the weekend, 16 teams actively worked on solutions from building a transparent and accessible rental information system to developing a community food hub that bridges surplus food with food insecurity; from eco-housing units that provide emergency and affordable housing for women facing domestic violence, to a disability-led AODA training and consulting platform.

The weekend left students deeply inspired, with many describing it as a transformative and eye-opening experience that blended creativity, collaboration, and real-world impact — with one noting that it was the “best learning experience of the year.”

First-time attendees found the high-energy brainstorming both challenging and exhilarating, while repeat participants emphasized how the Jam reignited their commitment to sustainability and innovation. The emphasis on teamwork and diversity fostered a sense of unity, with many appreciating the opportunity to collaborate with like-minded peers and engage in purpose-driven problem-solving.

“At the Global Goals Jam Winter 2025, we didn’t just create models—we designed hope. By tackling food insecurity, we built bridges to a future where no one goes to bed hungry, and every community thrives with access to the resources they need to flourish.”

- Lyca C., Global Goals Jam Canada Winter 2025 Participant

“COIE’s programs pushed me to think more creatively, lead more boldly, and reimagine how innovation can drive inclusive impact. It’s where I bridged strategy with service and learned to solve real-world problems with heart.”

- Vivian Chiokwa, Global Goals Jam Canada Winter 2025 1st Place Winner
Global Business Management, TBS

Our Experiential Ideation Jams in Action

Integrating 5G into aviation and aerospace

Rapid Inclusive Ideation Jam - 5G Aerospace/Aviation

Centennial Innovates, in partnership with Rogers Communications and De Havilland Canada, hosted a Rapid Ideation Jam facilitated by COIE. Participants explored innovative ways to integrate 5G technology into aerospace and aviation, with a focus on aircraft manufacturing, maintenance, operations, and training. Five teams developed impactful project ideas, ranging from using XR for aircraft design to leveraging 5G drones for predictive maintenance, all aimed at improving efficiency, reducing costs, while also addressing sustainability through innovation. The session showcased the exciting potential of 5G to revolutionize the aerospace industry.

Leveraging AI for creative productivity

Rapid AI Micro-Jam pilot

At the Centennial Innovates 2024 Symposium, the COIE team facilitated a 30-minute Rapid AI micro-jam pilot session that engaged participants in an inclusive decision-making exercise, augmented by AI. In less than half an hour, participants formulated a “How Might We” statement and crafted a value proposition using ChatGPT and produced an AI-generated video using Invideo based on the developed value proposition, combining an innovative decision-making method with leading-edge technology for creative productivity.

GET READY *To Explore*

VR pitching and AI-assisted interviews

Inside our Immersive Learning Innovation Lab

Building on the success of pilots and classroom introduction from the previous year, COIE expanded its Virtual Reality (VR) Pitching sessions and engaged over 45 Finance and Accounting students from The Business School, where they practiced presenting using VR headsets. The students enjoyed stepping away from the stress of numbers and focusing on enhancing their presentation skills, benefiting from the feedback received.

Additionally, COIE piloted its Interview Lab, where participants had the chance to practice interviewing with AI-generated questions using job descriptions and their resumes, allowing them to hone their skills and receive real-time feedback. These experiential opportunities are key to develop and perfect much-needed communications skills and directly contribute to the new essential skills.

> **“My experience was extremely fruitful. I would say that when you put the VR headset on and you’re immersed in such a reality, it’s quite an experience because you kind of forget that it’s virtual and you feel the real emotions of actually presenting to an audience. I was able to rehearse my presentation and get actual feedback in terms of real AI simulation. They told me what I could fix, what I could improve, and it was just a good experience overall. I would definitely recommend this to anyone trying to improve their presentation skills.”**
> **- VR Pitching Bootcamp Participant** and TBS Student

Bringing COIE's experiential programming to the classroom

CDEV Sustainability Jam & Social Enterprise for Employment (SEE) Jam

The School of Community and Health Studies (SCHS) has been collaborating with COIE since 2023 to foster sustainable entrepreneurial mindsets through the learning modules of the SDG Innovation Lab.

CDEV Sustainability Jam
In Fall 2024, the CDEV Sustainability Jam engaged two Community Development Work (CDEV) classes in empathy mapping, critical thinking, and lean methodologies to tackle campus-specific sustainability challenges. Built on the success of the previous pilot and delivered as a four-week in-class experiential challenge program, students tackled challenges in regenerative agriculture, community tourism, and the circular economy. Teams applied empathy mapping, critical thinking, and lean methodologies to develop solutions and crafted compelling pitch presentations enriched by feedback from expert judges. The jam culminated with in-person final sessions, engaging participants in impactful learning and storytelling.

