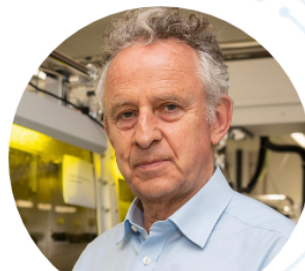


Institut
Courtois



Université 
de Montréal



Plenary Speaker

Professeur Sir Richard Friend

Cavendish Laboratory - Cambridge University

Grande Conférence de l'Institut Courtois 2026

Matériaux moléculaires et hybrides multi-échelles :
microstructure, excitons et dynamique à plusieurs
corps

22 et 23 octobre 2026

Université de Montréal

ATTENTION Les jours 1 et 2 se déroulent dans deux endroits différents :

Jour 1 – 22 octobre : Université de Montréal **Campus MIL** A-3502 (1375 Ave Thérèse Lavoie Roux)

Jour 2 – 23 octobre : Université de Montréal, **Pavillon Roger Gaudry** Hall d'honneur (2900 Chemin de la tour)
K-500

GRANDE CONFÉRENCE

23 octobre 2026

	Titre	Conférencier.ère
8h00	Inscription et café	
9h00	Allocution d'ouverture du directeur de l'Institut Courtois	Carlos Silva
9h30	Mot du CRSNG	Alejandro Adem
9h45	Designing photonic light- and heat-management structures for solution-processed optoelectronic devices	Natalie Stingelin
10h30	Pause café	
10h45	Connecting Structure, Dynamics, and Discovery Across Scales/Relier structure, dynamique et découverte à travers les échelles	Aram Amassain
11h30	Relations structure-propriété dans les matériaux polymères fonctionnels / Structure-property relationships in functional polymer materials	Audrey Laventure
12h15	Diner	
12h15	Photo des professeur.e.s membres de l'Institut Courtois	
13h15	Exploring polaron delocalization in indacenodithiophene-based polymers	Christine Luscombe
14h00	Excitons, biexcitons et états quantiques collectifs dans les matériaux conjugués/From Excitons to Biexcitons: Many-Body Physics in Conjugated Polymers	Carlos Silva
14h45	Pause	
15h00	Organic semiconductors – From OLED displays to quantum applications	Professor Sir Richard Friend
16h00	Présentation d'affiche et Cocktail	
18h00	Remise du prix du comité étudiant de l'IC et allocution de clôture	

Merci à nos commanditaires



Faculté des arts et des sciences

Université 
de Montréal

Invité d'honneur et conférencier plénier

Professeur Sir Richard Friend

Cavendish Laboratory

University of Cambridge, UK



Biographie

Sir Richard Friend est un physicien de renommée mondiale et un pionnier dans le domaine de l'électronique organique. Il a occupé le poste de professeur Cavendish de physique à l'Université de Cambridge de 1995 à 2020 et continue d'exercer les fonctions de chercheur principal au Laboratoire Cavendish.

Ses recherches novatrices sur les semi-conducteurs à base de carbone ont révolutionné tant la science fondamentale que la technologie moderne. Sir Richard a été parmi les premiers à démontrer comment les polymères organiques peuvent être utilisés comme matériaux semi-conducteurs actifs, permettant ainsi des avancées majeures telles que les diodes électroluminescentes organiques (DELO), les écrans flexibles et l'électronique imprimable. Ses travaux ont joué un rôle central dans le développement des technologies d'affichage actuelles, désormais largement utilisées dans les téléviseurs, les téléphones intelligents et les appareils électroniques de nouvelle génération.

Membre de la Royal Society et de la Royal Academy of Engineering, Sir Richard a reçu de nombreuses distinctions internationales, dont le Prix Millennium de la technologie. Il a été fait chevalier en 2003 pour ses services rendus à la physique.

Grâce à son leadership universitaire et à son esprit d'entreprise, notamment en tant que cofondateur de sociétés telles que Cambridge Display Technology, il a joué un rôle déterminant dans la transformation de découvertes fondamentales en technologies concrètes ayant un impact mondial.

