IWAI2025

INTERNATIONAL WORKSHOP ON ACTIVE INFERENCE

OCTOBER 15, 16 & 17, 2025

New Residence Hall, McGill University
3625 Park Ave, Montreal, Quebec H2X 3P8

ACKNOWLEDGEMENTS

IWAI ORGANIZATION COMMITTEE

MAHAULT ALBARRACIN, VERSES, USA

DAVID BENRIMOH, MCGILL UNIVERSITY, CANADA

CHRISTOPHER BUCKLEY, UNIVERSITY OF SUSSEX, UNITED KINGDOM

PABLO LANILLOS, CAJAL NEUROSCIENCE CENTER, SPANISH NATIONAL RESEARCH COUNCIL, SPAIN

RIDDHI J. PITLIYA, VERSES, USA

HIDEAKI SHIMAZAKI, KYOTO UNIVERSITY, JAPAN

IVILIN PEEV STOIANOV, INSTITUTE OF COGNITIVE SCIENCES AND TECHNOLOGIES (ISTC), NATIONAL RESEARCH COUNCIL (CNR), ITALY

TIM VERBELEN, VERSES, USA

MARTIJN WISSE, DELFT UNIVERSITY OF TECHNOLOGY, NETHERLANDS

WELCOME TO IWAI 2025!

We are thrilled to welcome you to Montreal for the first ever North American edition of IWAI. We have prepared a fantastic ensemble of speakers ranging from the theoretical to the applied, in fields ranging from machine learning to robotics to computational psychiatry. This diversity speaks to the burgeoning growth of our field and its potential to serve as a general theory of information processing that can underlie significant advancements across the range of human undertaking.

We are also very excited to welcome you to Montreal - a city known as much for its expertise in neuroscience, artificial intelligence as for the liveliness of its nightlife and foodie scene. While we have a packed schedule laid out for you, we hope you get some time to explore the historic McGill campus, try poutine, and feast on some Montreal bagels.

Active Inference is at a critical crossroads. As the hype around generative AI runs into the fundamental limitations of the technology, new approaches such as Active Inference will be increasingly relevant on the global stage in the quest for new intelligent systems adapted to solving our greatest challenges. At the same time our community is still a close one- at IWAI, you can still meet, speak to, and connect with even the most senior thinkers in Active Inference. Take this opportunity - build connections, foster friendships and collaborations, and let's prepare for what comes next together!

Welcome to Montreal and to IWAI 2025!

David Benrimoh, MD.CM., MSc., MSc., FRCPC

Mahault Albarracin, PhD

IWAI 2025 Chairs

PAST EDITIONS
VIRTUAL 2020 GHENT | 2021 BILBAO
ONSITE 2022 GRENOBLE | 2023 GHENT | 2024 OXFORD

INVITED SPEAKERS

OPENING KEYNOTE	**Chris Mathys**

KEYNOTES	**Glen Berseth** **Karl Friston** **Dalton Sakthivadivel** **Jun Tani**

SOCIAL SCIENCE PANEL	**Axel Constant** **Ines Hipolito** **Ben White**

TUTORIAL ON ACTIVE INFERENCE	**Ryan Smith**

FIRESIDE CHAT AND COCKTAIL	**Anna Ciaunica** **Karl Friston** **Chris Mathys**

LOCATIONS

Main Stage, Poster Room, Lunch
New Residence Hall, McGill University
3625 Park Ave, Montreal, Quebec H2X 3P8

Fireside Chat & Cocktail
McGill Faculty Club, McGill University
3450 McTavish St, Montreal, Quebec H3A 1X9

Gala Dinner
NOMAD
129 avenue Van Horne, Montréal, QC, H2T 2J2

FOR MORE INFORMATION, VISIT THE EVENT WEBSITE

PROGRAM SCHEDULE

15
OCTOBER

8.00
REGISTRATION & BREAKFAST
NEW RESIDENCE HALL, LOBBY

9.00
OPENING REMARKS
DR. DAVID BENRIMOH AND DR. MAHAULT ALBARRACIN NEW
RESIDENCE HALL, MAIN STAGE

9.10
ACTIVE INFERENCE TUTORIAL
DR. RYAN SMITH
NEW RESIDENCE HALL, MAIN STAGE

11.10
BREAK
NEW RESIDENCE HALL, LOBBY

11.20
CURRENT PROGRESS IN EMPIRICAL APPLICATIONS OF ACTIVE INFERENCE IN COMPUTATIONAL PSYCHIATRY
DR. RYAN SMITH
NEW RESIDENCE HALL, MAIN STAGE