Custom 'SEE' Jam
COIE also delivered a bespoke 'Social Enterprise for Employment (SEE)' Design Jam to a CDEV class in March 2025, focused on the fundamentals of social innovation, social entrepreneurship and service design methodologies and how to apply them to ideate and present socially innovative and sustainable entrepreneurial ideas that address employment issues for minority and marginalized groups.

These experiential programs facilitated an innovative integration of community economic development best practices with design thinking and lean methodologies, honing an entrepreneurial mindset and skills when addressing community challenges.

Riipen
Cross-College Entrepreneurial Challenge
April 19 - 26, 2024

Centennial students win top awards at Cross-College Entrepreneurship Challenge

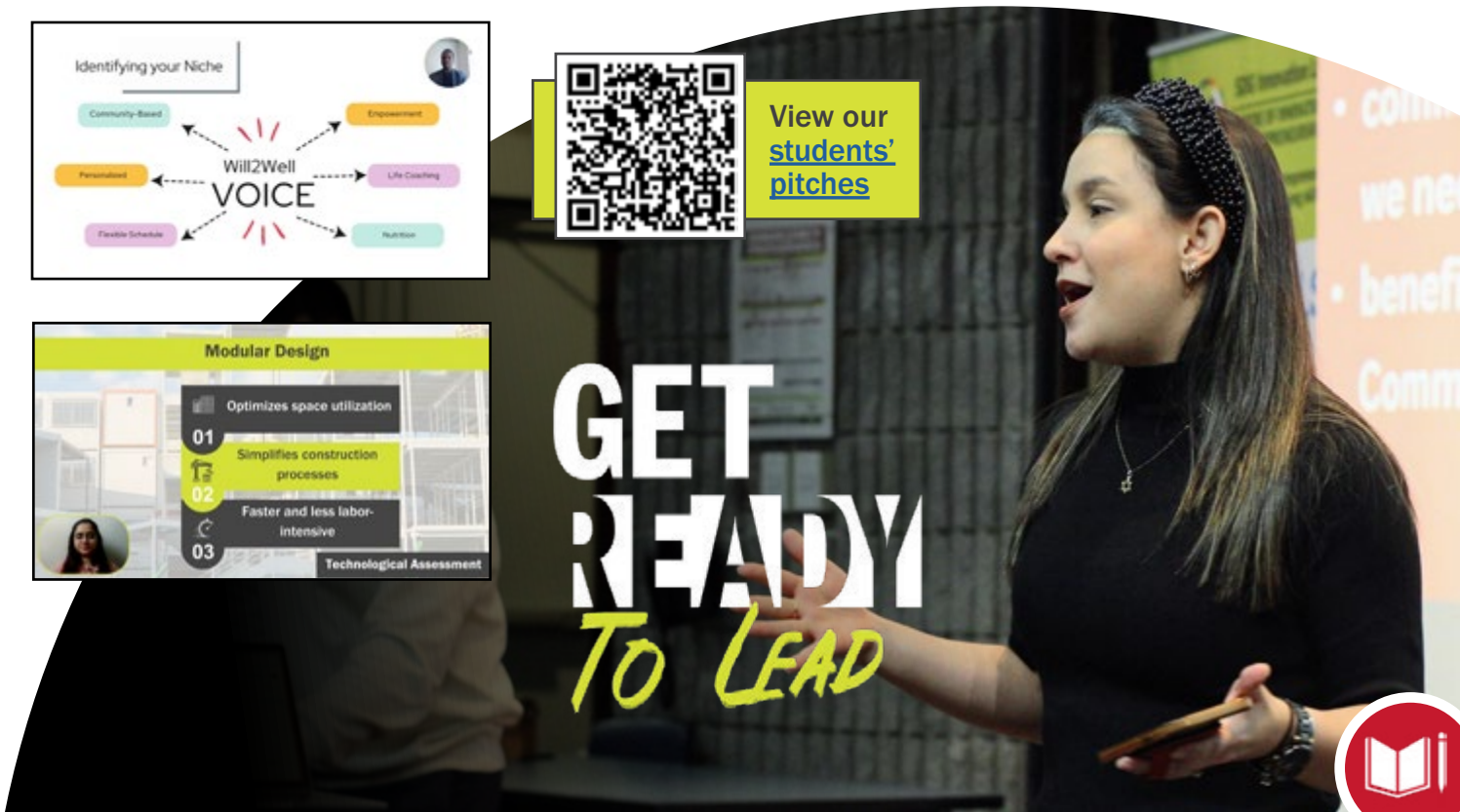
3-day Ontario-wide entrepreneurial challenge

Centennial students achieved top honours at the third annual Riipen Cross-College Entrepreneurship Challenge, held from April 19–26, 2024. Sponsored by RBC Future Launch, the competition brought together students from 11 Ontario colleges to tackle two real-world business challenges through collaboration and innovation.

