



QCAM

Quebec Centre for
Advanced Materials

Newsletter

Winter 2025

Issue 7

2024 Student symposium

On Friday, 1 November 2024, the [Quebec Center for Advanced Materials](#) (QCAM) organised the fourth edition of the student symposium on [Concordia's Loyola Campus!](#) The symposium was entirely organized by QCAM student committee, and 112 participants attended the event, among them 72% of students and postdocs, coming from the 11 member institutions from all over Quebec. This bilingual event fosters collaboration among our members by enhancing the visibility of research groups, disseminating student research, and creating networking opportunities.



The program included 23 oral presentations covering the six QCAM research themes: three fundamental themes (science of polymers, self-assembly, and nanoscience) and three applied ones (applications in energy, green chemistry, and biomedical). We were delighted to welcome Valeria Guccini, Assistant Professor at the Uppsala University, who gave a plenary lecture entitled *Exploring the Structure-Property Relationship of Soft Matter to Enhance their Performance*. Dr Guccini was visiting Québec as part of a collaborative program between Québec and Scandinavian countries.

After the student presentations, a former QCAM student, Olivier Rynne, took the stage to present Concordia's [Volt-](#)

[Age](#) project. Olivier is IP specialist in Volt-Age admin team. The symposium continued with a networking session and poster presentations, ending with the awards ceremony.

The prizes for oral presentations were awarded to Brittany Pelletier-Villeneuve (Energy, UQAM); Victoria Lapointe (Energy and nanoscience, Concordia), Mehdi Shamekhi (Nanoscience and

sustainable materials, Concordia), Léo Boivin (Self-assembly and sustainable materials, UdeS) and Maxime Goulet. (Polymers, UdeM). The prizes for the best poster presentations were awarded to Souheib Zekraoui (U. Laval) et Sacha Porlier (UdeM). We would like to express our sincere thanks to QCAM and Concordia University for their generous support. The symposium booklet is available [online](#).



QCAM's trip to Chicoutimi

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After QCAM - careers in colleges

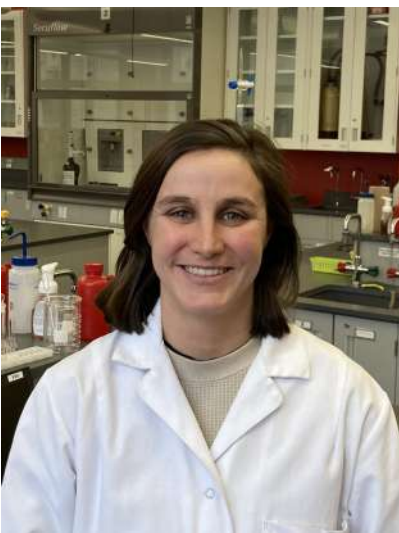
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QCAM (post)doc: what next?

Spotlight on careers in colleges

Laurence Savignac, Chemistry teacher and co-coordinator of the Natural sciences programme at [Collège André-Grasset](#), associate member of QCAM

I had to make a career choice in the summer of 2021, when I was going to submit my PhD thesis about the project on materials for lithium-ion batteries carried out in Prof Steen B. Schougaard's group. As I had had the chance to give several practical workshops at university, I had no doubt about my next step: I wanted to devote myself to teaching at Cégep level. This is the place where I myself fell in love with chemistry, because this is a dynam-



ic, friendly environment offering the opportunity to do many laboratory experiments. I honestly believe that popularising scientific concepts is the best way to share my passions, and I am fortunate to collaborate with enthusiastic chemistry teachers that share the same goal. Next year, I will be developing a materials section of an optional chemistry course and I am thrilled to give cégep students an insight into this subject. As coordinator of the Natural Science programme, I also play an active role in providing high-quality education.

(Translated by Matteo Duca)

Eline Laurent, researcher at the Technology transfer centre on industrial ecology ([CTTEI](#)).