12.20
LUNCH
NEW RESIDENCE HALL, LOBBY

13.20
CONTRIBUTED TALKS 1
MODELS OF DECISION MAKING
WAYMO
POSTER SPOTLIGHTS 1
NEW RESIDENCE HALL, MAIN STAGE

14.30
BREAK *MADE POSSIBLE WITH THE SUPPORT OF WAYMO*
NEW RESIDENCE HALL, LOBBY

15.00
OPENING KEYNOTE
WHAT ARE WE UP AGAINST IN ACTIVE INFERENCE?
DR. CHRIS MATHYS
NEW RESIDENCE HALL, MAIN STAGE

16.00
POSTER SPOTLIGHTS 2
NEW RESIDENCE HALL, MAIN STAGE

16.30
POSTER SESSION 1
NEW RESIDENCE HALL - POSTER ROOM

18.30
FIRESIDE CHAT & COCKTAIL
DRS. A. CIAUNICA, K. FRISTON, C. MATHYS, & R. SMITH MCGILL
FACULTY CLUB

PROGRAM SCHEDULE

16 OCTOBER

8.00
REGISTRATION & BREAKFAST
NEW RESIDENCE HALL, LOBBY

9.00
INVITED TALKS
REMARKS ON THE MATHEMATICS OF THE FREE ENERGY PRINCIPLE
DR. DALTON SAKTHIVADIVEL
NEW RESIDENCE HALL, MAIN STAGE

10.00
CONTRIBUTED TALKS 2
FORNEY STYLE FACTOR GRAPHS
POSTER SPOTLIGHTS 3
NEW RESIDENCE HALL, MAIN STAGE

11.00
BREAK
NEW RESIDENCE HALL, LOBBY

11.15
CONTRIBUTED TALKS 3
FUNDAMENTAL ACTIVE INFERENCE EXTENSIONS
POSTER SPOTLIGHTS 4
NEW RESIDENCE HALL, MAIN STAGE

12.15
LUNCH
NEW RESIDENCE HALL, LOBBY

13.15
CONTRIBUTED TALKS 4
SIMULATIONS OF MENTAL PROCESSES
POSTER SPOTLIGHTS 5
NEW RESIDENCE HALL, MAIN STAGE

14.15
SOCIAL SCIENCE PANEL *PROUDLY SPONSORED BY **VERSES***
DRS. A CONSTANT, B WHITE, I HIPOLITO NEW
RESIDENCE HALL, MAIN STAGE

15.15
BREAK *MADE POSSIBLE WITH THE SUPPORT OF **NOUMENAL***
NEW RESIDENCE HALL, LOBBY

15.45
CONTRIBUTED TALKS 5
HUMAN EXPERIMENTS
NOUMENAL
POSTER SPOTLIGHTS 6
NEW RESIDENCE HALL, MAIN STAGE

16.55
POSTER SESSION 2
NEW RESIDENCE HALL - POSTER ROOM

19.00
GALA DINNER *TICKETS PURCHASED SEPARATELY*
NOMAD, 129 AVENUE VAN HORNE, MONTRÉAL, QC, H2T 2J2

PROGRAM SCHEDULE

17
OCTOBER

8.00
REGISTRATION & BREAKFAST
NEW RESIDENCE HALL, LOBBY

8.50
INVITED TALKS
COGNITIVE NEUROROBOTICS STUDIES
EXTENDING THE FREE ENERGY PRINCIPLE
DR. JUN TANI, NEW RESIDENCE HALL, MAIN STAGE

9.50
FIRESIDE CHAT, 'THE FUTURE OF AI'
DRS. GARY MARCUS & KARL FRISTON, MODERATED BY TIM VERBELEN
NEW RESIDENCE HALL, MAIN STAGE