COIE organized and prepared two student teams to take on this fast-paced challenge. Over the course of the weekend and early week, the teams researched their assigned business cases, developed practical solutions, and delivered polished 5-minute video pitches.

Team 1 — Mike Defazio (TBS), Temitope Olorunda (TBS), Sumaiya Parveen (SETAS) and Yaatu Adem (SETAS) — assigned to the case from Will2Well, was tasked with reimagining the company's brand voice to better attract customers. Their compelling pitch earned them two of the competition's top honours: Judges' Overall Winner and Most Engaging Video, standing out among all participating Ontario colleges. This impressive achievement builds on the team's earlier success at the Global Goals Jam Canada Winter 2024. Congratulations to both teams for their dedication and success—and to Team 1 for an outstanding performance!

View our students' pitches



OUR STUDENTS SHAPE OUR FUTURE WORKFORCE

Learning that matters: working directly with industry partners

Our student innovators are at the heart of every single applied research project, working directly with our industry and community partners on their real-world challenges. Through this experience, they develop not only their technical skills such as data collection and analysis skills using specialized equipment and tools, they also develop a variety of professional and soft skills — such as project management, time management, presentation and teamwork skills. But perhaps the most valuable overarching takeaway is an innovation mindset that our students will bring to the future workforce after graduation.

Through the practical experiences at Centennial Innovates, students increase their capacity to modernize and innovate within their field, become intrapreneurs, and bring their knowledge of emerging and advanced technologies into their workplace.

"Under the mentorship of Senior Project Managers [at Centennial Innovates], I served as a Student Project Manager, overseeing multiple projects simultaneously in the technology domain. This opportunity allowed me to enhance my project management skills, embrace agile methodologies, and strengthen my leadership abilities. I'm leaving Centennial Innovates more confident in my capabilities and eager to apply my skills in future endeavors."

- Pavendhan Santharam, Project Management, TBS; WIMTACH Project Management Intern

Spotlight on our advanced manufacturing innovation

Southern Ontario has a robust manufacturing sector, comprising 37,550 firms that support 787,100 jobs. This sector contributes 11% to the provincial GDP, accounts for 80% of merchandise exports, and represents 26% of total employment when considering direct, indirect, and induced impacts. It also produces nearly 45% of Canada's total manufacturing output, making it a key driver of the national economy.

In partnership with the Southern Ontario Network for Advanced Manufacturing Innovation (SONAMI), our researchers lead projects that deliver innovative solutions for local SMEs in the advanced manufacturing field, including process optimization, prototype design and testing, evaluation of emerging technologies, and the development and commercialization of new or improved products.

Over the past four years, our work has spanned several key areas, including:

- additive manufacturing technologies;
- product testing and validation;
- information and communication technology and cybersecurity;
- process optimization; and
- simulation and modeling.

8 DECENT WORK AND ECONOMIC GROWTH

OUR STUDENT DEMOGRAPHICS

33% WOMEN RESEARCHERS

72% ASIAN RESEARCHERS

74% SETAS PROGRAMS

Our 2024–25 Student Intern Survey results include demographic data that showcases the diversity in our research teams. A noteworthy reflection of this is that 72% of our student researchers identify as Asian — with 39%, 13%, 18% and 2% from South, East, Southeast and West Asia respectively.

Hands-on real-world experience, practical job-related skills and **industry exposure** were the top three motivators for our students, with 62%, 54% and 50% of students citing them respectively when describing what they look forward to gaining from their internship.

IN 2024–25, OUR ADVANCED MANUFACTURING APPLIED RESEARCH ACTIVITY ENGAGED:

33 STUDENT RESEARCHERS | **19** FACULTY RESEARCHERS | **7** INDUSTRY PARTNERS | **5** PROJECTS COMPLETED | **3** ONGOING PROJECTS

Message from Dr. Eric Blaise, Director, Applied Research and Innovation

“In Aerospace and Advanced Manufacturing, Centennial Innovates builds partnerships with a broad range of companies — from startups to large multi-nationals — to help them find solutions to their technological challenges. The College leverages its expertise and facilities within the School of Engineering Technology and Applied Science, especially within the Advanced Manufacturing and Automation Technology department for challenges related to aerospace and advanced manufacturing. The student researchers who work with industry partners get to develop their skills and build upon the technical training they’ve learned in their respective programs.

At Centennial College, innovation is a core principle that drives education and technological advancement. Central to this mission is our Landing Gear Innovation Lab, a dynamic space that inspires creativity and collaboration among students from various disciplines. Over the past couple of years, the Landing Gear Innovation Lab, situated next to the Downsview Campus, has been the go-to site for student researchers to develop, build and test some of their collaborative work. The open, high ceiling, modular industrial space is perfect to asses the real physical prototypes built for our industry partners. This space enables student researchers to work freely on their research project without being in the way of academic activities at the main campus.

