IMOL 2023

6th international workshop on

Intrinsically Motivated Open-ended Learning

Organization committee:

- Stéphane Doncieux
- Georg Martius
- Sao Mai Nguyen
- Emre Ugur
- Johann Huber

Local organization:

ISIR (Institut des Systèmes Intelligents et de Robotique) : https://www.isir.upmc.fr/ under the dual supervision of Sorbonne Université and CNRS







Location:

Sorbonne Université, campus Pierre et Marie Curie 4 Pl. Jussieu, 75005 Paris

Sponsored by PILLAR robot project: https://pillar-robots.eu/

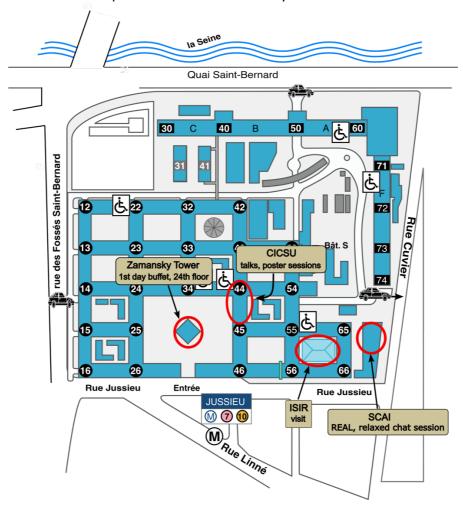




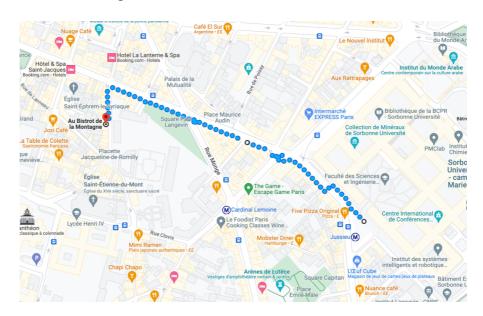
Funded by the European Union under the Horizon Europe programme

Maps

Pierre and Marie Curie Campus of Sorbonne University



September, 14th banquet : path to « Au Bistrot de la Montagne », 38 Rue de la Montagne Ste Geneviève, 75005 Paris, France



Workshop locations

- All days, registration, talks and poster sessions: CICSU (Centre International de Conférences de Sorbonne Université), 102 (hall) & 106 room, 1st floor, tower 44, corridor 44-45
- September 13th, lunch buffet: Zamansky tower, 24th floor
- September 13th, evening for the REAL session and a relaxed chat session: SCAI, Esclangon building, 1st floor
- September 14th, banquet: « Au bistrot de la montagne », 38 Rue de la Montagne Ste Geneviève
- September 15th, afternoon: ISIR visit

Program (preliminary version)

September 13th

Start	Туре	Speaker	Title
09:00	Introduction	S. Doncieux	
09:10	Talk	P.Y. Oudeyer	Autotelic agents, open-endedness and applications
09:50	Discussion		
10:00	Coffee break		
10:30	Talk	S. Calinon	Robot learning from few samples by exploiting the structure
			and geometry of data
11:10	Contributed talk	A. Aubret	Intrinsically motivated object representation learning
11:20	Contributed talk	C. Colas	Thinking Patterns: An Interactive and Collaborative Pattern
			Language for Machine Reasoning
11:30	Contributed talk	T.J. Ringstrom	Towards Open-Endedness on a Compositional Foundation:
			Evaluating Plans and Items with Hierarchical Empowerment Gain
11:40	Contributed talk	A. Dahmani	Toward Understanding Automated Causal Curriculum Learning in
			Humans and Reinforcement Learning Agents
11:50	Discussion		
12:00	Lunch Break	Zamansky Tower,	24th floor
13:30	Poster session	CICSU hall	
15:10	Talk	M. Hoffmann	(How) Can we spot active exploration in the behavior of young
			infants?
15:50	Talk	J. Chu	In praise of folly: goals, play, and problem-making
16:30	Coffee break		
17:00	Talk	J. Clune	
17:40	Discussion		-
17:50	REAL & relaxed	SCAI	
	chat session		
18:50	End of the day		

