Volt-Age
CONCORDIA

Midterm Report 2026

SEED TO IMPACT

Research, innovation and the future of electrification

CONCORDIA

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NOTE:

This report contains the most up-to-date information available as of June 2026.

VOLT-AGE AT MIDTERM



TIM EVANS



KARIM ZAGHIB

ON BEHALF OF THE VOLT-AGE EXECUTIVE COMMITTEE

GRAHAM GAGNON
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Research and Innovation
Dalhousie University

WILLIAM GHALI
Vice-President (Research)
University of Calgary

STEVEN LISS
Vice-President, Research and Innovation
Toronto Metropolitan University

MANON TREMBLAY
Senior Director, Indigenous Directions
Concordia University

LISA WHITE
Executive Director, Equity Office
Concordia University

A MESSAGE FROM LEADERSHIP

Canada stands at a pivotal moment in its energy transition. As electricity demand is projected to double by 2050, the challenge before us requires strengthening Canada's capacity to innovate, collaborate and translate research into solutions that support economic competitiveness, energy security and long-term sustainability.

This is precisely why Volt-Age was created at Concordia University.

Supported by the Canada First Research Excellence Fund (CFREF), Volt-Age brings together researchers, students, industry partners, communities and institutions from across the country to develop the technologies, policies and skilled workforce needed to support Canada's transition to an electrified economy. Just as importantly, it demonstrates how universities can work together across regions and disciplines to address a complex challenge whose scale extends beyond any single institution, sector or province.

By combining complementary expertise from Concordia, the University of Calgary, Toronto Metropolitan University and Dalhousie University, Volt-Age is creating new opportunities to accelerate discovery, strengthen research capacity and generate solutions that can be applied broadly. This collaborative model has become one of the program's greatest strengths, enabling researchers to tackle complex challenges through partnerships that bridge disciplines, institutions and communities.

This report reflects Volt-Age's progress achieved to date and the strength of a growing national network united by a shared commitment to advancing sustainable electrification.

Three years in, Volt-Age's vision is delivering results.

Research is advancing across the program, from energy storage and smart grids to sustainable buildings, mobility systems and community resilience. Projects are increasingly moving beyond the laboratory through partnerships with industry, governments, Indigenous communities and other organizations.

Across Canada, Volt-Age researchers are working alongside partners to develop solutions that reflect local priorities and knowledge. This includes collaborations with Indigenous communities that support community-led approaches to energy and infrastructure development.

At the heart of this work are the students, trainees and early-career researchers who will help shape Canada's future. Since the launch of Volt-Age, hundreds of undergraduate and graduate students, postdoctoral fellows and research professionals have joined the program. Through interdisciplinary research, hands-on training and mentorship, they are developing the skills needed to become the next generation of leaders in the energy transition.

As Volt-Age reaches its midpoint, this report reflects the progress achieved to date and the strength of a growing national network united by a shared commitment to advancing sustainable electrification. We are proud of the progress highlighted in these pages and grateful to the researchers, students, partners, staff and collaborators whose contributions have made it possible. We look forward to building on this momentum and continuing to work together toward a more resilient, prosperous and sustainable future for Canada.

TIM EVANS
VICE-PRESIDENT, RESEARCH, INNOVATION AND IMPACT
CONCORDIA UNIVERSITY

KARIM ZAGHIB
CHIEF EXECUTIVE OFFICER
VOLT-AGE, CONCORDIA UNIVERSITY

WHO WE ARE

Volt-Age is a national research initiative based at Concordia University, in partnership with Dalhousie University, Toronto Metropolitan University and the University of Calgary, made possible through the support of the Canada First Research Excellence Fund (CFREF) and the Fonds de recherche du Québec (FRQ).

We develop carbon-neutral solutions in building technology, energy storage, smart grids and electrified transportation. Our work advances affordability, equity, community well-being and economic prosperity, with particular attention to Indigenous communities, while supporting long-term socio-economic benefits across Canada.

Through collaboration across academia, industry and government, Volt-Age accelerates practical solutions for a sustainable, electrified future.



BY THE NUMBERS

53
PROJECTS

12
UNDERGRADUATE STUDENTS

93
MASTER'S STUDENTS

246
PHD STUDENTS

30
POSTDOCTORAL FELLOWS

170+
RESEARCHERS

440+
HIGHLY QUALIFIED PERSONNEL

23
WORLDWIDE ACADEMIC PARTNERS

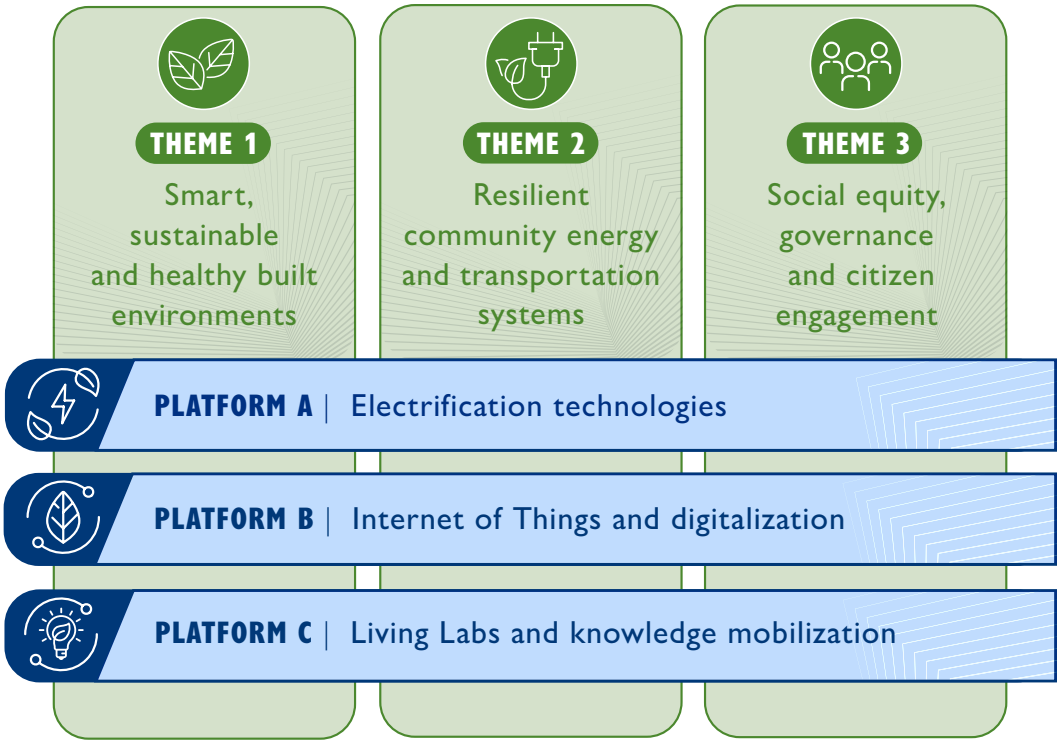
165
NON-ACADEMIC PARTNERS

465
PEER-REVIEWED PUBLICATIONS

26
ENGAGED CITIES, COMMUNITIES AND LOCAL INSTITUTIONS

HOW WE WORK

Volt-Age research is organized around three interconnected themes that form the foundation of the program. Every project is grounded in one of these areas, which together define the core directions of our work. The themes are supported by three cross-cutting platforms that connect and enable research across the program.