My academic career began in Strasbourg at the l'École de Chimie, Polymères et Matériaux, where I obtained my chemical engineering degree with a specialisation in polymer science. After that, I went on to pursue a PhD at the Charles Sadron Institute, under the supervision of Dr Jean-François Lutz. My thesis focusses on a fascinating and innovative topic: information storage at a molecular level. I optimised the synthesis and encoding of polymers by the precise, controlled design of macromolecules carrying binary messages.



After obtaining my PhD, I took off for Montréal and I landed in Milan Maric's group at the Department of Chemical Engineering at McGill to pursue a postdoctoral project in his team. I discovered research on the other side of the

Atlantic and I carried out many projects implementing the principles of green chemistry to their fullest extent. I synthesise new materials based on biosourced products and I improve their eco-design, for instance by synthesising vitrimers. This is a novel class of reusable, recyclable polymers. Thus, it felt as a natural choice to consider a career at the CTTEI, which works towards circular economy, the valorisation of industrial by-products and clean industrial processes. I am now interested in the study of innovative, sustainable solutions and my research mainly deals with the valorisation of plastic residues. I am very glad to work at this CCTT bringing together applied research and the development of an industrial ecology, inspired by values that I also share.

Photo taken by NathB, photographer

(Translated by Matteo Duca)

The **2nd edition of the QCAM college-university symposium** will take place at the [Printability and graphics communication institute \(ICI, Collège Ahuntsic, Montreal\)](#) on **15 August 2025** : save the date!

On the programme: talks on college-university collaborative projects and a talk by Leira Retamal Covarrubias, director of the FRQ - NT college-university programme.

QCAM's trip to Chicoutimi

The QCAM management team travelled to Chicoutimi to attend the conference [Progress in sustainable development](#) from 15 to 18 October 2024. This event, organised by UQAC, featured a rich and varied programme covering various aspects of research on sustainable development. The scientific tracks were:

- 1) *Green chemistry / biosourced chemicals*
- 2) *Circular economy / resource management*
- 3) *Process engineering, sustainable energy and materials*
- 4) *Ecosystems, biodiversity and adaptation to climate change.*

Our team attended four inspiring plenary lectures by:

- Normand Mousseau (*Synergy and tensions between energy transition and sustainable development*)
- Frédéric Fontaine (*Green and collaborative approach to CO₂ valorisation and C-H functionalisation*)



Left: the QCAM team faced wintry driving conditions in the Réserve faunique des Laurentides.

Right: Gelareh Momen (middle) proudly showcases the Anti-icing Materials International Laboratory (see also [next page](#))



New materials science lab at UQAC!

Our member Gelareh Momen took part in the ribbon-cutting ceremony to mark the inauguration of the new UQAC's Innovative materials synthesis and characterisation laboratory. This facility will enable UQAC's researchers to develop novel materials with anti-icing, anti-corrosion, anti-bacterial or self-healing properties. A major grant of Québec's Ministère de l'Économie, de l'Innovation et de l'Énergie (1.8 M\$) and a contribution from Fondation de l'UQAC (175 k\$) funded this project. The full press release is available [here](#).



Photo provided by UQAC's Service des communications et des relations publiques



- Célia Mailfert (*Better building through deconstruction*)
- Karine Auclair (*Enzymatic depolymerisation: mecanoenzymology*)

In preparation for the FQMA 2025 (see page 7), our team took notes during the talk by Étienne Allard-Goyer (Recyc-Québec) on circular economy and the panel discussion "Synergy between research and the industry : innovation towards sustainable development" chaired by Axelys CEO Jesse Vincent-Herscovici.

This interactive conference provided the perfect setting for networking with academics and industry professionals. The QCAM team also had the chance to visit

several research laboratories:

- [CURAL](#) (aluminium)
- [LASEVE](#) (analysis and separation of plant extracts), part of the Research centre on boreal ecosystems ([CREB](#))

QCAM was a proud sponsor of this conference.