September 14th

Start	Туре	Speaker	Title
09:00	Talk	R. Duro	PILLAR-Robots: An Approach to Making Autonomous Robots Useful
09:40	Talk	V. Santucci/ G. Baldassare	Integrating multiple motivations for autonomous open-ended learning
10:20	Discussion		
10:30	Coffee break		
11:00	Talk	O. Sigaud	Towards Inferential Social Learning in Teachable Autotelic Agents
11:40	Talk	G. Martius	Intrinsic Motivation meets Model-based RL - a Dream Team
12:20	Discussion		
12:30	Lunch break	CICSU hall	
14:00	Talk	E. Ugur	DeepSym: Discovering symbols for planning in robotics
14:40	Talk	J. Huber	Dataset generation with Quality-Diversity: Application to Grasping and lessons for Open-Endedness
15:20	Contributed talk	M. Gilles	Enhancing Efficiency of Robot Picking Using Sim-to-Application Transfer and Interest-Driven Domain Adaption
15:30	Contributed talk	M. Zadem	Goal Space Abstraction in Hierarchical Reinforcement Learning via Set-Based Reachability Analysis
15:40	Discussion		
15:50	Coffee break		
16:20	Poster session	CICSU hall	
18:00	End of the day		
19:30	Banquet	"Au Bistrot de la r	nontagne"

September 15th

Start	Туре	Speaker	Title		
09:00	Talk	F. Xu			
09:40	Talk	S. M. Nguyen	Hierarchical actions : from human movement analysis to complex sensorimotor skills learning		
10:20	Discussion		complex sensormotor stans rearrang		
10:30	Coffee break				
11:00	Talk	L. Soulier	Behind the journey of ChatGPT: on overview of Large		
			Language Models		
11:40	Panel discussion		IMOL challenges		
12:20	Discussion				
12:30	Closing remarks				
12:45	12:45 End of the meeting				
14:00	ISIR visit				

Poster session 1, September 13th, 13:30

(Selected posters indicated with a title in **bold font** will be introduced by a short talk)

- 1. Toward Understanding Automated Causal Curriculum Learning in Humans and Reinforcement Learning Agents, Annya Dahmani, Eunice Yiu, Nan Rosemary Ke, Tabitha Edith Lee, Oliver Kroemer, Alison Gopnik
- 2. Thinking Patterns: An Interactive and Collaborative Pattern Language for Machine Reasoning, Cédric Colas, Nicolas Yax, Clément Romac, Laetitia Teodorescu, Pierre-Yves Oudeyer, Stefano Palminteri
- 3. *Intrinsically motivated object representation learning*, Arthur Aubret, Céline Teulière, Jochen Triesch
- 4. Towards Open-Endedness on a Compositional Foundation: Evaluating Plans and Items with Hierarchical Empowerment Gain, Thomas James Ringstrom
- 5. Flexible Social Dynamics Emerge Through Model-Based Intrinsic Motivation, Violet Xiang, Logan Cross, Nick Haber
- 6. Computationally Modelling Self-Determination Theory for HCI: The Case of Competence, Erik Lintunen, Christian Guckelsberger, Sebastian Deterding
- 7. Limitations of Asocial Intrinsic Motivation in Meta Imitation Learning, Grgur Kovač, Rémy Portelas, Peter Ford Dominey, Pierre-Yves Oudeyer
- 8. Codeplay: Autotelic Learning through Collaborative Self-Play in Programming Environments, Laetitia Teodorescu, Cédric Colas, Matthew Bowers, Thomas Carta, Pierre-Yves Oudeyer
- 9. Combining Intrinsic and Extrinsic Motivations in a Robotics Cognitive Architecture, Andrea Morelli, Marco Mirolli, Vieri Giuliano Santucci
- 10. Maximizing the Information Capacity of Neurons for Continual Learning, Léo Coquet, Alexandre Pitti, Claudio Weidmann, Ngoc-Son Vu
- 11. Epistemic Uncertainty-based Exploration of Affordances, Fedor Scholz, Johannes Bertram, Martin V. Butz
- 12. Mixing Novelty and Competence-based Intrinsic Motivations in Deep Reinforcement Learning, Gianluca Maselli, Vieri Giuliano Santucci
- 13. Neuro-Symbolic Architecture for Extraction and Application of Higher-Order Rules
 Using Serial-Order Codes, Krzysztof Lebioda, Alexandre Pitti, Fabrice O. Morin, Alois
 Knoll
- 14. Improving object grounding in robot instructions, Amric Trudel