THREE INTERCONNECTED THEMES

1. Smart, sustainable and healthy built environments

Advances decarbonization through the design of energy-efficient, sustainable buildings, infrastructure and public spaces, including systems that generate more renewable energy than they consume.

2. Resilient community energy and transportation systems

Develops solutions that strengthen how energy is stored, distributed and used across communities through research in charging infrastructure, energy storage, grid integration and cybersecurity.

3. Social equity, governance and citizen engagement

Focuses on inclusive approaches to the energy transition through governance, planning and engagement that support social equity and encourage participation and knowledge exchange throughout decarbonization.

THREE CROSS-CUTTING PLATFORMS

A. Electrification technologies

Develops and integrates the core technologies that support Volt-Age research across sectors.

B. Internet of Things and digitalization

Builds the digital backbone of Volt-Age, supporting efficient, cybersecure and resilient energy management systems.

C. Living Labs and knowledge mobilization

Connects research with real-world settings through collaborative approaches that engage communities in applied research and knowledge sharing.

OUR GOVERNANCE STRUCTURE

COMMITTEE CHAIRS

TIM EVANS
Executive Committee

NORMAN HÉBERT
Advisory Board

PAMELA MCGOVERN
Audit Committee

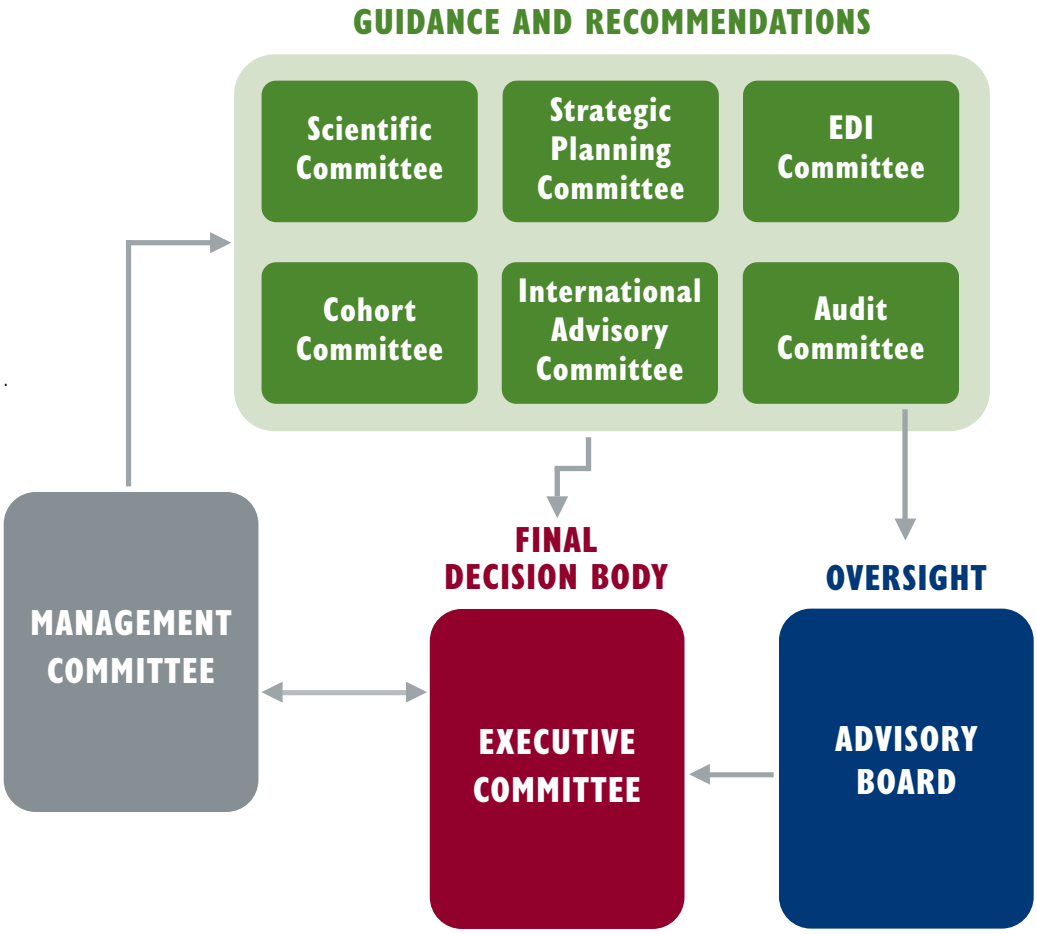
TANJA TAJMEL & KARIM ZAGHIB
EDI Committee

URSULA EICKER
International
Advisory Committee

KARIM ZAGHIB
Management Committee

ANDREAS ATHIENITIS
Scientific Committee

KARIM ZAGHIB
Strategic Planning and
Recommendation Committee



COHORT COMMITTEE LAUNCHES

In May 2026, Volt-Age launched a Cohort Committee to give graduate students and postdoctoral fellows a voice in governance. Comprised of Volt-Age-funded trainees, the committee provides input to leadership, supports communications across leadership groups and strengthens community engagement. Meeting quarterly, its members help ensure trainee perspectives are reflected in decision-making and contribute to a more collaborative and inclusive research culture.

OUR PARTNERS



Volt-Age is built on a structured model of shared responsibility where partnerships are central to its growth and long-term success. Collaboration with industry, public institutions and financial partners determines how ideas move beyond the lab and into impacting the lives of Canadians.

These diverse partnerships strengthen the program in multiple ways, from student training and talent development to innovation capacity, business development and core programming. Collaboration between universities, industry and the non-profit sector continues to deepen, expanding reach and capability. This evolving network of partners is essential to how Volt-Age grows and ensures research translates into meaningful outcomes for society and industry.

NORMAN HÉBERT
CHAIR, VOLT-AGE ADVISORY BOARD

"Through Volt-Age's partnership with Aéroports de Montréal, researchers have worked directly with airport operations teams to address the unique challenge of managing electricity demand in a mission-critical environment where demand can exceed substation capacity during parts of the renewal process. These collaborations have accelerated the development and deployment of solutions that would otherwise have been difficult or much slower to achieve."