10.30
BREAK
NEW RESIDENCE HALL, LOBBY

10.45
CONTRIBUTED TALKS 6
SCALING AND EFFICIENCY
POSTER SPOTLIGHTS 7
NEW RESIDENCE HALL, MAIN STAGE

11.45
CONTRIBUTED TALKS 7
ROBOTICS
POSTER SPOTLIGHTS 8
NEW RESIDENCE HALL, MAIN STAGE

12.45
LUNCH *MADE POSSIBLE WITH THE SUPPORT OF **NEXT***
NEW RESIDENCE HALL, LOBBY

13.45
CONTRIBUTED TALKS 8
THEORY OF MIND/MULTI-AGENT
VERSES
POSTER SPOTLIGHTS 9
NEW RESIDENCE HALL, MAIN STAGE

14.45
INVITED TALK
FOUNDATIONAL MODELS FOR CONTROL AND ACTIVE INFERENCE.
DR. GLEN BERSETH , NEW RESIDENCE HALL, MAIN STAGE

15.40
POSTER SESSION 3
NEW RESIDENCE HALL, POSTER ROOM

16.30
BREAK *MADE POSSIBLE WITH THE SUPPORT OF **VERSES***
NEW RESIDENCE HALL, LOBBY

17.00
CLOSING KEYNOTE
ACTIVE INFERENCE, LEARNING AND SELECTION
DR. KARL FRISTON , NEW RESIDENCE HALL, MAIN STAGE

18.00
AWARDS AND CLOSING REMARKS
DR. DAVID BENRIMOH AND DR. MAHAULT ALBARRACIN
NEW RESIDENCE HALL, MAIN STAGE

CONTRIBUTED TALKS

October 15, 2025

13.20
CONTRIBUTED TALKS 1 - MODELS OF DECISION MAKING

On the Variational Costs of Changing Our Minds
David Hyland; Mahault Albarracin

Cognitive Effort in the Two-Step Task: An Active Inference Drift-Diffusion Model Approach
Álvaro Garrido Pérez; Viktor Lemoine; Amrapali Pednekar; Yara Khaluf; Pieter Simoens

Addressing the Subsumption Thesis: A Formal Bridge between Microeconomics and Active Inference
Noé Romeo Kuhn

Contributed Talk, Sponsor: WAYMO

October 16, 2025

10.00
CONTRIBUTED TALKS 2- FORNEY STYLE FACTOR GRAPHS

Bethe Predictive Coding
Magnus Koudahl; Tommaso Salvatori; Lancelot Da Costa; Jeff Beck; Alexander Tschantz; Christopher L Buckley; Hampus Linander

A Message Passing Realization of Expected Free Energy Minimization
Wouter W. L. Nuijten; Mykola Lukashchuk; Thijs van de Laar; Bert de Vries

Spike-Timing-Dependent Plasticity for Bernoulli Message Passing
Sepideh Adamiat; Wouter M. Kouw; Bert de Vries

CONTRIBUTED TALKS

October 16, 2025

11.15
CONTRIBUTED TALKS 3 - FUNDAMENTAL ACTIVE INFERENCE EXTENSIONS

Diffusion-Generated Latent Spaces for Continuous Amortized Active Inference Agents: A Mathematical Framework

Zahra Sheikhbahaee; Adam Safron; Dalton A R Sakthivadivel;
Mahault Albarracin; Irina Rish

Deep Active Inference with Neural Stochastic Differential Equations

Marc Pritsch; Georgia Koppe

A Diffusion Prior for Active Inference Planning

Catherine F. Higham;
Roderick Murray-Smith

13.15
CONTRIBUTED TALKS 4 - SIMULATIONS OF MENTAL PROCESSES

An Active Inference Model of Covert and Overt Visual Attention

Tin Mišić; Karlo Koledić; Fabio Bonsignorio;
Ivan Petrovic;
Ivan Marković

Dynamic Attentional Agents in Focused Attention Meditation: Hierarchical Computational Modeling of Expert-Novice Differences

Prakash Chandra Kavi; Daniel Ari Friedman;
Gustavo Patow

Geometric Hyperscanning under Active Inference

Nicolás Andrés Hinrichs; Mahault Albarracin;
Dimitris Bolis; Yuyue Jiang; Leonardo Christov-Moore;
Leonhard Schilbach