The Anti-icing Materials International Laboratory

By Claire Charpentier and Sanae Benaissa

We never get cold feet at UQAC's [Anti-icing Materials International Laboratory](#) (AMIL). Our infrastructure allows us to carry out unique research on frost and snow. The AMIL also allows us to reproduce a snowstorm in summer, a freezing drizzle in spring and an ice rink in autumn! Cold chambers enable us to work in the cold domain all year round under controlled conditions.

However, AMIL also greatly emphasises the training of highly qualified personnel and world-class research and development programmes. For instance, a snow machine allows us to simulate snowfall in the lab while modulating its intensity. An airport traffic simulator replicates the impact of mechanical activation on de-icing or anti-icing chemicals designed for airport landing strips. These two innovative tools are employed by Sanae Benaissa and Claire Charpentier, two students pursuing a PhD in materials engineering at UQAC. These unique tools will advance research in two areas of cold weather science that are quite distant. Snow and ice are phenomena that operate in very different ways. In addition, Sanae's project focuses on aeroplanes, while Claire's is on airport runways. At AMIL, nobody gets left behind, and we help everyone affected by the cold: bridges, wind turbines, helicopters, landing strips, drones, and even developing anti-icing coatings.

In summary, the Anti-icing Materials International Laboratory is a unique research laboratory in cold weather sci-

ence on a global scale. AMIL provides services to the industry to solve challenges related to cold climates while also training specialists in this little-explored field of study.

Article translated by Matteo Duca

Claire and Sanae are QCAM student members and work under Gelareh Momen's supervision.



Claire Charpentier was born in France in 1995. She holds an engineering degree (ingénieur généraliste numérique) from École supérieure d'ingénieurs Léonard de Vinci at Paris (ESILV). She then working for Alten in the field of aerospace engineering. In May 2022, she joined the Chicoutimi-based

Anti-icing Materials International Laboratory to pursue a PhD in engineering.



Sanae Benaissa was born in Morocco in 1996. She holds an engineering degree from INSA Toulouse and a university technology degree from Aix-Marseille. She first joined UQAC's AMIL for an internship at the end of her master's degree in engineering. In January 2022, she

then decided to pursue a PhD in engineering.

Interview with an Outstanding Researcher and QCAM Academic Member

By Lucille Kuster & Marilyne Bélanger-Bouliga

QCAM has the honour of interviewing Professor Noémie Dorval Courchesne, a distinguished researcher and valued member of our community. An associate professor in the Department of Chemical Engineering at McGill University and holder of the Canada Research Chair in Biologically-Derived Materials, she stands out for her expertise in the self-assembly of biological and organic molecules. Her innovative work combines synthetic biology and large-scale assembly to create functional materials. A recipient of the Christopher Pierre Award in 2020 and the Hubert-Reeves Award in 2024, she is also an active member of several research clusters/networks, including QCAM.



a genetic engineering lab to develop a protein system that could serve both as a structural framework while also integrating functional groups. It was at this point that she began working on living materials, a field that now defines her research.

Establishing a Research Group

In 2017, Professor Noémie Dorval Courchesne joined the Department of Chemical Engineering at McGill University. One of her greatest challenges was creating her own research group. "As a PhD student or postdoc, you don't really get the chance to manage a budget or run an entire lab" she explains. From the start, she had to consider several practical aspects, such as electricity, plumbing, costs, space planning, and acquiring new equipment.

Another challenge was the initial conditions of her lab: far from being empty, it was cluttered with "old equipment, worn-out furniture, and obsolete samples." She was only able to set up the space to suit her needs after clearing everything out. Managing the budget was also a significant learning experience. During her first interview, she was asked to estimate the cost of setting up her lab, and she vastly underestimated the expenses. "You don't realise how expensive it is or what should be prioritised," she admits.

Establishing a lab takes an enormous effort and overcoming many challenges, but this also provides valuable freedom in research, allowing a new professor to build a team and shape projects according to their vision.