JAYSON BURSILL
DATA SCIENTIST, DELTA CONTROLS INC.



"Through this collaboration, Volt-Age researchers have helped evaluate emerging clean technologies and strengthen the pathway from research to implementation. The quality of the exchanges accelerate innovation with tangible impact."

AMIRA IGOUZOUL
PROJECT MANAGER, CLEAN TECHNOLOGIES CONSORTIUM, LAB-TO-STARTUP PROGRAM AT 2 DEGRÉS

"This partnership is built on trust, shared objectives and practical collaboration. By connecting research expertise with operational realities, it enables Calgary Housing to scale data-informed solutions that enhance the supply and quality of affordable housing for Calgarians."

CINDY STEGMEIER
ACTING VICE-PRESIDENT, ASSET MANAGEMENT AND DEVELOPMENT, CALGARY HOUSING

"The collaboration with Concordia's Community Energy Solutions project has helped us better understand, model and validate energy and resilience strategies for our Saint-Jérôme residential development. By strengthening decision-making around building performance, energy efficiency and long-term resilience, the work supports our ambition to deliver high-performing, low-carbon communities."

CHLOÉ SOUCY
VICE-PRESIDENT, GI QUO VADIS

"My experience with the Concordia team has been consistently positive, and it has been rewarding to see how the Volt-Age program supports applied research. The digital twin models and decision-support tools developed through this collaboration are helping optimize buildings and infrastructure while informing smarter planning at the neighbourhood scale."

SEUNGYEON HONG
SUSTAINABILITY ENGINEER, ENERGY AND CIVIL, S2E TECHNOLOGIES INC.



OUR STUDENTS

At the heart of Volt-Age is a growing community of **381 students** and postdoctoral fellows working across disciplines towards Canada's electrification challenge.



246
PHD
STUDENTS

93
MASTER'S
STUDENTS

30
POSTDOCTORAL
FELLOWS

12
UNDERGRADUATE
STUDENTS

Together, they represent
29 **countries**, spanning
24 **academic departments**,
4 **faculties**, and
13 **institutions.**



Ana Victoria Palma Florido

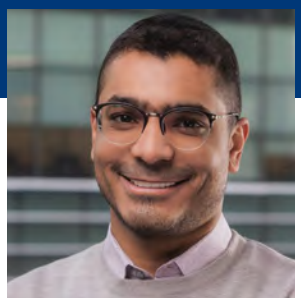
PhD candidate, Building Engineering

GINA CODY SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

Ana is helping make airport terminals more energy efficient without compromising passenger comfort. Through Volt-Age's *Occupant-Centric Building Decarbonization* project, she studies how heating, cooling and ventilation systems affect travellers in complex environments like airports. Her research explores how factors such as travel stress, cultural differences and passenger behaviour influence comfort, helping building operators reduce energy consumption while creating better indoor environments.

As an out-of-province student, Ana says one of Volt-Age's most valuable benefits for students has been the access to French-language training, which has helped her feel more confident navigating daily life in Montreal.

"Learning French was something I really wanted to do when I moved to Quebec, but between graduate studies and the cost of additional courses, it was difficult to make it a priority. The French classes offered through Volt-Age have made a huge difference. Since they're integrated into the program and free, I've been able to build my confidence, better understand the language and have conversations I couldn't have had before. It has helped me feel more at home in Quebec while pursuing my studies."



Ahmed Nouby Mohamed Hassan

PhD candidate, Building, Civil and Environmental Engineering

GINA CODY SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

Ahmed is developing tools that help city planners and developers make smarter decisions about sustainable and resilient buildings and neighbourhoods. Supported through Volt-Age's *Smart Solar Community Living Lab* seed project, his research combines probabilistic simulations and network theory to evaluate how infrastructure like heat pumps, solar panels and smart building systems contribute to resilience objectives and balance potential trade-offs. The goal is to help stakeholders prioritize investments and accelerate the design of more resilient, energy-efficient communities.

Through his PhD work, Ahmed is applying this knowledge to affordable, energy-efficient housing projects that integrate renewable energy systems.

"Volt-Age connected me with researchers, students and municipal partners from different disciplines, helping me develop a more integrated perspective on resilience challenges and learn how to present my research to decision-makers. The program also funded the project that laid the foundation for the work I'm continuing in my PhD."



Suleiman Ahmed

PhD candidate, Civil Engineering

GINA CODY SCHOOL OF ENGINEERING
AND COMPUTER SCIENCE

Suleiman is studying how climate change affects frozen soils and the infrastructure built on them. His work focuses on modelling coupled thermo-hydro-mechanical (THM) processes in permafrost systems, using advanced simulations to examine how environmental changes affect the safety and performance of northern infrastructure.

As part of Volt-Age's climate-resilient urban microclimates project, his research aims to help communities adapt to a changing climate while improving the resilience and sustainability of critical systems. The findings will also help inform future policies, planning decisions and climate adaptation for communities across Canada.

"Volt-Age funding has been instrumental for me. It has allowed me to focus fully on my research, participate in workshops and conferences, collaborate with researchers and pursue high-quality work without financial constraints. It's also a recognition of my work and a strong motivation to continue striving for excellence in research."



Maryam Mahmoudi Kouhi

PhD candidate, Chemical Engineering

GINA CODY SCHOOL OF ENGINEERING
AND COMPUTER SCIENCE

Maryam is exploring a new frontier in battery research and is part of one of the first teams in the world to do so. Working with Prof. Michel Trudeau in Chemical Engineering, her research focuses on hybrid-ion batteries, an emerging technology with the potential to impact the future of energy storage.

Since arriving in Montreal as an international student, Maryam says Volt-Age has provided valuable opportunities to develop both her research skills and her connection to the community. Through French-language training, workshops and networking opportunities, she has gained confidence communicating her ideas, collaborating across disciplines and building connections beyond academia.

"Volt-Age has everything a graduate student needs. Their workshops changed my perspective on skills like communication, networking, teamwork and presenting research to people from different fields. I hope to help strengthen connections between students and industry so that we can better understand what employers need and prepare for our future careers."

OUR RESEARCH: FROM SEED TO IMPACT

Volt-Age projects range from early exploration to large-scale application, ensuring promising ideas are supported, tested and expanded where they show the greatest potential.

Seed Projects advance early-stage research, helping teams explore new approaches and vaildate emerging ideas.

Impact Projects drive large-scale technological innovation advancing promising solutions toward broader, system-level application.



THE CURATION PROCESS

The transition from Seed to Impact was guided through a curation process that aligned scientific excellence with collaboration and real-world relevance.

To inform the development of the Impact funding round, Volt-Age engaged researchers, students, Indigenous partners and institutional collaborators through a series of consultations. This included **16 engagement sessions** involving approximately **200 participants**. Through workshops, webinars, hybrid discussions and meetups, participants provided feedback that helped identify research priorities, collaboration opportunities and pathways to impact.