Organic Semiconductors – From OLED displays to Quantum Applications

Organic molecules with semiconducting properties are now used as the light-emitting diodes, LEDs, in organic LED displays. These are now the dominant technology for the high performance displays used in smartphones and in televisions, but their potential applications are far broader, from solar cells to printable electronics and to bio-interfaces. I will describe some of the journey from early discoveries to practical display technology and I will outline some of our current research on some new phenomena that these materials can show, including their use as optically-accessed quantum sensors.

Professeure Natalie Stingelin

Georgia Institute of Technology

Chair of the School of Materials Science and Engineering



Designing photonic light- and heat-management structures for solution-processed optoelectronic devices

An ever-increasing interest in the development and application of innovative optical and optoelectronic devices places greater emphasis for the advancement of new smart and functional materials that are readily processable. Significant progress has already been realized in the fields of organic light-emitting diodes (OLEDs) and photovoltaic cells (OPVs) through development of novel semiconducting materials. Here we discuss developments and advancements in materials design towards photonic structures that aid and improve light management in organic and inorganic/organic hybrid devices, with focus on solar cells. Specifically, we present a novel inorganic/organic hybrid material that is produced in a one-pot synthesis and is solution processable, and can be manipulated to exhibit a refractive index of 1.5 to up to 2.05. The material is of very low optical loss and, thus, can be readily integrated into efficient photonic structures. We cover systems targeted for use in light in-coupling structures, anti-reflection coatings, optical cavities for exciton-polariton research, and beyond. Extension to architectures for heat management, important for a broad range of photovoltaic device platforms, including inorganic, inorganic/organic hybrid and organic devices, will also be presented.

Professeur Aram Amassian

Department of Materials Science and Engineering, North Carolina State University



Connecting structure, dynamics, and discovery across scales

How a semiconductor is made shapes not only its structure, but also how it functions and evolves in a device. Yet the pathways connecting fabrication, microscopic organization, and device behavior often remain hidden from researchers. This talk explores these connections in emerging semiconductors for energy and electronic applications. Through examples from organic and hybrid semiconductors, I will show how revealing the dynamic processes that link film formation, structural evolution, and functional response improves how materials are designed for real-world applications. This perspective motivates a translational approach to materials research, in which fundamental understanding is connected directly to the processing, reliability, and manufacturability constraints that determine whether materials can become useful technologies. Building on this foundation, I will discuss how robotic platforms coupled with AI guidance expand the scope and depth of materials discovery. Combining high-throughput exploration with information-rich measurements offers a path beyond optimizing isolated properties toward uncovering predictive relationships among composition, processing, structure, and function. The broader vision is a new generation of laboratories that connect mechanistic understanding with autonomous experimentation, accelerating both fundamental discovery and the translation of emerging semiconductors into robust, scalable technologies.

Professeure Audrey Laventure

Département de chimie, Institut Courtois, Université de Montréal

Chaire de recherche du Canada en matériaux polymères fonctionnels

Chaire de recherche de l'Institut Courtois



Structure-property relationships in functional polymer materials

Our research group is currently developing strategies to investigate the structure-processing-property relationships at play upon the additive manufacturing of functional polymeric materials, more specifically via (photo-assisted) hot-melt extrusion (HME) and masked stereolithography (MSLA). Our efforts are focused on the development of a fundamental understanding of the phenomena occurring at a molecular level during 3D printing. To do so, we developed a streamlined experimental process where correlations between the physico-chemical properties of the compounds to be printed, printing parameters, and resulting 3D printed samples properties are established.

Herein, we first investigate the behavior of electroactive polymers upon their 3D printing. Two model systems are studied: the first is a thermoplastic and pi-conjugated polymer blend processed using HME for organic electronics, and the second is based on photo-crosslinkable monomers blended with

poly(vinylidene fluoride) (PVDF) processed with MSLA for piezoelectric applications. In both cases, the thermoplastic and photo-crosslinkable monomers act as a matrix to enable the processing without altering the phases in presence. We then report how we leveraged a unique characterization tool, which is polarized photo-rheo-IR, to study the evolution of the molecular and macroscopic scale behavior of the mesogenic unit of a photo-crosslinkable RM82-based liquid crystal elastomer (LCE) model system upon its extrusion. This integrated approach provides direct, time-resolved insight into the interplay between processing conditions and resulting microstructure, offering a promising pathway for rational processing guidelines to modulate and optimize the LCE performance, notably in actuators and soft robotics, and could be extended to other functional polymer materials.