CONTRIBUTED TALKS

October 16, 2025

15.45
CONTRIBUTED TALKS 5 - HUMAN EXPERIMENTS

An Active Inference Model of Mouse Point-and-Click Behaviour

Markus Klar; Sebastian Stein; Fraser Carlylr Paterson; John H. Williamson; Roderick Murray-Smith

Writing through Sympathetic Arousal: A Perceptual Active Inference Model of on the Effects of Sympathetic Arousal Interoception on Written and Spoken Grammatical Complexity

Aleksandra, B. Skelton; Lukas A. De Vries; Angelica M. Silva; Roberto Limongi

Evaluation of "As-Intended" Vehicle Dynamics using the Active Inference Framework

Kazuharu Kidera; Takuma Miyaguchi; Hideyoshi Yanagisawa

Contributed Talk, Sponsor: NOUMENAL

October 17, 2025

10.00
CONTRIBUTED TALKS 6 - SCALING AND EFFICIENCY

Message passing-based inference in an autoregressive active inference agent

Wouter M. Kouw; Tim N. Nisslbeck; Wouter W. L. Nuijten

Multi-dimensional Autoscaling of Processing Services: A Comparison of Agent-based Methods

Boris Sedlak; Alireza Furutanpey; Zihang Wang; Victor Casamayor Pujol; Schahram Dustdar

Predictive Coding-based Deep Neural Network Fine-tuning for Computationally Efficient Domain Adaptation

Matteo Cardoni; Sam Leroux

CONTRIBUTED TALKS

October 17, 2025

11.15
CONTRIBUTED TALKS 7 - ROBOTICS

Navigation and Exploration with Active Inference: from Biology to Industry	Daria de Tinguy; Tim Verbelen; Bart Dhoedt
Free-Gate: Planning, Control And Policy Composition Via Free Energy Gating	Francesca Rossi; Émiland Garrabé; Giovanni Russo
Mobile Manipulation with Active Inference for Long-Horizon Rearrangement Tasks	Corrado Pezzato; Ozan Catal; Toon Van de Maele; Riddhi J. Pitliya; Tim Verbelen

13.15
CONTRIBUTED TALKS 8 - THEORY OF MIND/MULTI-AGENT

Theory of Mind Using Active Inference: A Framework for Multi-Agent Cooperation	Riddhi J. Pitliya; Ozan Catal; Toon Van de Maele; Corrado Pezzato; Tim Verbelen
Demonstration of Making Humans Recognize Intentions of Robot Actions through Active Inference	Kanako Esaki; Yasuyuki Kudo; Tadayuki Matsumura; Takeshi Kato; Misa Owa; Junichi Miyakoshi; Yasuhiro Asa; Yang Shao; Ryuji Mine; Hiroyuki Mizuno
Navigating Uncertainties with Active Inference and Probabilistic Diffusion	Yufei Huang; Yulin Li; Andrea Matta; Mohsen a jafari

Contributed Talk, Sponsor: VERSES

POSTER SPOTLIGHT / SESSIONS

POSTER SESSION INSTALLATION
PRESENTED POSTERS MUST BE INSTALLED AT THE BEGINNING OF THE DAY OF THEIR SPOTLIGHT AND REMOVED AT THE END OF THAT DAY'S POSTER SESSION.
THERE WILL BE 10 POSTER STATIONS AVAILABLE PER SESSION (MAXIMUM 20 POSTERS), WITH EACH PRESENTER USING ONE SIDE. POSTERS ARE PLACED ON A FIRST-COME, FIRST-SERVED BASIS; NO ASSIGNED SPOTS WILL BE PROVIDED.