These insights, combined with lessons learned from the Seed Projects, informed the structure of the Impact funding round and helped ensure that Volt-Age projects evolved in a coordinated and responsive manner.

Spotlighting Indigenous clean energy leadership



Aphrodite Salas

ASSOCIATE PROFESSOR, DEPARTMENT OF JOURNALISM, CONCORDIA UNIVERSITY

Aphrodite Salas is documenting the energy transition in northern and Indigenous communities through journalism grounded in collaboration and reciprocity. Her documentary ᑯᒼᒃ ᑯᓕᑐᖅ *The Flowing River* follows Inukjuak's hydroelectric project as it transitions from diesel-dependent power toward nearly 100 per cent renewable energy, centring Indigenous voices and perspectives in line with Truth and Reconciliation Commission's Call to Action 86.

Her work emphasizes relationship-building and co-creation with communities, extending into student training through multimedia storytelling collaborations. The documentary premiered at Volt-Age's Electrify Society Summit and received the Broadcast Education Association Short-Form Documentary Award of Excellence.

"For me, the most meaningful part is the process — building relationships, practicing reciprocity, listening and co-creating work that matters to the communities."



PHOTO: LINA FORERO

RESEARCH SPOTLIGHTS
SEED PROJECTS

COMMUNITY VOICES

"It's respect, mutual respect that happens. If we don't respect each other this would never happen. We need that relationship. And for us to spend time with each other, eat together, celebrate together — that's what we need, human-to-human interaction."

– Sarah-Lisa Kasudluak, VICE PRESIDENT, PITUVIK LANDHOLDING CORPORATION

"We were among the few on the frontlines who put ourselves on the line, not for personal gain, but to keep the project alive, support our community and fight against climate change – trusting our partners and each other to create a lasting impact for future generations."

– Tommy Palliser, EXECUTIVE DIRECTOR, NUNAVIK MARINE REGION WILDLIFE BOARD

STUDENT TESTIMONIAL

"Collaborating with Prof. Salas, along with our partners and friends in Inukjuak, allowed me to see Indigenous storytelling through an entirely new lens, bringing me back to the fundamentals of meaningful storytelling and true partnership grounded in reciprocity and trust-building."

– Lina Forero, MA STUDENT, DIGITAL INNOVATION IN JOURNALISM STUDIES



PHOTO: APHRODITE SALAS

Modelling a sustainable, solar-powered 15-minute city



Caroline Hachem-Vermette

ASSOCIATE PROFESSOR, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING, CONCORDIA UNIVERSITY

Caroline Hachem-Vermette is adapting the 15-minute city concept for North American contexts, designing neighbourhoods that integrate energy, food and mobility systems within walkable urban networks. Her research aims to reduce emissions while improving livability and community connection.

Her framework combines land use, transportation and energy modelling to create interconnected neighbourhood clusters that share resources and infrastructure.

"We want to design interconnected neighbourhood clusters that share food, energy and amenities, creating a balanced, adaptive urban network."



STUDENT TESTIMONIAL

"The goal was always to make this a relatively simple and transparent model, because when you are implementing mixed-use neighbourhoods, community members are important participants."

– Faisal Kabir, MSC STUDENT, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING

Making technology more reliable

Atefeh Mashatan

ASSOCIATE PROFESSOR, INFORMATION TECHNOLOGY MANAGEMENT, TORONTO METROPOLITAN UNIVERSITY



Atefeh Mashatan studies the security of connected technologies in homes, buildings and energy systems, focusing on the challenges of protecting Internet of Things devices used by everyday consumers.

Her research applies a zero-trust model to consumer environments, continuously verifying devices and users while adapting to real-world constraints such as limited computing power and diverse user needs.

"The challenge isn't just designing strong security. It's designing security that works in environments where devices are constrained and users aren't experts."



Building batteries that can be reused at scale

Mark Obrovac

PROFESSOR, DEPARTMENT OF CHEMISTRY,
DALHOUSIE UNIVERSITY



Mark Obrovac studies battery materials with a focus on manufacturability and recyclability at scale. His work addresses a key challenge in electrification: ensuring materials can be reliably produced, reused and recovered.

His research includes battery recycling pathways and collaboration on sodium-ion battery development, linking lab-scale discoveries with industrial production processes.

"If you're developing a process in the lab, it has to make sense in the real world."



PHOTO: LINA FORERO

Advancing sodium-ion batteries for scalable renewable energy storage



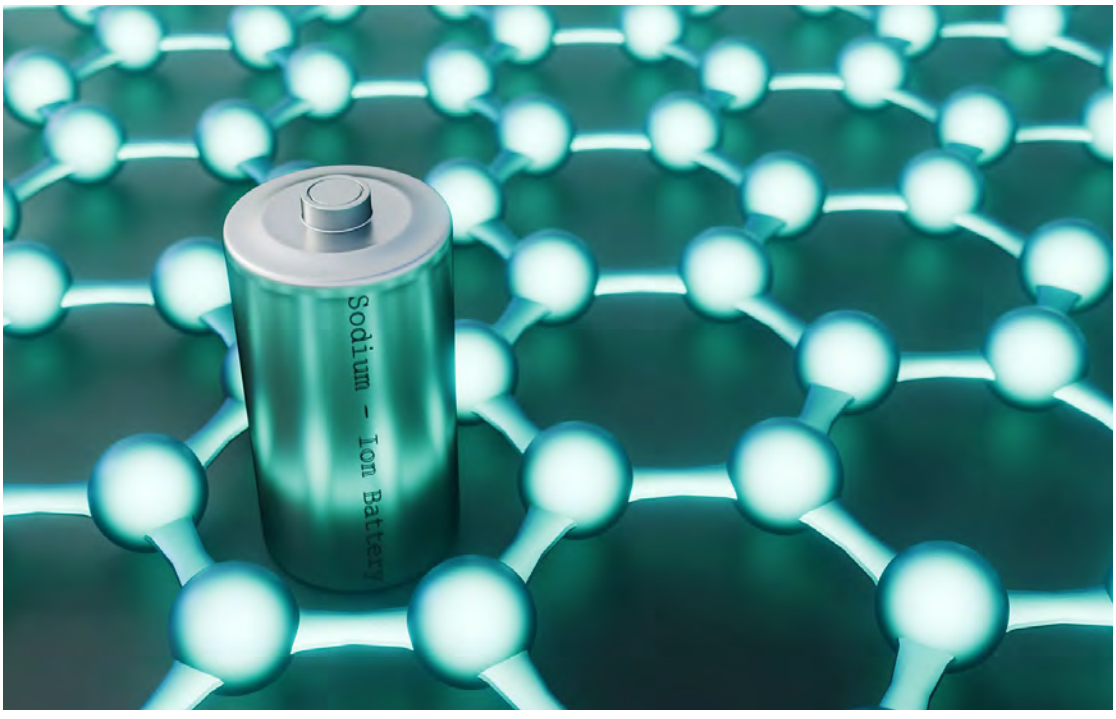
Jeff Dahn

PROFESSOR, DEPARTMENT OF PHYSICS AND ATMOSPHERIC SCIENCE, DALHOUSIE UNIVERSITY

Jeff Dahn is leading a collaborative project to advance sodium-ion battery technologies as a more sustainable and cost-effective complement to lithium-ion batteries. Working with industry partners, the team is focused on developing energy storage systems for stationary applications such as residential storage, off-grid communities and zero-emission buildings.