Professeure Christine Luscombe

Okinawa Institute of Science and Technology



Exploring polaron delocalization in indacenodithiophene-based polymers

π -Conjugated polymers (CPs) are being investigated as electronic components in a wide range of applications including organic field effect transistors (OFETs) and organic photovoltaics. The motivation for the usage of CPs in electronic devices includes their low mass density, solution processability, and compatibility with high-throughput manufacturing techniques. Moreover, some CPs are suitable materials for use in deformable electronic devices because of their inherent mechanical properties and electronic properties. In this regard, poly(indacenodithiophene-benzothiadiazole) has received significant interest because of its exceptional hole mobility despite lacking long range order. In comparison, poly(indacenodithiophene-benzopyrrolodione) (PIDTBPD) has a lower hole mobility but is exceptionally ductile at similar M_n . Herein, we synthesize random indacenodithiophene (IDT) copolymers with varying amounts of incorporated benzothiadiazole and benzopyrrolodione (BPD), which introduces varied degrees of backbone twist to each respective polymer system. This allows us to elucidate how the BPD monomer introduction leads to conformational and morphological changes that influence the crack onset strain (CoS) and hole mobility. Studies with charge modulation spectroscopy reveal significant differences in the polaron coherence length in the IDT-based polymers compared with traditional semiconducting polymers. In this presentation, the unique characteristics of IDT-based polymers will be discussed and their utility towards flexible devices.

Professeur Carlos Silva

Département de physique – Université de Montréal

Directeur de l'Institut Courtois



From excitons to bioexcitons: many-body physics in conjugated polymers

What happens when two electronic excitations meet inside a material? This deceptively simple question has accompanied much of my scientific journey, beginning with early experiments in Cambridge exploring how multiple excitations could lead to charge generation in conjugated polymers. Over the years, it has evolved into a broader fascination with the collective quantum behaviour of matter: how excitations interact, how molecular organization shapes those interactions, and how we can experimentally uncover the correlations that emerge. In this lecture, I will trace that journey through exciton–exciton annihilation, biexcitons, and the remarkable influence of molecular packing on the electronic properties of conjugated materials. Along the way, I will explore a fundamental challenge: experiments do not necessarily reveal the full microscopic physics of a material. What we learn depends on what we choose to measure. This realization leads to the concepts of observability and identifiability—not only whether a quantum phenomenon can be detected, but whether its microscopic origins can be distinguished from competing explanations. These ideas now shape my Canada Excellence Research Chair programme in Light–Matter Interactions and inform a broader vision for materials discovery at the Institut Courtois. By bringing materials design, advanced spectroscopy, and theoretical modelling into closer dialogue, we seek to discover not only new materials and properties, but also new ways of knowing why those properties emerge. I will conclude by returning to correlated two-exciton states in conjugated aggregates, where these questions come together and point toward new opportunities in quantum materials.

Présentations par affiches

Affiches des recherches et infrastructures financées par l'Institut Courtois:

1. Éric Dionne (IC funded infrastructure) - MAPLES : Montreal Area Platform for Electrochemical Systems
2. Christian Pellerin (IC funded infrastructure) - Laboratoire de caractérisation des matériaux polymères
3. Pedro Aguiar (IC funded infrastructure) - Centre Régional de Résonance Magnétique Nucléaire (CRRM)
4. Patricia Moraille (IC funded infrastructure) - Scanning Probe Microscopy (SPM) at the Laboratory of characterization of materials (LCM)
5. Félix Thouin (IC funded infrastructure) - Quantum information perspective on multidimensionnal spectroscopy
6. David Tiede (Chercheur postdoctoral à l'IC) - Many-body dynamics in polaritonic systems
7. Adair Campus Uscanga (Chaire IC , C. Silva) - Magic states in the Asymmetric Quantum Rabi Model
8. Claudia Bazan (Projet Exploratoire de l'IC) - Toward Self-Driven Microscopy Exploration for the Characterization of Functional Materials
9. Charles Chénier (Chaire IC , M Dollé) - Developping a High-Throughput Methodology for Materials Discovery Using Glass Adaptivity
10. Frédéric Bellerive (Projet Exploratoire de l'IC) - Novel high configurational-entropy solid solution with perovskite structure
11. Joséphine Potdevin (Chaire IC, W. Witzcak-Krempa) - Dynamics of out-of-equilibrium multipartite entanglement in quantum systems
12. Ligu Chen (Projet Exploratoire de l'IC) - Preparation and characterization of crystalline C90-D5h and C100-D5d Fullertubes
13. Tarek Zerroug (Projet Exploratoire de l'IC) - Institut Courtois's Exploratory Project: AI Co-Scientist for Scanning Probe Microscopy
14. Farshid Effaty (Chercheur postdoctoral à l'IC) - CoXtal: A 3D, Conformer-Aware Model That Ranks Coformers for a Target API
15. Vanessa Kairouz – (IC funded infrastructure) Center for continuous flow synthesis: Infrastructure and Applications

Affiches des participants

16. Thomas Boulanger – Beneath the lithium: linking copper morphology to plating behavior and cycling efficiency
17. Iulia Costache - Développement d'une sonde Raman à base de nanotubes de carbone et d'anticorps pour la détection d'allergènes alimentaires
18. Javiera Fernandez - Quantitative Strain and GND Mapping in Martensitic Steels by High-Resolution EBSD
19. Jules Godreul - Impact of Leaching Treatments on Graphite Structural Integrity
20. Mouhamed Gueye - First row transition metals – Cyano amidine-N-Oxide (AMOX-Ph-CN) complexes exhibiting photophysical characteristics and relaxation pathways from higher energy excited state
21. Édouard Jean - Analyse thermique différentielle par émission infrarouge (DTA-IR) à haute température
22. Jérôme Indigo - Observation de l'effet de parité sur des propriétés rédox de SAMs de ferrocene: une étude comparative de différents électrolytes
23. Anthony Jolly - Relations quantitatives structure-mise en forme dans des résines photopolymères biosourcées
24. Arnaud Lessard - Réseau neuronal convolutif d'architecture U-Net pour étudier la cinétique moléculaire sur 1-CNTFET
25. Samuel Levesque - Synthesis of Interlocked 2D Polymer Thin Films
26. Éléonore Lévesque - Controlling aryl diazonium functionalization of graphene to prevent multilayer growth
27. Maryam Lormahdiabadi - Impact of Antibacterial Cysteine-Derived Carbon Dots on the Biophysical Properties of Pulmonary Surfactant
28. Megan McGeehan - Formulation and 3D Printing of PVDF-Containing Photocurable Resins for Digital Light Processing
29. Meghan McNeil - Additive manufacturing of organic π -conjugated polymer materials for applications in flexible electronics
30. Hannes Muller - Harvesting Sunlight for HER: Cu(I)-Photosensitizers with Quarterpyridine based Ligands
31. Meysam Naghizadeh - Rapid and Cost-Effective Characterization of Primary Particles/Grains in NMC Cathodes: ECCI in FESEM
32. Anthony Olivier - Monitoring by Rheo-IR the Influence of Shear on the Crystallization of Poly(caprolactone)
33. Rodrigo Paulino - Probing nonlinear lattice dynamics accross a ferroelectric phase transition with 2D THz coherent spectroscopy
34. Tristan Perodeau - Exploring how crystallinity impacts ion transport in Solid Polymer Electrolytes