October 15, 2025

POSTER SPOTLIGHTS 1

Reframing the lived experience of persistent dizziness: insights from active inference	Marc A Broberg; Mick Thacker; Karl Friston; Jorge E Esteves
No Way Out: Understanding Freeze Response in Trauma through Active Inference	Yaqi S. Zhang; Anna Pereira
Do Ambidextrous Organizations Minimize Free Energy?	Mikko Järvinen
Morals and Reasoning: Formalizing Moral Influence on Reasoning and AI Systems Alignment	Albert Olweny Okiri
Are clinical diagnoses regimes of attention under active inference?	Dr David M Foreman; Gabbay Dov

POSTER SPOTLIGHT / SESSIONS

October 15, 2025

POSTER SPOTLIGHTS 2

From Theory to Clinical Application: Aligning Active Inference Complexity with Behavioural Task Design in Suicidality Research

Pamina Laessing; Andreea Diaconescu; Peter Dayan

Psilocybin for treatment-resistant depression in autism: an active-inference model of improved cognitive flexibility

Peter Bedford; Povilas Karvelis; Andreea Diaconescu

The Role of Affective States in the Development of Psychotic Symptoms

David Benrimoh; Ryan Smith; Andreea O Diaconescu; Timothy Friesen; Sara Jalali; Nace Mikus; Laura Gschwandtner; Jay Gandhi; Guillermo Horga; Albert Powers

Real-time Active Inference for Auditory Hallucination Modeling in VR-based Voice Conversion

Cumhur Erkut

Modeling uncertainty and volatility using gamified online decision-making tasks across clinical and non-clinical populations: Setup & study plan

Franziska Knolle

Activating inference: Facilitating change in psychodynamic psychotherapy

Patrice Duquette

Active Inference for Energy Smart Connected Buildings

Mohsen A. Jafari; Andrea Matta

An Active Inference Approach to Agricultural Knowledge Representation

Vasu Jindal; Huijin Ju; Zili Lyu

Bayesian Glimpse Control Boosts Active Vision RL on Atari Pong

Pengcheng Pan; Shogo Yonekura; Yasuo Kuniyoshi

Decoding Intentions and Kinematics by Inference

Stefano Diomedi; Antonio Roberto Buonfiglio; Matteo Priorelli; Ivilin Peev Stoianov

POSTER SESSION 1
Commences after the Poster Spotlights

POSTER SPOTLIGHT / SESSIONS

October 16, 2025

POSTER SPOTLIGHTS 3

Active Inference for an Intelligent Agent in Autonomous Reconnaissance Missions	Johan Schubert; Farzad Kamrani; Tove Gustavi
Effects of dynamic goal prior specification on grid-world agent trajectories	Thijs Jenneskens; Wouter M. Kouw
Belief Formation in LLM Agents: Information Diffusion Simulation Based on the Collective Predictive Coding Hypothesis	Yusuke Hayashi
Performing Active Inference with Explainable Tensor Networks	Philip Wilson
Free Energy Projective Simulation (FEPS): Active Inference with Interpretability	Joséphine Pazem; Marius Krumm; Alexander Q. Vining; Lukas J. Fiderer; Hans J Briegel

POSTER SPOTLIGHTS 4

Dynamic Attractors as Active Inference: A Network-based Approach to Adaptive Systems	Matthew Brown; Jeong Hwan Yoon; Pedro Fontana; Harneet Singh; Whitney Sales; Karl Friston
Influence of Deep Neural Network Training Methods on Continual Learning	Emma Graham; Chelsea Joe; Peter Chin; Richard Granger
Hierarchical Deep Active Inference for Efficient Long-Horizon Planning	Gabriel W. Haddon-Hill; Shingo Murata
From Information Thermodynamics to Organizational Principles	Lukas J. Fiderer; Elias Kunze; Hans J Briegel
Long-term prediction of the learning process using reverse engineering of generative models	Takuya Isomura; Yuki Tanimoto; Makio Torigoe; Hitoshi Okamoto; Hideaki Shimazaki

POSTER SPOTLIGHT / SESSIONS

October 16, 2025

POSTER SPOTLIGHTS 5

Material attention: A method to measure the effect of regimes of attention on decision making, using information theory and Markov chain models
Arturo José Valiño; Andy Clark; Felipe Criado-Boado; Luis M. Martínez; Axel Constant

Hierarchical Active Inference Modeling of Social Trust Dynamics in PTSD: Integrating Qualitative Phenomenology with Computational Psychiatry
Andrew Pashea; Jeremy Cooper; Haeun Sun; Angelos Krypotos

I Feel Incapable, Therefore I Fail — an Active Inference Account of Cognitive Control Deficits in Major Depressive Disorder and Generalized Anxiety Disorder
Mengting Zhang