As sodium is more abundant and less expensive than lithium, it's a promising option for large-scale renewable energy storage. The researchers are working to improve battery performance, durability and lifetime while addressing broader challenges related to energy security, supply chains and the transition to renewable energy systems.

"Sodium-ion cells have come a long way and have an incredibly long lifetime, that can last many, many decades."



Tackling food insecurity with rooftop greenhouses

Bruno Lee

ASSOCIATE PROFESSOR, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING, CONCORDIA UNIVERSITY

Luis D. Virla

ASSISTANT PROFESSOR, SUSTAINABLE SYSTEMS ENGINEERING, UNIVERSITY OF CALGARY





Bruno Lee and Luis Virla, in collaboration with six other co-principal investigators, are advancing building-integrated rooftop greenhouses that improve energy efficiency while strengthening food security. Their Impact Project, *Closing the Water–Energy–Food Loop*, explores aquaponic greenhouse systems that use fish waste to fertilize plants, creating more sustainable and efficient food production.

The team is developing models that allow greenhouses and buildings to exchange heat and carbon dioxide, reducing energy use while supporting plant growth. The project also draws on expertise in community engagement and Indigenous-led low-carbon monitoring systems, helping integrate local knowledge and sustainable practices into greenhouse design through the *Creeburn Lake Lodge Living Lab*.

"Our goal is to understand how to incorporate greenhouses into buildings in a way that benefits both people and the environment."
– Bruno Lee



Powering communities with electric vehicles

Pragasen Pillay

PROFESSOR, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, CONCORDIA UNIVERSITY



Pragasen Pillay is exploring how electric and hybrid vehicles can act as mobile energy sources, strengthening community resilience during outages while supporting renewable energy integration. His Impact Project examines how vehicles can connect with microgrids and local energy systems in both urban and remote contexts.

His team tests electric and hybrid vehicles alongside solar energy and heat pumps to improve battery performance and extend range in cold climates, with applications ranging from Montreal's Pointe-Saint-Charles to northern Indigenous communities such as Inukjuak.

"Electric and hybrid-electric vehicles are more than transportation. They can store energy and supply power when it's needed most."



Turning buildings into active energy systems

Andreas Athienitis

PROFESSOR, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING, CONCORDIA UNIVERSITY



Andreas Athienitis is rethinking buildings as active components of Canada's energy system, capable of generating, storing and managing power. His project integrates solar energy, thermal storage, batteries and smart controls into coordinated systems that support a low-carbon and resilient grid.

The project uses digital twins to simulate performance before deployment and builds on zero-energy building research through real-world testbeds, including solar-integrated façades and the Varennes Library. It also extends to neighbourhood-scale systems through collaboration with researchers working on urban energy modelling and digital twins.

"We are trying to shift how buildings are designed and operated so they can actively support a low-carbon grid while remaining resilient to extreme weather events."



Designing smarter, low-carbon community energy systems

Ursula Eicker
PROFESSOR, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING, CONCORDIA UNIVERSITY

Jenn McArthur
PROFESSOR, DEPARTMENT OF ARCHITECTURAL SCIENCE, TORONTO METROPOLITAN UNIVERSITY





Ursula Eicker and Jenn McArthur, along with five other co-principal investigators, are developing digital twin-based planning tools to help cities design low-carbon, financially viable neighbourhood energy systems. Their Impact Project supports municipalities, utilities and developers in building zero-emission energy networks tailored to local contexts.

The research is tested across case studies in Canada and internationally, exploring combinations of building retrofits, district energy systems, mobility and renewable integration. It connects neighbourhood planning with building-scale decarbonization through collaboration with researchers in urban systems and digital modelling.

"We look at different types of communities and contexts and identify how tailored local solutions can be designed and implemented in practice." – Ursula Eicker



Making smart systems more secure

Lorenzo De Carli

ASSOCIATE PROFESSOR, DEPARTMENT OF ELECTRICAL AND SOFTWARE ENGINEERING, UNIVERSITY OF CALGARY



Lorenzo De Carli studies how people interact with connected technologies in buildings and urban energy systems, focusing on privacy, security and real-world usability. His research examines how smart infrastructure behaves outside controlled environments.

His project addresses cybersecurity challenges in smart city systems, including sensors and meters that must remain reliable over time. It emphasizes the importance of designing security systems that account for human behaviour, system operators and operational constraints.

"Security decisions don't happen in isolation. They depend on how systems are used, who manages them and how people respond to them."

Financing the energy transition

Thomas Walker

PROFESSOR, DEPARTMENT OF FINANCE, JOHN MOLSON SCHOOL OF BUSINESS, CONCORDIA UNIVERSITY



Thomas Walker examines how financial systems shape the pace and scale of electrification projects. His research highlights how investment models often struggle to support technologies with long-term horizons and higher upfront costs.

His work, including his new book *Wiring the Future*, brings together finance, policy and engineering perspectives to understand how capital flows influence the energy transition.

"Electrification projects often require large upfront investments and longer timelines to deliver returns."

Powering the next generation of batteries

Xia Li
ASSOCIATE PROFESSOR, DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING, CONCORDIA UNIVERSITY

Sixu Deng
ASSISTANT PROFESSOR, DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING, CONCORDIA UNIVERSITY





Xia Li and Sixu Deng are developing ultra-high-energy-density, fast-charging lithium batteries to support electrification across transportation and buildings. Their project, led by Karim Zaghib, focuses on improving both performance and sustainability of next-generation energy storage systems.

At Concordia's Collaborative Centres on Energy and its Transition, they lead a team of over 20 students working with industry and government partners to test new materials and battery designs.

"Our goal is to advance this technology in a way that benefits people and society." – Sixu Deng



PHOTO: RODOLPHE BEAULIEU | PRODUCTION: LE QUARTIER

WHAT IS A LIVING LAB?

Living Labs are real-world research environments where projects are developed and tested in everyday settings rather than in isolation from them.