- 15. From Sound Primitives Learning to Structure Extraction: Brain-inspired Model of Infant Early Vocal Learning, Xiaodan Chen, Alexandre Pitti, Mathias Quoy, Nancy F. Chen
- 16. Should I stay or should I go? Addressing the curiosity / boredom dilemma of a domestic robot, Daniela Pamplona, Antoine Manzanera
- 17. Grounding of Action Verbs Based on Similarity of Modular Neural Networks Parameters, Michal Vavrecka
- 18. Curiouser and Curiouser: Children's intrinsic exploration of mazes and its effects on reaching a goal, Eliza Kosoy, David Chan, Jasmine Collins, Deepak Pathak, Pulkit Agrawal, Alexei A Efros, Trevor Darrell, Alison Gopnik

Poster session 2, September 14th, 16:20

(Selected posters indicated with a title in bold font will be introduced by a short talk)

- 1. Enhancing Efficiency of Robot Picking Using Sim-to-Application Transfer and Interest-Driven Domain Adaption, Maximilian Gilles, Rania Rayyes
- 2. Goal Space Abstraction in Hierarchical Reinforcement Learning via Set-Based Reachability Analysis, Mehdi Zadem, Sergio Mover, Sao Mai Nguyen
- 3. Enhancing Agent Communication and Learning through Action and Language, Hugo Caselles-Dupré, Olivier Sigaud, Mohamed Chetouani
- 4. Language Grounded Generative Quality-Diversity With Decision Transformers, Achkan Salehi, Stephane Doncieux
- 5. Visit the lab scenario: exploration in model-based reinforcement learning, Augustin Chartouny, Keivan Amini, Mehdi Khamassi, Benoît Girard
- 6. Regularity as Intrinsic Reward for Free Play, Cansu Sancaktar, Justus Piater, Georg Martius
- 7. Learning Hierarchical World Models with Adaptive Temporal Abstractions from Discrete Latent Dynamics, Christian Gumbsch, Noor Sajid, Georg Martius, Martin V. Butz
- 8. Open-ended Learning of Goals with Non-stationary Interdependencies in Autonomous Robots, Alejandro Romero, Gianluca Baldassarre, Richard J. Duro, Vieri Giuliano Santucci
- 9. *Unsupervised Discovery of Safe Skills for Robotics*, Charly Pecqueux-Guézénec, Nicolas Perrin-Gilbert, Stephane Doncieux

- 10. Directing Open-ended Learning through Verbally Expressed Purposes, Emilio Cartoni, Gianluca Baldassarre, Gianluca Cioccolini
- 11. Prerequisite structure discovery for an intelligent tutoring system based on intrinsic motivation, Louis Annabi, Sao Mai Nguyen
- 12. Unveiling the Ontological Implications of Motivation and Directedness Towards Inostensible Referents: Evaluating Meinong and Russell's Perspectives, Alexis Rozanski
- 13. An Intrinsic Motivation for Self-Representation, Tracey Mills, Cédric Colas, L. A. Paul, Julian De Freitas, Tomer Ullman, Joshua B. Tenenbaum
- 14. Diverse Offline Imitation via Fenchel Duality, Marin Vlastelica, Pavel Kolev, Jin Cheng, Georg Martius
- 15. Specific Curiosity is a Holistic Pursuit, Nadia M. Ady
- 16. Studying reasoning in a family of large language models, Nicolas Yax, Hernan Anllo, Stefano Palminteri
- 17. Rapid Learning without Catastrophic Forgetting in the Morris Water Maze, Raymond Wang, Jaedong Hwang, Akhilan Boopathy, Ila R Fiete
- 18. Successive Refinement in Continual Learning: A Study on Spatial Representations, Nicola Catenacci Volpi, Hippolyte Charvin, Daniel Polani
- 19. Biologically inspired use of self-organizing maps for continuous learning in humanoid robots, Magdalena Yordanova