The Landing Gear Innovation Lab is a beacon of creativity, equipping the next generation with the skills needed to face challenges and drive change in an evolving world. Each project emerging from this space not only enhances their education but also contributes to a brighter future. These collaborations such as the ones with WinGlobal allow students to build their knowledge on their academic curriculum in areas such as aerodynamics, stuctures, energy management, flight controls. These types of projects are mulitdisciplinary projects that challenge the students and faculty and help train the workforce of tomorrow on how to innovate to make Canada more productive and challenge the status quo.”

“I realized my passion for technology and pledged to improve myself each year by learning new things, as technology is ever-changing. Knowing there was this opportunity available, even though I was only in my second semester, is truly invaluable. I have 11 years of work experience in different industries before moving to Canada...[but] I feel like I’ve learned more than I have in the past couple of years working in a corporate job. Besides Machine Learning and technical skills I gained from this project, the most valuable aspect for me is realizing my true passion and what I truly want to do in life. I understood more about myself and the next steps I want to do in my career [which is to] pursue research. While technical skills can be learned, the character you bring to research is difficult to develop. It’s being comfortable with the unknown. This is the first time I’ve done machine learning research for a company, and the opportunity given to me is tremendous. Enough so that I know it has changed my entire view of things. It’s a big help for students like me who are striving to forge their own paths. This opportunity has honed not only my technical skills but also my character and resolve.”

INNOVATING THROUGH OUR STUDENTS

GET READY *To Succeed*

Jeanne Damasco
Software Engineering Technology — Artificial Intelligence, SETAS; AI Student Researcher

STUDENT **TESTIMONIAL**

Redesign of aircraft exit latch

Emergency Exit Latch Parts Optimization using Additive Manufacturing

De Havilland Aircraft of Canada (DHC), one of our longstanding industry partners, is a global leader in turboprop and special-mission aircraft known to operate in some of the world's harshest environments. We recently completed a two-year project that redesigned their aircraft's exit latch components utilizing topological optimization methodology, a mathematical method that optimizes the material layout and distribution within a given design space. This would in turn reduce the components' total weight, manufacturing time, and number of parts of their current latch. The project also involved using additive manufacturing (3D printing) to print the newly designed parts in a specific lightweight, high-strength aluminimum alloy — made possible through an important partnership with with Canadore College's Innovation Centre for Advanced Manufacturing and Prototyping (ICAMP). The research team then performed various durability testing on the parts. These results would be crucial for the design and development of an innovation solution that would consider new technologies and materials.

"My recommendation would be not to hesitate; [Centennial Innovates] is the best place to grow, learn, and connect with highly skilled professionals. Don't view it merely as a job; see it as an opportunity that can open many doors down the line. You learn a lot, and there is a complete immersion in the professional world. Don't be afraid to make mistakes; give it a try, and you won't regret it."

- Diego Herrera, Mechanical Engineering Technology, SETAS; Advanced Manufacturing and Aerospace Student Reseaarcher

Five students engaged

Principal Investigator: Prof. Wladimir Figueiredo, SETAS

Our innovations at retail stores

Safety enhancement and product development with Canadian Tire

Over the past two years, we have collaborated with Canadian Tire on a few different projects, including the creation of a comprehensive Occupational Health and Safety Manual tailored to Canadian Tire's Product Development labs. The project team — including staff, faculty, and student researchers — successfully mapped out lab-specific risks and safety requirements, and structured the manual's content around real-world needs and internal procedures. This project strengthened our partnership with Canadian Tire and contributed to cultivating a culture of health and safety, while offering students meaningful, hands-on experience in applied compliance and policy design. Another project involved the development of two motorcycle stands for Canadian Tire's motorcycle line, leveraging the passion and expertise of faculty researcher Alex Grupp, a Professor and Program Advisor from the School of Transportation's Motorcycle Powersports and Motorcycle Technician programs.

Emerging technologies expand aviation training opportunities

Leveraging AR/VR for aviation training

Our increased focus on aerospace maintenance, repair and overhaul (MRO) technology development includes exploring technologies and innovations that will allow improved access to MRO expertise and facilities in remote areas, including fly-in Indigenous communities. Currently, we are working with Bombardier and Toronto Metropolitan University to explore the use of augmented and virtual reality (AR/VR) to train aircraft maintenance engineers, which has great potential to support more local MRO services for rural and Indigenous communities.

