VERONICA CHELU

Postdoctoral Researcher @ McGill University / Mila, Quebec AI Institute
📍 *Montreal, Canada*

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Research Interests

- theoretical, computational & behavioural neuroscience (psychedelic research, neural coding, manifolds & dynamics, neuroplasticity, neuropsychopharmacology)
- continual reinforcement learning (RL) & adaptive decision-making, learning theory, deep learning, dynamical systems, neural latent-circuit modelling

Education

2019–2025   **Ph.D. in Computer Science**, *McGill University* 🎓, (Montreal)
Thesis: Efficient Online Learning & Adaptive Decision-Making in Artificial & Biological Agents 📄📄📄
Supervised by Doina Precup 🏛.

2016–2018   **M.Sc in Computer Science / Artificial Intelligence**, *University "Politehnica" Bucharest* 🎓, (Bucharest)
Thesis: The influence of exploratory behaviour on temporal abstraction & subgoal identification in HRL. 📄📄📄
Supervised by Dr. Tudor Berariu 🏛.

2009–2013   **B.Sc in Computer Science**, *University "Politehnica" Bucharest* 🎓, (Bucharest)
Thesis: Emotion simulation on virtual 3D face models. 📄
Supervised by Prof. Dr. Florica Moldoveanu 🏛.

Publications & preprints

[1] **Veronica Chelu** and Doina Precup. *Excitatory-Inhibitory Dynamics in Adaptive Decision-Making*. accepted @ Reinforcement Learning and Decision Making (RLDM) workshop 2025 ↗📄.

[2] **Veronica Chelu** and Doina Precup. *Mood as an Extrapolation Engine for Adaptive Learning and Decision-Making*. presented @ Computational and Systems Neuroscience (COSYNE) 2025 ↗, 📄.

[3] **Veronica Chelu** and Doina Precup. *Functional Acceleration for Policy Mirror Descent*. presented @ Aligning Reinforcement Learning Experimentalists and Theorists (ARLET) workshop @ ICML 2024 ↗, @ European Workshop on Reinforcement Learning (EWRL) 2024 ↗, @ Adaptive Learning in Complex Environments workshop (TTIC) ↗, 📄, 📄.

[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] Arthur Juliani, **Veronica Chelu**, Laura Graesser, and Adam Safron. *A dual-receptor model of serotonergic psychedelics*. in submission @ PLOS Computational Biology ↗, 📄, 📄.

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

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

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

[10] 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, 📄.

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

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

[13] **Veronica Chelu**. *Temporal abstraction and subgoal discovery by clustering successor features*. In:

Women in Machine Learning (WIML) Workshop 2018 🔖.

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

[15] **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. 🔖.

Reports & Other Articles

[16] **Veronica Chelu**. *Efficient Credit Assignment in Reinforcement Learning (PhD Proposal).* McGill University. 🔖, 2022.

[17] **Veronica Chelu**. *Retrospective Causal Models for Temporal Credit Assignment.* Borealis AI. 🔖, 2021.

[18] **Veronica Chelu**. *Abstract Models in Reinforcement Learning (PhD Comprehensive report).* McGill University. 🔖, 2020.

[19] Ioannis Mitliagkas, **Veronica Chelu**, Andre Cianflone, Aldo Lamarre, and Breandan Considine. *IFT 6085 - Lecture 5 Accelerated Methods - Polyak's Momentum (Heavy Ball Method).* 🔖, 2019.

Academic Awards

2022-2023 **Bourses de doctorat en recherche: 2022-2023 - B2X - 321675**, *Fonds de recherche du Quebec, Nature et Technologies (FRQNT)* 🏛

2021-2024 **PhD Excellence scholarship**, *IVADO* 🏛

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**, *Google DeepMind* 🔗, (Montreal, CA)
Host: Arthur Guez, Manager: Doina Precup

Feb 2020 – July 2020 **Research Scientist Intern**, *Google 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 Global Technology* 🔗, (Bucharest)

2014 **Software Engineer**, *Finastra (formerly Misys)* 🔗, (Bucharest)

2013 **Software Engineer**, *Cronian Labs (meanwhile dissolved)* 🔗, (Bucharest)

