Proceedings of the 39th Canadian Conference on Artificial Intelligence (*Canadian AI 2026*)

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Editors:
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Preface: 50 Years of Canadian AI

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The Canadian Conference on Artificial Intelligence (Canadian AI) brings Canadian and international researchers to present and discuss original research in AI. It is sponsored by the Canadian Artificial Intelligence Association / Association Pour L'Intelligence Artificielle au Canada (CAIAC), which started out of a workshop in 1973 and was originally named as the Canadian Society for Computational Studies of Intelligence/Societé canadienne pour études d'intelligence par ordinateur (CSCSI/SCEIO) It is probably the oldest organized association of its kind. The first formal CSCSI/SCEIO Conference was held in Vancouver, BC, in 1976. The conference was held biannually for several years until it became an annual event in 2000. It branded to "AI" and then "Canadian AI" in 2004. In 2008, CSCSI/SCEIO was officially renamed to CAIAC.

The 39th Canadian Conference on Artificial Intelligence (Canadian AI 2026) is in-person event held May 25-29, 2026, at Simon Fraser University - Burnaby campus, in Vancouver, BC. This milestone edition celebrates 50 years since the inaugural 1976 conference. Over its 50-year history, the conference has been hosted in various Canadian cities: Vancouver (1976, 1992, 1996, 2021*), Toronto (1978, 1998, 2012, 2018, 2022*), Victoria (1980, 2005, 2016), Saskatoon (1982), London (1984, 2004), Montréal (1986, 2000, 2007, 2014, 2023), Edmonton (1988, 2017), Ottawa (1990, 2001, 2010, 2020*), Banff (1994), Calgary (2002, 2025), Halifax (2003, 2015), Québec City (2006), Windsor (2008), Kelowna (2009), St. John's (2011), Regina (2013), Kingston (2019), and Guelph (2024). Due to COVID-19, conferences in 2020-2022 were held virtually.

Canadian AI 2026 is collocated with the 23rd Conference on Computer and Robot Vision (CRV), together forming the joint Canadian Conference on AI, Robots & Vision (AI/CRV) 2026. Canadian AI 2026 introduces a few changes this year, beginning with a *two-round submission process*. The conference utilizes the Microsoft Conference Management Tool (CMT) service to manage the peer-reviewing process. This service is provided for free by Microsoft and they bore all expenses, including costs for Azure cloud services as well as for software development and support. Under this tool, each submission underwent *triple-blind review* by 2-4 members of a 153-person Program Committee. Round 1 outcome included acceptance, rejection, or a *revision request*, allowing authors to revise and resubmit for Round 2, which concluded with acceptance or rejection decisions. The process attracted a record-breaking 308 submissions from 29 countries and regions (e.g., Canada, Belgium, Denmark, Philippines, Sweden, USA, Vietnam), which 63 were accepted as 12-page long papers for oral presentation (leading to an *acceptance rate of 20%*) and 47 were accepted as 6-page short papers for poster presentation. Among these 110 accepted works (which include 5 position papers and 85 student papers), the research spans a broad AI spectrum—including AI applications; machine learning; deep learning and neural models; natural language processing (NLP); unbiased, safe and trusted AI; as well as large language models (LLM). In another major change for 2026, the accepted papers are published in the *Proceedings of Machine Learning Research* (*PMLR*), with the final volume featuring the 63 long papers and 47 short papers from the main conference, as well as 15 papers from the Graduate Student Symposium (GSS).

The conference program is enriched by two keynote speeches, two invited talks, the GSS, an Industry/Government Track, and a Responsible AI event. The keynote presentations feature leading researchers in the field:

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- Kevin Leyton-Brown (University of British Columbia) discusses “algorithm synthesis with theoretical guarantees” and
- Sheila McIlraith (University of Toronto) explores “language as a signal-symbol nexus for human-compatible sequential decision making”.

As invited speakers, Kelsey Allen (Canadian Institute for Advanced Research (CIFAR) & University of British Columbia) presents “minds and machines: the evolving loop between cognitive science and AI” and Katie Seguin (Mental Health Commission of Canada) describes “artificial intelligence guidance in mental health and substance use health care in Canada”.

Additionally, GSS provides a valuable platform for graduate students to discuss and explore their research interests and career objectives with peers. It features five oral presentations selected from the accepted submissions alongside a poster session showcasing all accepted student works.