Resilience and adaptability in self-evidencing systems
Mahault Albarracin; Dalton A R Sakthivadivel

The Next Episode
Candice Pattisapu; Maxwell J. D. Ramstead

POSTER SPOTLIGHTS 6

Intracranial Neural Signatures of Decision Uncertainty Based on an Active Inference Model for Three-Armed Bandit Reversal Learning Task
Alessandra Nicoletta Cruz Yu; Ko-Ping Chou; Ryan Smith; Ignacio Saez; Vincenzo Fiore

An Active Inference Account of Stuttering Behavior and Clinical Implications
Evan Usler

Exploring the computational underpinnings of the learned helplessness effect
Nace Mikus; Federico Mancinelli; Giorgia Silani; Claus Lamm; Chris Mathys

Technological Predictions: Rethinking UX Design through Active Inference and the Free Energy Principle
Luca Possati

Carving Psychological Space
Candice Pattisapu; Maxwell J. D. Ramstead

POSTER SESSION 2
Commences after the Poster Spotlights

POSTER SPOTLIGHT / SESSIONS

October 17, 2025

POSTER SPOTLIGHTS 7

AXIOM: Learning to Play Games in Minutes with Expanding Object-Centric Models

Conor Heins; Toon Van de Maele; Alexander Tschantz; Hampus Linander; Dimitrije Markovic; Tommaso Salvatori; Corrado Pezzato; Ozan Catal; Ran Wei; Magnus Koudahl; Marco Perin; Karl Friston; Tim Verbelen; Christopher L Buckley

A Hardware-oriented Approach for Efficient Active Inference Computation and Deployment

Nikola Pižurica; Nikola Milović; Igor Jovančević; Conor Heins; Miguel de Prado

Bayesian Structure Learning for Scalable Active Inference

Lancelot Da Costa

Active Inference with Dynamic Planning and Information Gain in Continuous Space by Inferring Low-Dimensional Latent States

Takazumi Matsumoto; Kentaro Fujii; Shingo Murata; Jun Tani

Updating ActiveInference.jl: Modularity and Ease of Use for Active Inference Models Beyond the Discrete POMDP

Peter Thestrup Waade; John C. Boik; Jonathan Ehrenreich Laursen; Samuel William Nehrer; Dominik Firisz; Chris Mathys

Merging Biology with AI: A Brain-on-Chip for Next-gen Neuromorphic Computing

Guillem Monsó; Wouter M. Kouw

POSTER SPOTLIGHT / SESSIONS

October 17, 2025

POSTER SPOTLIGHTS 8

Real-World Exploration and Navigation via Deep Active Inference with a Diffusion Policy and a World Model

Riko Yokozawa; Kentaro Fujii; Yuta Nomura; Shingo Murata

Deep Active Inference for Real-World Robot Control Using a Temporally Hierarchical World Model

Kentaro Fujii; Shingo Murata

Few-Shot Hierarchical Active Inference for Adaptive Planning with Diffusion Trajectories

Yulin Li; Mohsen a jafari; Andrea Matta

Hierarchical Active Inference for Autonomous Navigation in Microsoft AirSim with Environmentally Adaptive Planning

Satyaki Maitra; Harshil Shah

Robots Inventing Tools: Task-conditioned Tool Design for Robotic Operations

Pablo Lanillos; Abián Torres; Poppy Collis; Virgilio Gomez Lambo

POSTER SPOTLIGHTS 9

Attentional Narrowing and Cognitive flexibility in Active inference

Kirstin Wagner; Alexander Hemming; Dylan Grove

Resolving space-sharing conflicts in road user interactions through uncertainty reduction: An active inference-based computational model

Julian Frederik Schumann; Johan Engstrom; Jens Kober; Arkady Zgonnikov

RL Agents Exploring Communication with the Free Energy Principle

Theodore Jerome Tinker; Jun Tani; Kenji Doya

Simulating Agency Learning in Probabilistic and Social Multi-Agent Scenarios Using Active Inference

Jialin Shi, Riddhi J. Pitliya, Santiago Castiello, Robin A. Murphy

Making Sense of Uncertainty: Designing Experiences for Adaptive Inference

Anna Pereira

POSTER SESSION 3
Commences after the Poster Spotlights