35. Zoha Rasheed - Seawater mediated electrochemical carbon dioxide sequestration and mineralization
36. Arindam Saha - Anti-Kasha emission from Co(III)-amidine-N-oxide complexes: photophysics & reactivity
37. Nikita Aurelia Schulz - Bifluorene-Phenanthroline and Pyridylpyrrole as Ligands for Cu(I) Photosensitizers
38. Félix Therrien - A comparison of experiment-selection strategies in a CO₂RR automated laboratory
39. Audrey Villeneuve - Production d'oxygène singulet dans des architectures imprimées en 3D
40. Hannah Williams - Continuous-flow platform for closed-loop plasmonic nanoparticle synthesis
41. Léo Prevost-Nottelet - Electrical and hyperspectral characterization of the afterglow of an atmospheric nitrogen plasma torch for thin film deposition
42. Gary Mathieu - Inside the Battery: Operando NMR as a Tool to Study Redox Flow Electrolytes
43. Ariane Caron - Fine-tuning of HydrazoBisPyridinium Properties as a Posolyte for AORFB through N-alkyl Functionalisation
44. Nelsie-Anne Beatrix - Optimisation de méthodes d'identification et de quantification de micro-et nanoplastiques dans les milieux aquatiques
45. Jade Cimmino - Gate-Dependent Control of Aryldiazonium-Based Functionalization of Graphene in Field-Effect Biosensors
46. Maxime Goulet - Self-Driven Process Optimization in Pneumatic 3D Printing: From Static Ensemble Learning to Autonomous Bayesian Method
47. Alejandro Leon Grande - Quantum dynamics of molecular aggregates using the Holstein Hamiltonian

Comment se rendre

Jour 1- 22 octobre – Université de Montréal - Campus MIL (1375 Ave Thérèse Lavoie-Roux) A -3502

En metro

Pour vous rendre au Campus MIL de l'Université de Montréal, vous pouvez descendre à la station de métro Acadie (5 minutes à pied) ou à la station Outremont (7 minutes à pied) sur la ligne bleue.

En vélo

Il y a des supports à vélo devant l'édifice.

En voiture

Il y a un stationnement sous terrain accessible à l'arrière de l'édifice. [L'entrée se trouve sur Av. Marcelle-Gauvreau](#). Le prix du stationnement est 20\$ et n'est pas couvert par l'inscription à la Conférence. Si ce stationnement est fermé, vous pouvez utiliser le stationnement temporaire extérieur, accessible du côté Est de l'édifice. [Cliquez ici pour le point Google Maps](#).



Jour 2 – 23 octobre - Université de Montréal, Pavillon Roger Gaudry (2900 chemin de la tour) L-400

La Grande Conférence de l'Institut Courtois se tient au Pavillon Roger Gaudry de l'Université de Montréal, dans le Hall d'honneur. Cette salle se trouve au 4^e étage de l'aile L. L'entrée, située juste sous la tour, mène directement au lieu de la conférence. Nous vous recommandons vivement de contourner le pavillon à pied, car de nombreuses zones sont inaccessibles en raison de travaux à l'intérieur du bâtiment.

En métro

Le Pavillon Roger Gaudry est situé à la station de métro « Université de Montréal », sur la ligne bleue. En sortant du quai du métro, prenez la sortie à gauche et montez les escaliers. Vous ferez quelques pas à l'extérieur et entrerez dans l'édifice juste devant la



porte. Prenez les longs escaliers roulants et, en haut, tournez à droite. Marchez à l'extérieur sur le chemin de la Tour en direction de la tour; l'entrée se trouve juste sous la tour.

En vélo

Trois places de stationnement pour vélos sont disponibles devant le pavillon Roger Gaudry, sur le chemin de la Tour.

En voiture

Le garage Louis-Colin est un stationnement à étage de Université de Montréal. Il y a deux entrées pour y accéder:

- via le Boulevard Édouard-Montpetit, au coin de l'Avenue Louis-Colin;
- via la Rue Queen Mary, au coin de l'Avenue Decelles.

Il y a un frais de 21\$ pour la journée qui n'est pas couvert par les frais d'inscription de la conférence.

En Uber

Assurez-vous d'entrer l'adresse suivante : **2900 Chemin de la tour** et demandez d'être déposé devant l'entrée centrale, tel que présenté sur la photo. [Vous pouvez vous référer à ce point Google Maps.](#)

Carte de l'Université de Montreal - Campus de la montage où se trouve le pavillon Roger-Gaudry

Pavillon Roger Gaudry = #12, Les points oranges indiquent les passages intérieurs; l'entrée à l'événement se trouve au niveau de la flèche verte.