The Industry/Government Track bridges the public and private sectors, welcoming industry researchers, developers, entrepreneurs, and public sector employees. The program features two panels and two invited talks. Panel #1 on “open model and open access in AI” is moderated by Newvick Lee (GitLab) with panelists Steve DiPaola (Simon Fraser University), Kris Krug (BC + AI Ecosystem), Jekaterina Novikova (Vanguard), and Annie Ying (GitLab). Panel #2 on “navigating AI safety challenges” is moderated by Alka Tandan (Reframe & Refine) with panelists Robert Barton (Cisco Systems), Eric Brochu (Microsoft), Mitu Mann (Interac), and Annika Rosanowski (Mitacs). Additionally, the track features two invited invited talks are given by Karsten Kreis (NVIDIA) on “research from pixels to proteins: scaling generative AI for scientific discovery” and Eric Oosenbrug (BC Public Service) on “confident & wrong: why responsible AI demands more than a checklist”.

The Responsible AI event focuses on the responsible and ethical development of AI. Its program features two keynote talks by University of British Columbia researchers: Hila Gonen speaks on “beyond accuracy: different reliability dimensions in language models,” sharing work on the challenges of making language models more reliable, safe, and trustworthy; Muhammad Abdul-Mageed shares insights connected to his work in the development of more equitable and socially beneficial language technologies. The event also includes a student 3-minute-thesis (3MT) competition, a student research poster session, and a panel. This panel brings together a group of academics working across many areas of responsible AI: Nick Vincent (Simon Fraser University), Hila Gonen (University of British Columbia), Alissa Centivany (Western University), Mo Chen (Simon Fraser University), Peter West (Simon Fraser University), and Kevin Leyton-Brown (University of British Columbia). They bring perspectives on the notion of “responsibility to whom?”, offering useful insights into contextual framings of responsibility in AI development and deployment.

We extend our sincere thanks to all the individuals who contributed to the success of the conference. In particular, we would like to express our gratitude to the CAIAC Executive Committee for providing advice and guidance based on their experience from previous Canadian AI conferences: Sébastien Gambs (President), Mark Crowley (Vice-President), Richard Khoury (Past President), Luiza Antonie (Treasurer), and Paula Branco (Secretary). We are also grateful to the AI/CRV Organization Committee for their tireless efforts. We thank our dedicated Program Committee members, the authors who submitted their work, and all the participants who join us. We also gratefully acknowledge the generous support of our host society (CAIAC) and our platinum sponsors (Canadian Institute for Advanced Research (CIFAR) and the Mental Health Commission of Canada (MHCC)).

Keynote Speeches

Algorithm Synthesis with Theoretical Guarantees

Kevin Leyton-Brown
University of British Columbia (UBC), Vancouver, BC, Canada

Abstract

Despite massive progress on LLM-driven code synthesis, synthesizing algorithms with high empirical performance requires extensive, extremely expensive empirical testing. Algorithm configuration methods are automated ways of performing such testing: optimizing the performance of parameterized heuristic algorithms on given distributions of problem instances. Such methods can be seen as efficient procedures for extending classical machine learning to hypothesis spaces consisting of algorithm designs. This talk will begin by defining the problem and illustrating its promise via some recent practical success stories. However, all widely used algorithm configuration methods both achieve poor asymptotic runtime performance in the worst case and optimize what I will argue is the wrong objective function. I will begin by explaining why we should leverage decision theory to maximize expected utility instead of minimizing average runtime. Then I will present a new algorithm configuration approach called Continuous, Online Utilitarian Procrastination (COUP), which optimizes this objective while offering strong theoretical guarantees. I will conclude by showing that these guarantees come effectively for free, as COUP achieves state-of-the-art empirical performance.

Language as a Signal-Symbol Nexus for Human-Compatible Sequential Decision Making

Sheila McIlraith
University of Toronto, Toronto, ON, Canada

Abstract

Striking advances in machine learning are transforming how we build sequential decision-making systems—from conversational agents and logistics planners to robots, and more generally to computer programs that automate a myriad of everyday tasks. The synthesis of decision-making systems from data presents fundamental challenges to how we effectively integrate and leverage human know-how, capture human norms and preferences, adhere to safety and regulatory constraints, and how we build systems that are taskable by and understandable to the humans they interact with. In this talk, I'll discuss how language—both formal and natural language—provides a signal-symbol nexus for building human-compatible AI sequential decision-making systems. Not only does language provide an expressive and concise vehicle for communication, but I'll show that exploiting the compositional syntax and semantics of language can greatly improve the efficiency of learning.

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