Academic Journey

Professor Noémie Dorval Courchesne began her academic career in biotechnology at the University of Ottawa, where she completed several research internships over the course of three summers. These experiences familiarised her with the dynamic environment of research teams and the academic world, sparking her interest in scientific research. Eager to deepen her knowledge, she pursued a PhD in chemical engineering at MIT under the co-supervision of two long-time collaborators. They regularly co-supervised students, allowing her to specialise in both biological engineering and materials chemistry. Her work focused on biomaterials, particularly the integration of proteins and bacteria into the materials she designed.

Continuing in the field of biomaterials, she completed a postdoctoral project at Harvard in 2015. There, she joined

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Current Research

Professor Noémie Dorval Courchesne's lab specialises in the synthesis of protein-based biomaterials. Her team is working to optimise production processes to make them scalable for industrial applications. "For example, we aim to improve the purity of our biomaterials while maintaining high yields," she explains. A collaboration with a company specialising in bioprocessing could be a promising approach to refining these methods.

Among the most exciting applications of these biomaterials, Professor Dorval Courchesne highlights those with environmental benefits, particularly self-healing materials. Her team has even collaborated with Lululemon® to design fabrics capable of self-healing using biofilms. Therapeutic applications are also promising: "By applying probiotics to the skin or a wound, we can release different therapeutic molecules," she explains. These advances pave the way for significant innovations in biomaterials, at the intersection of biotechnology and materials engineering.

Mentoring Students

Professor Dorval Courchesne is currently looking for PhD students interested in joining her lab this year. When asked what she looks for in a student, she emphasises creativity, dynamism, and independence in research projects. She also highlights the importance of exchanging ideas and scientific communication, both through articles and oral presentations.

Professor Dorval Courchesne stresses that a candidate's potential is what attracts her interest during interviews. She wants to assess a student's understanding through discussion, rather than relying on rehearsed responses. She also notes that the qualities of an ideal candidate do not have to be fully developed at the beginning; they can be honed within her lab.

She fosters student development through regular one-to-one or group meetings and encourages mentorship within

her team. Students play an active role in maintaining a productive and respectful lab environment, with tasks with formative tasks leading to a dynamic and respectful workspace. She also places great emphasis on work-life balance. She concludes by announcing that her lab will welcome undergraduate interns from various programs this summer. If you're interested, don't wait—reach out to Professor Dorval Courchesne as soon as possible!

The Hubert-Reeves Award and the Future

The Hubert-Reeves Award is presented to researchers around the age of 40 who stand out for their research excellence and their ability to establish and maintain strong, lasting collaborations within the scientific community. Professor Dorval Courchesne explains that this award is particularly meaningful to her because Hubert Reeves was not only a researcher but also advocate for environmental causes and scientific communication—values that she holds dear.

She recognises that receiving this award is a great honour and provides significant visibility both within and beyond the scientific community. She especially enjoyed attending the award ceremony, where she had the chance to meet a wide range of well-known figures from all walks of life. Through discussions with other award recipients, she realised they all shared a common trait despite their diverse interests: creativity.

There is no doubt that creativity played a key role in her winning this prestigious award so early in her career. She plans to continue her research on biomaterials with a focus on real-world applications. "I want to concentrate on developing more practical applications based on proteins. In the past, we put a lot of effort into proof of concept. Now, we need to think about how to incorporate these materials into concrete applications," she explains.

Watch this [Instagram](#) video interview with Noémie Dorval Courchesne in which our member delivers an inspiring message emphasising the importance of innovative materials.

May 2025: an... eventful month



**Forum québécois
sur les matériaux avancés**
Materials for the society of tomorrow




With the presence and support of Rémi Quirion and Janice Bailey

**1 and 2
MAY
2025**
Montréal, QC

1 May	2 May
Plenary: Normand Mousseau Panel: The challenge of developing materials-based solutions for a sustainable society Start-up success stories Industrial R&D challenges Networking cocktail	Success stories: research projects on materials for a sustainable society Panel: societal aspects in materials science PRIMA Québec 2035 Ambition roadmap Pitch your waste Plenary: Alain Webster

Early-bird registration for students: **100 \$** (deadline **21 March**)

All info on the FQMA website (bilingual) ↓



The Quebec Advanced Materials Forum is made possible by the generous support of Fonds de recherche du Québec - secteur Nature et Technologies



Three symposia organised by QCAM members at the next [ACFAS conference](#) (5-9 May 2025, ÉTS, Montréal, an event taking place in French).