Three students engaged

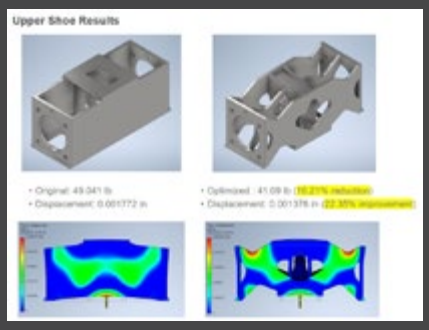
Principal Investigators: Profs. Leon Gordon and Reinaldo Gonzalez, SOT; Mohammad Bashar and Wladimir Figueiredo, SETAS

Improving rollforming efficiency and sustainability through advanced manufacturing innovation

Innovations in pitch stamping and metalworking

Leveraging support from the Southern Ontario Network for Advanced Manufacturing Innovation (SONAMI), Samco Machinery partnered with Centennial College on a collaborative research and development project to enhance the performance and efficiency of their Vortex Press™—a variable pitch stamping machine used in rollforming. The project focused on optimizing the machine's design through advanced manufacturing techniques such as additive manufacturing and finite element analysis (FEA), with the goal of increasing production speed, reducing material waste, and improving overall machine functionality.

As a result of the project, the new design had a 25% overall weight reduction, leading to significant improvements in the efficiency and performance of the machine. Following the project's success, this collaboration has also strengthened a unique relationship to bring much-needed visibility to the roll forming industry. As the demand for highly trained mechanical and electrical designers continues to grow, partnerships like this one help equip the future workforce with real-world experience and skills to meet the modern challenges in the advanced manufacturing sector.



Two students engaged

Principal Investigators: Profs. Wladimir Figueiredo and Florin Nijloveanu, SETAS

STUDENT **TESTIMONIAL**

Check out Matthew's success story

INNOVATING THROUGH OUR STUDENTS

"The experience of assembling that test rig [for the Marsh Brothers Aviation project] really helped with the career I was able to get right after school...If I didn't work with the Centennial Innovates program, I don't know if I'd be able to get the job that I have today...Working with the customers [and] having the confidence to speak was one of the biggest things."

Matthew Thurston
Former Advanced Manufacturing Student Researcher, now Manufacturing Engineering Specialist, BWXT Technologies Inc.

OUR STUDENTS NURTURE A THRIVING PLANET

13 CLIMATE ACTION

At Centennial Innovates, sustainability is not separate from innovation — it is part of both the process and the outcome. The Sustainable Development Goals and sustainability mindset developments are a foundational and keystone perspective across all our entrepreneurial programming. Through applied research, we are helping companies reduce weight, improve material durability, increase resource efficiency, accelerate elecrtification and decarbonization and more — with example projects spanning the development of microgrid controllers and smart electric vehicle (EV) charging plugs to developing magnetic aircraft braking systems and self-lubricating polymers that significantly reduce the use of consumables.

We also offer comprehensive greenhouse gas (GHG) and energy audit services to evaluate carbon footprint and/or energy consumption. Since we've launched this service, we have helped organizations such as Ports Toronto — including their Billy Bishop Airport, Port of Toronto and the Outer Harbour Marina — and the Toronto Zoo in analyzing their environmental impact and identifying opportunities and next steps to progress on their sustainability goals. Through this service, not only are we leveraging Centennial's expertise and various related programs, we are also training and engaging our students in conducting real-world energy and GHG audits for industry partners — honing their competitive edge upon graduation.

This year, our applied research activity in sustainable energy systems and low-carbon mobility engaged:

- **62** STUDENT RESEARCHERS
- **24** FACULTY RESEARCHERS
- **29** INDUSTRY PARTNERS
- **24** PROJECTS COMPLETED
- **7** ONGOING PROJECTS

“This is now the second engineering research project that Proton Fuels has collaborated with Centennial College on. The ability to develop collaborative projects that address a specific engineering problem that we may be facing has been incredibly impactful. We also hope that these projects have also been a meaningful experience for the students who have been involved. We thank the students and professors who have been involved and hope to work with them again in the future.”
- Majd Bayouq, Founder, Proton Fuels Inc.

PROTON FUELS

Modular hydrogen vehicle fueling

Designing a modular hydrogen fuel station

Proton Fuels is a clean energy infrastructure company focused on the design, manufacturing, and operation of hydrogen vehicle fueling systems. This project supported the development of their modular hydrogen fuel station — successfully completing its mechanical development, structural analysis, and manufacturing preparation phases. The team also effectively disseminated the knowledge and lessons learned to the industry partner, ensuring that they are fully prepared for the upcoming manufacturing and deployment stages.

