VERONICA CHELU

PhD Candidate @ McGill University / Mila, Quebec AI Institute
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Research interests

- 🧠 theoretical & computational neuroscience: (meta-)plasticity/adaptation, psychedelic research
- 🤖 RL, policy optimization, learning theory, deep & continual learning, dynamical systems

Education

2019–present **Ph.D. in Computer Science**, *McGill University*, Montreal
Lifelong learning, adaptive decision-making & meta-plasticity in artificial & biological agents. Supervised by Doina Precup.

2016–2018 **M.Sc in Computer Science / Artificial Intelligence**, *University "Politehnica" Bucharest*, Bucharest
The influence of exploratory behaviour on temporal abstraction and subgoal identification in HRL.

2009–2013 **B.Sc in Computer Science**, *University "Politehnica" Bucharest*, Bucharest
Bachelor Thesis: Emotion simulation on virtual 3D face models.

Working papers

[1] **Veronica Chelu** and Doina Precup. *Functional Acceleration for Policy Mirror Descent.* accepted @ Aligning Reinforcement Learning Experimentalists and Theorists (ARLET) workshop @ ICML 2024 🔗, Adaptive Learning in Complex Environments workshop (TTIC) 🔗, 📄, 📄.

[2] Arthur Juliani, **Veronica Chelu**, Laura Graesser, and Adam Safron. *A dual-receptor model of serotonergic psychedelics: therapeutic insights from simulated cortical dynamics.* in submission @ PLOS Computational Biology 🔗, 📄, 📄.

[3] **Veronica Chelu**, Tom Zahavy, Arthur Guez, Doina Precup, and Sebastian Flennerhag. *Acceleration in policy optimization.* presented @ EWRL 2023 🔗, 📄, 📄.

Selected articles

[4] **Veronica Chelu**, Diana Borsa, Doina Precup, and Hado van Hasselt. *Selective Credit Assignment.* arXiv 2022, 📄.

[5] **Veronica Chelu**, Doina Precup, and Hado van Hasselt. *Forethought and Hindsight in Credit Assignment.* In: Proceedings of Neural Information Processing Systems (NeurIPS) 2020. 📄.

[6] Nathan de Lara, **Veronica Chelu**, and Doina Precup. *Recurrent Policies Are Not Enough for Continual Reinforcement Learning.* Accepted @ Failure Modes of Sequential Decision-Making in Practice, ICBINB workshop @ RLC 2024 🔗, 📄.

Publications & preprints

[7] Ray Jiang, Shangtong Zhang, **Veronica Chelu**, Adam White, and Hado van Hasselt. *Learning Expected Emphatic Traces for Deep RL.* AAAI 2022, 📄.

[8] Anthony GX-Chen, **Veronica Chelu**, Blake A. Richards, and Joelle Pineau. *A Generalized Bootstrap Target for Value-Learning, Efficiently Combining Value and Feature Predictions.* AAAI 2022, 📄.

[9] Arushi Jain, **Veronica Chelu**, Sharan Vaswani, and Nicolas Le Roux. *Actor-critic as a joint maximization problem.* accepted @ RLDM 2022, 🔗.

[10] Anthony GX-Chen, **Veronica Chelu**, Blake Richards, and Joelle Pineau. *Lambda Successor Return Error.* In: Biological and Artificial Reinforcement Learning Workshop at NeurIPS 2020.

[11] **Veronica Chelu** and Doina Precup. *Option Discovery by Aiming to Predict.* In: Proceedings of Reinforcement Learning and Decision Making (RLDM), in Multi-Task and Lifelong Reinforcement Learning Workshop and in Self-Supervised Learning Workshop at ICML 2019. 📄.

[12] **Veronica Chelu**. *Temporal abstraction and subgoal discovery by clustering successor features.* In: Women in Machine Learning (WIML) Workshop 2018.

[13] **Veronica Chelu**. *The influence of exploratory behaviour on temporal abstraction and subgoal identification.* Transylvanian Machine Learning Summer School (2018) - Best Poster Award. 📄.

[14] Veronica Chelu*, J. Baek*, L. Iordache, V Paunescu, A. Ghiuta H. Ryu, Y. Soh A. Petreanu, A. Leica, and B. Jeon. *Scene Understanding Networks for Autonomous Driving based on Around View Monitoring System.* In: Workshop on Autonomous Driving, Conference on Computer Vision and Pattern Recognition (CVPR) 2018. 🄿.