They bring researchers and partners together to define problems, develop solutions and work through challenges collaboratively. Living Labs aim to ensure research outcomes are practical, relevant and usable in the communities where they are applied.

Optimizing airports as smart, energy-efficient buildings

Mohamed Ouf



ASSOCIATE PROFESSOR, DEPARTMENT OF BUILDING, CIVIL AND ENVIRONMENTAL ENGINEERING, CONCORDIA UNIVERSITY

Mohamed Ouf is leading a project in collaboration with YUL Montréal-Trudeau International Airport that uses the airport as a Living Lab for energy-efficient building design. The research focuses on reducing electricity use for heating, cooling, lighting and ventilation while maintaining passenger comfort in a high-traffic transport hub.

Airports experience highly variable occupancy and energy demand. Ouf's team is studying real-time energy use and passenger behaviour to better understand how buildings can adapt to changing conditions using sensors, data analytics and adaptive control systems that adjust operations in real time and refine comfort strategies through operational feedback.

"Airports combine lighting, heating, ventilation and air conditioning with constantly shifting occupancy. That makes them ideal for studying how buildings can operate smarter."




Stantec
TFIVE

Advancing campus decarbonization through a Living Lab model



Damon Matthews

PROFESSOR, DEPARTMENT OF GEOGRAPHY, PLANNING AND ENVIRONMENT, CONCORDIA UNIVERSITY

Concordia's campus is becoming a real-world testing ground for electrification and climate action. Damon Matthews leads an initiative that brings together researchers, students, administrators and campus organizations to co-develop solutions tied directly to the university's sustainability goals.

The initiative supports student-led research spanning internal carbon pricing, electrification governance, climate adaptation and resilience, lifecycle emissions assessment, sustainable food systems, immersive media engagement and the integration of Indigenous perspectives into sustainability planning.

"Our Living Lab makes use of the expertise that exists across the Concordia community to support impactful research projects that will advance progress towards our university's sustainability targets."



ADVANCING INTELLECTUAL PROPERTY AND COMMERCIALIZATION

Volt-Age works with researchers to identify, protect and commercialize innovations emerging from its funded projects. We support intellectual property (IP) activities including patents, copyrights, trademarks and guide researchers through licensing, industry partnerships and startup creation.

Through workshops, consultations and tailored resources, researchers are supported in best practices related to inventorship, confidentiality and publication. By integrating IP management with commercialization support, Volt-Age helps ensure research outcomes can generate both societal and economic impact.

RESEARCH PROTECTION AND DEVELOPMENTS

To date, **Volt-Age has captured 47 research ideas** across funded projects using an internal classification framework, including:

Nine at the idea-sharing stage
Seven at the idea-revision stage
Two at the external evaluation stage
Two patents filed with inventors at Concordia and Dalhousie University

"My patent represents an important step in translating research into industrial applications. It has allowed our work to be recognized not only through publication, but also through the protection of the innovation itself."
– Ahmad Darabi, PhD Candidate, Electrical and Computer Engineering

OUTREACH AND IP AWARENESS

Volt-Age has conducted
130 consultations with
91 researchers.

Outreach initiatives include in-person consultations and workshops focused on researcher concerns and practical guides on confidentiality, IP filing timelines and copyright. The team has also developed a structured, researcher-focused process to support the protection and translation of new innovations.

WORKSHOPS

Stakeholder engagement: communicating for alignment, trust and impact

Participants practiced strategies for effective stakeholder communication, building trust, aligning expectations and navigating multidisciplinary collaborations.

Introduction to intellectual property

The session introduced core concepts in patents, copyrights, trademarks and trade secrets, while exploring strategies for protecting and sharing research and innovation.

"This workshop was essential for students in mechanical engineering, where many group projects could eventually be developed further. I learned more about how to protect my current and future inventions."
– Immanuel Ticha Muluh, MSc student, Department of Mechanical Engineering



EQUITY, DIVERSITY AND INCLUSION IN ACTION

Equity, diversity and inclusion (EDI) principles are embedded across Volt-Age's research, governance and partnerships to help ensure the benefits of electrification are shared across communities, with particular attention to equity-seeking groups.

We work to address systemic barriers in science, technology, engineering and mathematics (STEM) and the energy transition, including gender inequities, accessibility gaps, limited Indigenous representation and broader financial and policy barriers, helping support a more inclusive and equitable sector.

Since September 2025, Volt-Age has delivered 29 EDI training and consultation sessions to strengthen knowledge-sharing and support implementation across the network.



FOUR PILLARS OF VOLT-AGE'S EDI ACTION PLAN

1. Governance and administration

Diversity and inclusion are integrated into decision-making, funding and program oversight through representative governance structures, climate surveys and guidance from a dedicated EDI Committee and staff.

2. Research and innovation

All projects are expected to integrate EDI principles into research design, collaboration and knowledge sharing, including partnerships guided by the Volt-Age Reciprocity Agreement with Indigenous communities.

3. Capacity-building

We offer training and learning opportunities for researchers, students, partners and administrators to strengthen EDI knowledge and practices across the program.

4. Research on EDI

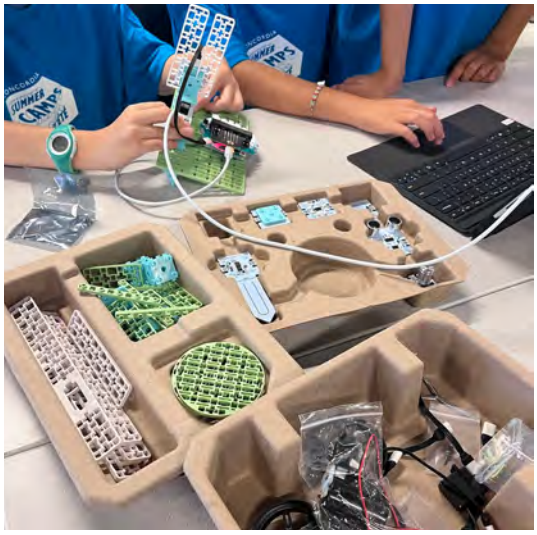
Volt-Age tracks participation and outcomes while supporting research on how EDI principles are applied in electrification and energy transition initiatives across Canada.