Two students engaged

Principal Investigator:
Prof. Mihail Plesca, SETAS

Affordable, sustainable cargo transport with UAVs

WinGlobal

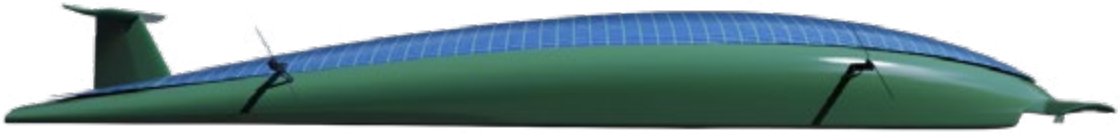
Detailed design of Win Global drone

WinGlobal is a startup aiming to transform logistics in remote regions by developing a lighter-than-air aircraft. Centennial Innovates and WinGlobal started collaborating in January 2024, with three fruitful projects under their belts to date. The overarching goal is to design a zero-emissions, lighter-than-air unmanned aerial vehicle (UAV) using buoyant gas for lift. This innovative technology — with a working name of the DroneShip — aims to tackle key challenges in cargo transportation, offering a more cost-effective and environmentally sustainable solution.

The first project started with the design of the initial concept of this drone, considering all of WinGlobal’s requirements. The second project brought in a bigger research team, focusing on detailing the mechanical design and conducting comprehensive research about market trends and projections in air cargo transportation and drone technology. The third project, set to be completed by May 2025, involves not only the conclusion of the mechanical design but also the electrical system and avionics, as well as an extensive guideline about aerospace regulations for drones.

Three students engaged

Principal Investigators:
Prof. Eric Hansen, Jonathan Nadler and Wladimir Oliveira, SETAS



EcoNest Senior Living Design

We collaborated with Terra Power Systems Inc. to create a conceptual design for a visionary low-rise senior living community in Hamilton, Ontario. The project was driven by a commitment to three core principles: cost-efficiency, eco-friendliness, and aesthetic excellence. Through innovative design and strategic use of resources, the EcoNest Senior Living project aims to deliver an affordable and accessible environment for seniors seeking a comfortable, enriching and active lifestyle.

Designing affordable, sustainable senior living

The project embraces green building practices and was engineered to use low-carbon building materials and harmonize passive/hybrid solar strategies in a visually stunning community.

The team employed the Integrated Design Process and cutting-edge building information modeling (BIM) technology to investigate space planning, building components, aesthetic considerations, and technical requirements, as well as regulations (i.e. environmental impact, site plan control, zoning, and building codes) at the schematic design stage. The EcoNest concept goes beyond mere architectural design; it aspires to cultivate an exemplary lifestyle for the future of senior living. The project was featured in pages 58-61 of the Association of Energy Service Professionals (AESP) 2024 Q3 Energy Intel publication.

Two students engaged

Principal Investigator:
Prof. Behrang Fakharian, SETAS

Check out the EcoNest feature on the AESP publication

STUDENT **TESTIMONIAL**

“I started at Centennial just trying to find the right classroom. That turned into leading research for Fererro and Ports Toronto. Now, as a Project Coordinator, I lead projects across sustainbility, AI, and app development with curiosity and purpose. Thank you for trusting me before I even trusted myself.”

Javier Corredor
Energy Systems Engineering Technician, SETAS Graduate; Former Energy Student Researcher; Current Project Coordinator, Energy, Transportation and SmartTO

STUDENT **TESTIMONIAL**

INNOVATING THROUGH OUR STUDENTS

“I’m passionate about using AI and software to develop solutions that help peoples’ lives and make things more efficient. Through Centennial Innovates, I learned how to develop a software that is sustainable, scalable, user-friendly and useful. I learned how to use agile methodologies to bring about big improvements for the industry partner. I’m happy to share that I’ve secured an internship position at ABC Technologies to continue working on implementing the AI Schedule software beyond this project. If you’re thinking about doing applied research at Centennial, don’t think — just do it.”

- Victor Tse, Software Engineering Technology - Fast Track, SETAS; AI Student Researcher

ABC TECHNOLOGIES
—MOLDING THE FUTURE—

Exploring AI in automotive manufacturing

ABC Technologies, based in Toronto, is a world leader in plastics, lightweighting, blow molding and injection molding technology for the global automotive industry. As part of their broader initiative “Exploring AI in Automotive Manufacturing,” they collaborated with Centennial Innovates and successfully executed three major applied research projects addressing key challenges in polymer analytics, scheduling optimization, and cost-to-quote research. These projects each uniquely contributed toward enhancing automation and efficiency in automotive manufacturing processes.

In January 2025, Centennial Innovates secured over $85,000 in funding from the Ontario Centres of Innovation (OCI)’s Automotive Innovation Challenge to further our projects exploring AI in automotive manufacturing with ABC Technologies. Centennial is the sole academic partner in the project, which is valued at over $200,000. This success further solidifies Centennial’s excellent work and leading role in transportation innovation.