A QCAM symposium on [functional materials for sustainable development](#) organised by Claudiane Ouellet-Plamondon (ÉTS) and François Perreault (UQAM).

[Advances in 3D bioprinting for tissue engineering and medicine](#), co-organised by Marc-André Fortin (U. Laval).

[Microsystems research in Québec](#), organised by Ricardo Izquierdo and Mathieu Gratuze (ÉTS).

The overarching theme of the conference will be “Research at the heart of technological and social solutions”. Early-bird registration by **31 March 2025**

9TH ADVANCED MATERIALS ANNUAL MEETING 12-13 MAY 2025, MONTRÉAL

The organising committee of the [QCAM 9th annual meeting](#), to be held at the UQAM, on 12 and 13 May 2025, is pleased to announce its call for abstracts for oral and poster presentations!

We encourage all QCAM students and postdocs to submit an abstract in one of our six research themes by **22 April**. Please note that the number of slots for the orals is limited, so we will select one abstract per research group.

Plenary speakers

[Cathleen Crudden](#) (Queen’s University)

[Alexander Govorov](#) (Ohio University)

Invited speakers

[Gaixia Zhang](#) (ETS)

[Jérôme Claverie](#) (UdS)

[Thomas Auvray](#) (UQTR)

[May Griffith](#) (UdeM)

Bulletin board

IN THE MEDIA

Special feature on batteries in the February issue of *Québec Science*. “Lithium-ion batteries are like this: lithium gets in and out of the structure of their materials like in a mille-feuille”, explains QCAM postdoc Elsa Briqualeur. *Québec Science* also meets with our members Mickaël Dollé and Steen Schougaard. Available now on newsstands.

François Perreault [gives a radio interview](#). Prof. Perreault aims to improve “membrane distillation” of ammonia in sewage, for instance leachate. The key: increased membrane permeability towards NH₃. This [project](#) is a collaboration with Georgios Kolliopoulos (QCAM member, U. Laval) as well as with Moroccan researchers (U. Mohamed VI Polytechnique) and is supported by a CRSNT-FRQ grant.

Let’s go with the flow and listen to Mathieu Lapointe’s interview for the ICI Première pro-

gramme [Moteur de recherche](#). Prof. Lapointe asks a listener’s question: « Are our water treatment plants able to remove all pollutants? ». You will find out more about “Sand 2.0”. Prof. Lapointe won the [Prix Honoris Génus—Développement durable 2024](#) awarded by Ordre des Ingénieurs du Québec.

Breaking waves : 3D printed artificial reefs feature in a special report on the science [TV programme Découverte](#). Claudiane Ouellet-Plamondon gives an overview of the challenging design and production of this innovative tool to prevent coastal erosion.

“Where you feel you’ve made your mark?”, asks the host of the *Making your mark* [podcast](#) to Rafik Naccache. In this 45-min interview, Prof. Naccache describes his career straddling academia and the industry. “You have to always have a contingency plan, knowing that nothing is ever fully guaranteed in life”.

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Many thanks to our collaborators Lucille Kuster and Marilynne Bélanger-Bouliga, and to all other contributors.

Get in touch with the editor: matteo.duca@umontreal.ca



présenté par



A GAME NIGHT AGAINST CLIMATE CHANGE

This outreach activity aimed to raise awareness of solutions to fight climate change. The players of the board game *Solutions* try and determine the impact of several solutions in terms of CO₂ equivalents avoided.

An inter-cluster initiative in collaboration with CIRODD.