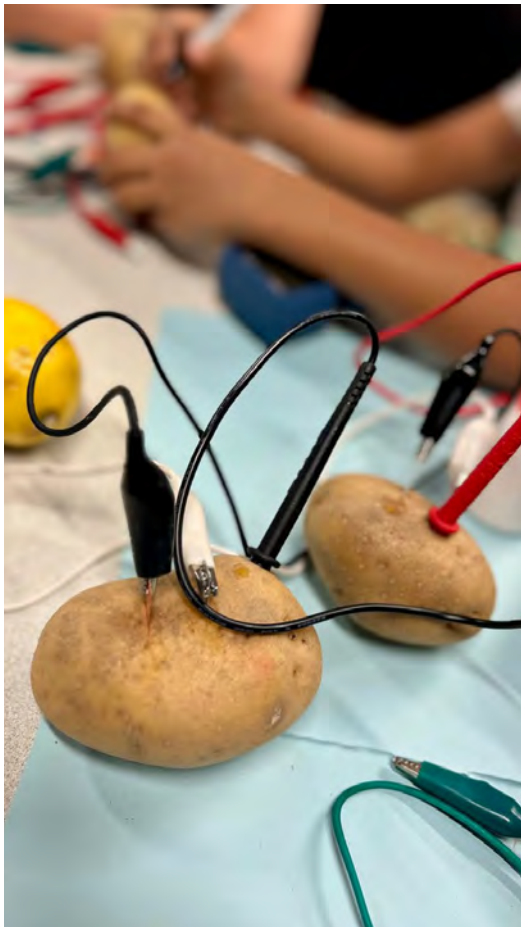
EDI INITIATIVES

Milli-Volt

Milli-Volt is a summer camp that expands access to STEM learning for children from underserved communities. Working with community partners, the program provides bursaries for families facing financial barriers and tailored support for children with diverse needs, including autism and ADHD.

The camp offers six age-specific sessions for children aged five to 12, combining hands-on learning in science and sustainability within a safe and inclusive environment to expand Volt-Age's educational reach.





Just Energy Transition certificate

Volt-Age, in collaboration with Concordia's Equity Office, is developing an online Just Energy Transition certificate that introduces researchers, trainees and professionals to practical tools for integrating EDI into electrification work.

The course will cover Gender-Based Analysis Plus (GBA+), EDI in technology and community co-creation. It will be offered in English and French and includes a certificate upon completion.

IP + EDI

Volt-Age integrates EDI into its approach to IP. A GBA+ lens is applied through training and ongoing discussion to support more equitable decision-making across IP-related processes.

We also work to broaden access to innovation through workshops, mentorship and open learning opportunities that help reduce barriers to patenting and commercialization. GBA+ is further integrated into commercialization strategies to support equitable access to funding, IP protection and startup pathways.

Indigenous outreach

Volt-Age is strengthening relationships with Indigenous communities through a dedicated Indigenous Outreach and Engagement role, working closely with Concordia's Indigenous Directions Office and community partners.

The initiative focuses on building connections with Indigenous youth through mentorship, experiential learning and engagement with research environments. It supports early pathways into university and research spaces while helping nurture the next generation of Indigenous scholars and leaders in sustainable technologies and the energy transition.



TRAINING THE NEXT GENERATION OF ENERGY INNOVATORS

Volt-Age prepares graduate researchers with the skills and experience they need to succeed in academia and beyond.

Through workshops, exploration sessions and applied activities, trainees build strong foundations in research design, data management, teaching and grant writing. They also gain practical experience in areas that extend beyond traditional academic training, including stakeholder engagement, science communication, knowledge translation and commercialization.

Career development is embedded throughout Volt-Age's training program, supported through goal-setting sessions, networking opportunities and hands-on learning via internships and project-based work.

POWER UP YOUR FRENCH

Developed with Concordia's Succeeding in French Office, trainees and staff build the language skills needed to work and study in Quebec's electrification sector.

The program combines small-group language instruction with workshops focused on public speaking, professional vocabulary and workplace readiness for students and researchers working in electrification and the energy transition. As of June 2026, 168 students and staff are registered, with the beginner-level cohort already full.

"It's very helpful for living in Montreal, where French is the main language, and it's also essential for entering the job market after graduation."
– Athena Karami Fardian, PhD candidate, Building, Civil and Environmental Engineering





WORKSHOPS
BY THE NUMBERS

19

WORKSHOPS DELIVERED

including two orientation sessions

327

TOTAL PARTICIPANTS

WORKSHOP HIGHLIGHTS



Goal-setting

Participants learned practical strategies for turning long-term academic and career ambitions into achievable milestones, while developing tools to track progress and stay focused on their goals.

"This workshop was a must-attend. The facilitators' expertise ensured that participants left with clear, relevant and immediately applicable insights." – Anonymous, PhD candidate, Department of Building Engineering

Indigenous perspectives

Participants explored historical and contemporary issues affecting Indigenous peoples, including laws, policies and demographics, as well as cultural, social and economic realities.

Blanket exercise

Through guided activities led by partners at Santele's Healing Circles, participants engaged with truths connected to reconciliation, fostering reflection, understanding and empathy.

Design your career journey

Graduate students explored career pathways, set achievable goals and developed personalized roadmaps connecting their research, skills and professional ambitions.

Foundations of science communication

Participants learned strategies for translating complex research into accessible, engaging stories for broader audiences, strengthening public engagement and communication beyond academia.

"This workshop was valuable both personally and professionally, particularly in learning how to communicate research to stakeholders. It helped me frame my work as a clear business case rather than in purely scientific terms." – Carmen Sweetoo, MSc student, Department of Management

Pathways to research impact

Participants explored how research can create tangible societal impact and how impact is measured beyond traditional academic publications.

"What I took from this workshop is the importance of always mapping your stakeholders — knowing who is at the core of what you are doing and why it matters to them." – Phiona Nabukenya Bukulu, PhD candidate, Individualized Program, Centre for Engineering in Society

Co-creation sessions on engaging with municipalities and communities

Participants heard from researchers and fellow Volt-Age students about collaborating with municipalities and communities, before taking part in group activities to co-design solutions to energy transition challenges.

"What stood out to me is the vital link between academia and municipalities — two worlds that need to come together. Hearing from researchers and practitioners working on real projects was inspiring and grounding." – Baraa' Abdelbari, MSc student, Department of Chemical Engineering



KNOWLEDGE MOBILIZATION: SHARING RESEARCH SHAPING CONVERSATIONS

Volt-Age helps bring research beyond the university through media coverage, public events, policy contributions and collaborative projects. From national news stories to municipal climate planning tools, these activities connect research with communities, decision-makers and industry partners working toward a low-carbon future.

IN THE MEDIA

Volt-Age researchers and students contribute expert commentary, interviews, op-eds and research insights to media outlets and science publications in Canada and internationally, helping inform public conversations on electrification, energy transition and innovation.

54
Volt-Age authors and experts featured

115
Media stories and features

34
Canadian and international outlets reached

RESEARCH IN ACTION

Roadmap to resilient, ultra-low-energy buildings

Led by Andreas Athienitis through the Canadian Academy of Engineering, this national roadmap outlines strategies for designing net-zero and resilient buildings across Canada. The report explores renewable energy integration, energy storage, smart grids and retrofit strategies while helping inform policy, building standards and community energy planning.