Project #1 - ABC Compound Predictive Analytics: This project used machine learning to predict the composition of different plastic materials based on data from physical tests. Our team used multi-output regression models and both real and synthetic datasets to develop a tool that could optimize material formulation, reducing the need for trial-and-error in laboratory settings.

Project #2 - Supreme AI Quotation System: This project automated the manual, error-prone process of generating cost quotations for engineer-to-order (ETO) HVAC fixtures. Through natural language processing and AI-driven logic, the student team built a prototype capable of reading and analyzing Request for Quotation (RFQ) documents, extracting relevant specifications, and generating consistent, transparent pricing models.

Project #3 - Automated Scheduling System: This project addressed the challenge of production scheduling by designing a tool that generates and dynamically updates job schedules in response to real-time production issues. This tool provided interactive user interfaces, allowing factory managers to visualize and adjust schedules with ease.

Collectively, these projects not only introduced innovative solutions into ABC Technologies’ production and business workflows, but also laid the groundwork for scalable AI adoption in Ontario’s manufacturing sector. The tools developed help reduce operational inefficiencies, decrease costs, and improve responsiveness—contributing to the province’s economic competitiveness and technological leadership.

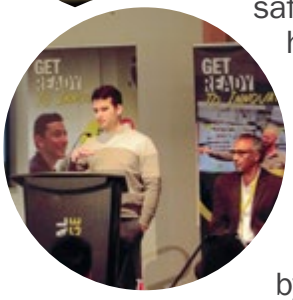
In February 2025, the research team, including 12 student researchers, visited ABC Technologies’ North York plant for a guided tour.

Our annual celebration and showcase: Centennial Innovates 2024 Symposium

On May 15 2025, over 200 faculty, staff, students and industry and community partners gathered at the Event Center for the Centennial Innovates 2024 Symposium, the 17th annual celebration of applied research, innovation and entrepreneurship at Centennial College. This year's theme "Innovating with Impact" reflected the enthusiasm and commitment of our dedicated staff, faculty, and student innovators to advance sustainable, impactful innovation, demonstrated by the speakers, panels and interactive activities throughout the day.

We kicked off the day with opening remarks by Dr. Glen Lowry, Associate Vice-President, Applied Research, HyFlex Learning and Academic Partnership, who introduced innovation as a poetics of transformative practice. Jonathan Hack, Dean, Centennial Innovates, Applied Research, Innovation and Entrepreneurship then highlighted key achievements throughout the year.

'Centennial Innovates in transportation': Dr. Wenzi Ckurshumova led this segment where Alan McClelland, Dean of the School of Transportation, discussed the shift toward electric, smart vehicles, while Naina Dewan, Manager of New Technology and Innovation at TTC shared the TTC's efforts to design the "bus of the future" to improve safety and rider experience. SETAS Professor Tekleab Schewai and his student researcher also presented their work on creating 3D animations for blind spot detection on buses.



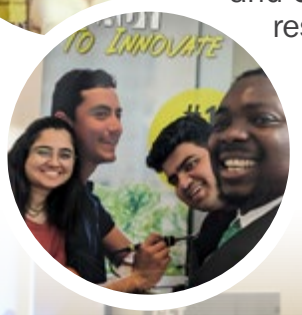
'Centennial Innovates in data analytics': The Centre for Explainable Data Analytics (CEDA) invited their industry partners to showcase their collaborations, including Kulture Rebellion's probiotic drinks powered by an AI-enabled data model, Dolce & Gourmando's cost-effective inventory management solution, and Team Kartik's efforts to use data analytics to streamline operations.

‘Centennial Innovates in Impact entrepreneurship’: Learning and development specialist Tawny Stephen delivered an engaging AI demo, presenting its potential across various domains, from text-to-image to video translation. The Centre of Innovation and Entrepreneurship (COIE), led by Lalit Guglani, then hosted an interactive AI-facilitated micro-jam where attendees brainstormed problems, opportunities and solutions to improve students’ career readiness upon graduation.

‘Centennial Innovates in aerospace’: Dr. Eric Blaise led a panel with Rosa Gordon, Research and Technology Program Officer at Bombardier, SETAS Professor Florin Nijloveanu, and student researchers Aryan Emami, Alistair Kwai, Darya Mohammadi and Adam Carneiro, discussing a project with Bombardier to develop retractable landing gear for their Ecojet. This panel was followed by a conversation with SETAS professor Wladimir Figueiredo about landing gear applied research and innovation.