2012 **Software Engineer**, *Telekom Romania (formerly Romtelecom)* 🔗, (Bucharest)

Mentorship

Summer 2023 **Research mentorship of undergraduate students**, *Nathan De Lara* 👤 *(Project: Recurrent Policies Are Not Enough for Continual Reinforcement Learning), and Steve Wen* 👤 *(Project: Adaptive exploration for non-stationary continuous control environments)*

Teaching

May-June 2020 — Teaching assistant and mentor, *AI4SocialGood Summer Lab 2020*, ↗

Winter 2020 — Teaching assistant for the Reinforcement Learning course, *Comp767 @ McGill University* 🎓

Spring 2018 — Lecturer for Deep Learning for Visual Arts, *Faculty of Mathematics and Computer Science, University of Bucharest* 🎓

Summer 2018 — Lectures and workshops on Reinforcement Learning, *@ University "Politehnica" Bucharest*, ROSEdu - Romanian Open Source Education, ↗

Talks

August 2024 — Lifelong learning, adaptive decision-making & meta-plasticity in artificial & biological agents, *invited talk* 📄 🖼 *@ Dr. Bagot' lab* ↗

June 2023 — Acceleration via Optimism and Adaptivity, *Mila RL Workshop @ Mont-Tremblant*

June 2020 — Forethought and Hindsight in Reinforcement Learning, *RL Sofa @ Mila* 📄

Summer 2020 — Forethought and Hindsight in Reinforcement Learning, *Neural Information Processing Systems Conference (NeurIPS) 2020*, 🖼

July 2019 — Option Discovery by Aiming to Predict, *Modeling Inductive Biases in Reinforcement Learning Workshop*, @ Reinforcement Learning and Decision Making (RLDM) 2019 ↗, Multi-Task and Lifelong Reinforcement Learning Workshop @ International Conference on Machine Learning (ICML) 2019 ↗

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

Hackathons

22-23 August 2024 — **Analytical Connectionism Hackathon**, ↗, I worked on a project attempting to model deficits in learning and decision-making present in neural disorders using Reinforcement Learning (RL) and Recurrent Neural Networks (RNNs).

Committee, Reviewing, Volunteering

Program Committee (Reviewer) @ Conference proceedings, *Cognitive Computational Neuroscience (CCN) 2025, Reinforcement Learning Conference (RLC) [2024], International Conference on Learning Representations (ICLR) [2024, 2023, 2022], Neural Information Processing Systems (NeurIPS) [2023, 2021], International Conference on Machine Learning (ICML) [2024, 2023, 2020 (top 33%)])*

Program Committee (Reviewer) @ Workshops, *European Workshop on Reinforcement Learning (EWRL) [2023, 2024], Aligning Reinforcement Learning Experimentalists and Theorists (ARLET) @ International Conference on Machine Learning (ICML) [2024], Deep RL Workshop @ Neural Information Processing Systems (NeurIPS) [2020, 2021], Multitask and Lifelong Reinforcement Learning Workshop @ International Conference on Machine Learning (ICML) [2019], Women in Machine Learning (WIML) @ Neural Information Processing Systems (NeurIPS) [2018, 2019], Continual Learning Workshop @ Neural Information Processing Systems (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 to graduate students.*

Training Courses

12-23 August 2024 — **Analytical Connectionism Summer School**, ↗, *neuroscience, psychology & machine-learning— analytical methods for neural-network analysis & connectionist theories of higher-level cognition & psychology*, Organized by Gatsby and Flatiron Institute, 📍 New York, USA

Fall 2019 — **Probabilistic Analysis of Algorithms and Data Structures**, *with Prof. Dr. Luc Devroye* 🎓, 📍 McGill University, Montreal, Canada

July 2019 — **Deep Learning and Reinforcement Learning Summer School (DLRL) 2019**, 📍 *University of Alberta, Edmonton, Canada*

July 2018 **Transylvanian Machine Learning Summer School (TMLSS) 2018**, ↗, 📍 Cluj-Napoca, Romania

Computer & programming skills

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

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

Life

meditation enthusiast, yogi (certified instructor: 200 hr Registered Yoga Teacher (RYT), self-taught handbalancer & contortionist, naïve artist, philosophy & nature enthusiast.