Academic awards

2022-2024	FRQNT, Fonds de recherche du Quebec, *Nature and Technology*
2021-2024	IVADO's PhD Excellence scholarship
2020-2021	Borealis AI 2020-2021 Fellowship
2016-2018	Excellence Scholarship, *for the M.Sc in Computer Science and Engineering at University "Politehnica" Bucharest*, funded by the Romanian government
2016-2018	Merit Scholarship, *for the M.Sc in Computer Science and Engineering at University "Politehnica" Bucharest*, funded by the Romanian government
2009-2013	Merit Scholarship, *for the B.Sc in Computer Science at University "Politehnica" Bucharest*, funded by the Romanian government

Industry experience

April 2022 – April 2023	**Research Scientist Intern**, *DeepMind*, Montreal, CA Host: Arthur Guez, Manager: Doina Precup
Feb 2020 – July 2020	**Research Scientist Intern**, *DeepMind*, London, UK, Core RL team Host: Hado van Hasselt, Manager: David Silver
2016–2018	**Research Engineer**, *Apsisware*, Bucharest, LG Electronics R&D team Worked on: *Scene Understanding for assisted technology and autonomous driving* and *Generative models with application to facial recognition*
2016	**Machine Learning Engineer**, *Sparktech Software*, Bucharest
2015	**Software Engineer**, *Deutsche Bank*, Bucharest
2014	**Software Engineer**, *Misys*, Bucharest
2013	**Software Engineer**, *Cronian Labs*, Bucharest

Academic experience, mentorship, teaching & talks

Summer 2023	**Research mentorship of undergraduate students**, *Nathan De Lara (project: Model-based learning for non-stationary continuous control environments), and Steve Wen (project: Adaptive exploration for non-stationary continuous control environments)*
June 2023	**Talk on Acceleration via Optimism and Adaptivity**, *Mila RL workshop 2023*
Summer 2020	**Talk on Forethought and Hindsight in Reinforcement Learning**, *RL Sofa, Mila 2020*
Summer 2020	**Teaching assistant and mentor**, *AI4SocialGood Summer Lab 2020*, [details]
Winter 2020	**Teaching assistant for the Reinforcement Learning course**, *McGill University*, [Comp767]
July 2019	**Contributed talk on Option Discovery by Aiming to Predict**, *Modeling Inductive Biases in Reinforcement Learning Workshop*, at Reinforcement Learning and Decision Making (RLDM) 2019
Spring 2018	**Lecturer for Deep Learning for Visual Arts**, *Faculty of Mathematics and Computer Science, University of Bucharest*
June 2018	**Applied deep learning for vision, sound and control**, *Faculty of Mathematics and Computer Science, University of Bucharest*, Recent Advances in Artificial Intelligence (RAAI) 2018
Summer 2018	**Lectures and workshops on Reinforcement Learning**, *University "Politehnica" Bucharest*, ROSEdu - Romanian Open Source Education, [details]

Committee, reviewing and volunteering

Reviewer @ Conference proceedings, *RLC (2024), ICLR (2024, 2023, 2022), NeurIPS (2023, 2021), ICML (2024, 2023, 2020 (33%))*

Reviewer @ Workshops, *EWRL (2023, 2024), ARLET ICML 2024, Deep RL Workshop NeurIPS (2020, 2021) Multitask and Lifelong Reinforcement Learning Workshop ICML (2019), WIML NeurIPS (2018, 2019), Continual Learning Workshop NeurIPS (2018)*

Volunteering, *Organized the "Professor Series" event for the Reasoning and Learning (RL) lab meetings— where each week we hosted professors from the McGill/Mila ecosystem to give talks on their broad research direction and offer career advice*

Training courses

Summer 2024 **Analytical Connectionism Summer School,** 🔗, *neuroscience, psychology & machine-learning— analytical methods for neural-network analysis & connectionist theories of higher-level cognition & psychology*, Organized by Andrew Saxe, supported by Gatsby and Flatiron Institute

Fall 2019 **Probabilistic Analysis of Algorithms and Data Structures,** *with Prof. Dr. Luc Devroye*, COMP 690 at McGill University, 🔗

Summer 2019 **Deep Learning and Reinforcement Learning Summer School (DLRL) 2019**, *at University of Alberta*

Summer 2018 **Transylvanian Machine Learning Summer School (TMLSS) 2018,** 🔗

Computer & programming skills

</> Python, C++, Git, Unix, Latex

ML/DL Jax, Tensorflow, Pytorch, Numpy, Matplotlib

Life

meditator/yogi (certified instructor 200 hr RYT), self-taught amateur handbalancer & contortionist-in-progress, occasional naïve artist (painting oil on canvas, drawing pencil/digital), philosophy & nature enthusiast.