Canadian Municipal Climate Action Inventory

Led by Adriane MacDonald through Concordia's Carbon Governance Living Lab, this initiative analyzes 104 municipal climate plans from across Canada. The inventory identifies more than 1,200 building-related climate actions and provides municipalities with evidence and tools to support building decarbonization and urban climate planning.

Comparative Analysis of the Experience and Morphology of Collective Transport Systems and their Cities Atlas

Developed by Pierre Gauthier in collaboration with the Agence régionale de transport métropolitain, the CAMMM Atlas is a web-based tool that examines how public transit systems, city design and services interact. The project supports sustainable mobility planning and urban decarbonization through mapping and comparative analysis.

Projected Futures X Volt-Age

This graduate summer school, led by Concordia's Department of Journalism, invites students from diverse disciplines to explore new approaches to science communication and storytelling. The program combines evidence-based journalism with experimental, project-based learning and concludes with a public Science Journalism Summit.



Supporting building decarbonization policy in Quebec

Volt-Age researchers contributed an expert submission to the Quebec government's consultation on building environmental performance. The report provided research-informed recommendations on energy use, lifecycle costing, peak demand management and building regulations to help accelerate decarbonization across the built environment.

BRINGING PEOPLE TOGETHER

Annual Conference

On March 21, 2025, the Volt-Age Annual Conference brought together **200** students, researchers, industry leaders, government representatives and community partners to share research from Volt-Age Seed Projects. Presentations explored energy storage, electrification, sustainable retrofits and Indigenous energy initiatives, alongside panel discussions on decarbonization and net-zero buildings.







Electrify Society Summit

Held May 5–6, 2026, the Volt-Age Summit welcomed **250** participants from academia, industry, government and community organizations for two days of discussion on electrification and clean energy transitions. Sessions explored grid transformation, energy financing, transportation electrification and emerging research challenges.

The Summit also featured an arts and electrification exhibition developed in collaboration with Concordia's Faculty of Fine Arts, showcasing installations, photography, performance and interactive works exploring energy, sustainability and social change.





LEADING THROUGH EXCELLENCE

Researchers and students across Volt-Age are earning national and international recognition for leadership, innovation and research excellence, reflecting the program's growing influence in electrification, sustainability and community-driven energy solutions.

SELECTED AWARDS AND DISTINCTIONS

Andreas Athienitis
Distinguished Achievement Award – International Building Performance Simulation Association (IBPSA) (2025)

Anne-Marie Croteau
Recipient of the King Charles III Coronation Medal – Governor General of Canada (2025)

Jeff Dahn
Energy Transition Award – Eni (2025)

Dominic Groulx
Fellow of ASME – American Society of Mechanical Engineers (2024–2025)

Xia Li
Royal Society of Canada honouree – Royal Society of Canada (2025)

Global Chemical Engineering Award for Outstanding Female Scientist – Global Chinese Chemical Engineers Symposium (GCCES)

Qingye (Gemma) Lu
Schulich Research Excellence Award – University of Calgary (2025)

Atefeh (Atty) Mashatan
Canada's Most Powerful Women: Top 100 (STEM category) – Women's Executive Network (2024)

Damon Matthews
Royal Society of Canada honouree – Royal Society of Canada (2025)

Malinda Smith
Distinguished Alumni Award – University of Alberta (2025)

Leon Wang
ASHRAE Fellow – American Society of Heating, Refrigerating and Air-Conditioning Engineers (2025)

Karim Zaghib
Officer of the Order of Canada – Government of Canada (2025)

EMERGING TALENT AND STUDENT EXCELLENCE

Sohail Akhtar (PhD candidate)
Best Paper Presentation Award – 23rd Global Joint Seminar on GeoEnvironmental Engineering (GEE 2025)

Amirhossein Eisapour (Master's student)
Dr. Jacob and Helen Friedman Graduate Award – Toronto Metropolitan University (2025)

Matthew Garayt (PhD candidate)
Marshall Prize for Research in New Energy – Dalhousie University Clean Technology Research Institute (2025)

Iris Guan (PhD candidate)
Canadian Young Leaders for Climate Resilience Program – Standards Council of Canada (2025)

Ameer Nizami (PhD candidate)
Meeting Student Award – Electrochemical Society (ECS) Canada (2024)

Anna Thinphang-nga (PhD candidate)
Canadian Chemistry Conference Student Award – Canadian Chemistry Conference (2024)

Harminderjit Singh Toor (Master's student)
Best Paper Award – Power Electronics, Drives and Energy Systems International Conference (PEDES) (2024)

Anna-Maria Sigounis (PhD candidate)
Best Paper Award – European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC) (2025)

Biruk Workneh (Master's student)
Best Student Paper Award – American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Annual Conference (2025)

LOOKING AHEAD

Volt-Age continues to expand its research community, strengthen partnerships and invest in the next generation of leaders working toward a carbon-neutral future.

BUILDING THE NEXT GENERATION OF RESEARCH LEADERS

10 Volt-Age Research Fellows

Volt-Age Research Fellows are new tenure-track positions designed to bring emerging research leaders to Concordia. The program supports early-career scholars through research funding, mentorship and reduced teaching loads, helping them build ambitious research programs connected to electrification, sustainability and social impact.

Fellows will join Concordia's four faculties as assistant professors and lead research in areas including:

- Empirical urban economics of transportation electrification
- Sustainable finance and low-carbon risk assessment
- Human-centred and sustainable design in the built environment
- Integrated community energy systems
- Indigenous action for just transition and decarbonization
- Building-integrated solar energy systems and materials
- Novel materials for the energy transition
- Artificial intelligence and advanced computing for electrification
- Electrified transportation and renewable energy systems
- Intelligent and autonomous systems for electrification

FEATURED FELLOW

Hugo Cordeau

ASSISTANT PROFESSOR, FACULTY OF ARTS AND SCIENCE

RESEARCH AREA: EMPIRICAL URBAN ECONOMICS OF TRANSPORTATION ELECTRIFICATION

"My work looks at the impact of infrastructure and policy on electric vehicle adoption. Through Volt-Age, I can connect this research with how governments design electrification strategies while working to build better charging networks and inform evidence-based policy decisions."



ASCENT

The Ascent call for proposals will invest approximately **$10 million** into new research and development projects aligned with dual-use applications. The initiative is open to Concordia-affiliated principal investigators, including new researchers joining the program for the first time.

The call also encourages collaboration with partner universities, industry, Indigenous communities, Crown corporations and public agencies. Projects will focus on advancing practical solutions that support sustainability, innovation, equity and long-term societal impact.

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Their continued investment in research and innovation is essential to advancing the energy transition.

Fonds de recherche Québec

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