‘Centennial Innovates in digital health technologies’: The spotlight was shone on WIMTACH’s success, whose partners had the opportunity to showcase their collaboration results — including Workforce Wellness’s personalized AI-assistant supporting frontline healthcare professionals; Wellwave’s digital therapeutics supporting depression treatment and cognitive function; and Fibra Inc’s patented real-time, non-invasive health monitoring technology for women via fabric-based sensors. Dr. Purnima Tyagi then moderated a panel discussion focused on fabric-based tealthcare technologies with Azadeh Yadollahi, Director at FIBER, University Health Network (UHN) and Senior Scientist at KITE; Marisol Campos Navarrete, Scientific Associate Research at KITE UHN; and Anthony Palma, Director, Partnerships and Strategic Initiatives at KITE.

‘Centennial Innovates through our brilliant faculty’: Dr. Matthew Stein, Chair, Research and Innovation Engagement shared about our Applied Research and Innovation Fellowship (ARIF) program and its record-breaking year before inviting School of Hospitality, Tourism and Culinary Arts (SHTCA) Professor Julia Segal to discuss her research on preparing hospitality graduates for industry needs.



‘Centennial Innovates through our partnerships’: The day wrapped up with a fireside chat between Dr. Glen Lowry and Chas Bains, Team Lead Manager at the Centre for Local Innovation and Collaboration (CLIC), discussing the role of strong innovation partnerships in driving change.

Read more about the Symposium

WE ARE PROUD OF OUR STUDENTS.

At Centennial College, innovation starts with our students. Every new design, every prototype, every applied research project, every entreprenuerial pitch is powered by their curiosity, creativity, and commitment to innovating for a better world.

Whether they are collaborating with industry partners, collecting data in cutting-edge labs, or tackling global challenges through our SDG design jams, our students bring their innovation into their work—diverse in background, united in purpose. We are proud of the bold ideas they champion, the communities they uplift, and the future they are actively shaping through our applied research and entrepreneurship activity.

Centennial Innovates through our students!

GET READY *For Anything*

Our student innovators are supported by a dedicated team.

A team effort is vital for applied research, innovation and entrepreneurship. Without enthusiastic students, collaborative industry partners, committed teammates, concerted leadership and supportive funding bodies, we could not deliver the impact we have today. We extend our sincere gratitude to all staff, faculty, chairs, and deans who consistently provide their expertise and support.

Administrative team

Jonathan Hack	Dean, Centennial Innovates, Applied Research, Innovation and Entrepreneurship
Bonnie Chung	Administrative Coordinator
Joanne Pan	Manager, Finance Operations and Risk
Paula Brohm	Financial Officer and Grant Accountant
Ruo Xi (Vicky) Huang	Communications and Marketing Strategist

Applied research team

Dr. Eric Blaise	Director, Applied Research and Innovation (Aerospace and Advanced Manufacturing)
Dr. Purnima Tyagi	Director, WIMTACH and Social Innovation Research
Dr. Wenzi Ckurshumova	Associate Director, Research and Innovation
Jeziel Vidad	Research Manager, WIMTACH
Dr. Sreekumar Pillai	Research Manager, Centre for Explainable Data Analytics
Dr, Omid Mokhtari	Research Manager, Fabric-based Research
Dr. Amanda Wedge	Manager, Social Innovation Research
Andrea Cavalheiro	Project Coordinator, WIMTACH

Tenzin Jinpa	Research & Development Lead (Software)
Ian Lilley	Research & Development Lead (Electronics)
Pooyan Nayyeri	Research & Development Lead (Mechanical Design)
Milad Hoorzad	Project Coordinator, Aerospace
Erika Oliveira	Project Coordinator, Advanced Manufacturing
Javier Corridor	Project Coordinator, Energy, Transportation and SmartTO
Sandra Munoz Ortegon	Project Coordinator, Energy, Transportation and SmartTO
Ava E.A. Afrane	Administrative Assistant, WIMTACH

Entrepreneurship team

Lalit Guglani	Director, Business Innovation and Entrepreneurship
Gabriella Zoltan-Johan	Manager, Startup Programs and Services
Kailimi Li	Entrepreneurship Programs Lead
Sunidhi Naik	Innovation Projects Coordinator
Debbie Deer	Immersive Lab Coordinator
Patrick Robinson	Academic Entrepreneurship Coordinator

Editor, designer and cover photography: Ruo Xi (Vicky) Huang
Designed with guidance and support from Centennial's Marketing and and Creative Services department.
This publication was printed on FSC® certified paper supporting responsible forestry practices


GET
READY
To Innovate
Scan for a
digital copy of
the report!
CONNECT WITH US:
centennialcollege.ca/centennial-innovates
aries@centennialcollege.ca
x.com/CentennialARIES
linkedin.com/company/centennial-innovates
CENTENNIAL
COLLEGE