

Mayalen Etcheverry

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RESEARCH INTERESTS

Machine Learning • Complex systems • AI for Science • Open-Endedness

EDUCATION

INRIA, [Flowers](#) team | [Poietis](#) company

Bordeaux, FR

Ph.D. in Machine Learning, Advisors: Dr. [Pierre-Yves Oudeyer](#), Dr. [Clément Moulin-Frier](#), Dr. Marc Nicodeme

2020–2023

- Thesis: “*Curiosity-driven AI for Science: Automated Discovery of Self-Organized Structures*”
Defended on November 16, 2023 [\[Manuscript\]](#) [\[Slides\]](#) [\[Video\]](#)

University College of London (distinctions, GPA: 4.0)

London, GB

M.Sc. in Computer Vision, Computer Graphics and Imaging

2016–2017

- Thesis: “*Making parametric models of buildings easier to edit by predicting future edit patterns in the Open3D platform*”, Thesis Supervisor: Dr. [Paul Guerrero](#)

Télécom Paris, Top-ranked French school in digital technologies (**GPA: 3.6**)

Paris, FR

M.Eng. in Computer Graphics (major) and Data Science (minor)

2014–2017

B.Sc. in Computer Science

Engineering School Preparatory Classes (GPA: 3.8)

Bordeaux, FR

Undergraduate program in mathematics and physics to prepare the national competitive entrance exams to the *Grandes écoles*

2012–2014

RESEARCH WORK EXPERIENCE

Tufts University, Allen Discovery Center [The Levin Lab](#)

Boston, USA

Visiting scholar, Advisor: Dr. [Michael Levin](#)

about –dec 2022

- Development of software tools for efficient simulation and optimization of gene regulatory networks models in JAX
- Development of curiosity-driven algorithms to reveal diverse behavioral competencies of gene regulatory networks

Poietis, in the R&D team

Pessac, FR

Doctoral Researcher under CIFRE contract, Supervisor: Dr. Marc Nicodème

2020 –2023

- Identification of the opportunities afforded by curiosity-driven machine learning approaches for applications in synthetic and regenerative biology, with 3 specific use-cases for Poietis bioprinting technology
- Development of a proof of concept use-case in the SimCells simulator (Python, Java, OpenCL)
- Development of a web platform to gather data collected by biologists during experimental campaigns (Flask)

INRIA, in the [Flowers](#) project-team

Bordeaux, FR

Research Engineer, Supervisor: Dr. [Pierre-Yves Oudeyer](#)

2019 –2020

- Unsupervised representation learning for intrinsically-motivated exploration of complex systems in Pytorch

- Development of a modular and dynamic network architecture where a hierarchy of behavioral characterization spaces is progressively constructed, allowing flexible representations and intuitive guidance during the discovery process

Siemens Healthineers, in the R&D team

Princeton, USA

Research Scientist Intern, Supervisor: Dr. [Bogdan Georgescu](#) and Dr. [Sasa Grbic](#)

2017-2018

- Deep Learning for organ segmentation in 3D CT Scans: responsible for implementing the preprocessing/training/evaluation pipeline for 10 organs - practical experience with Pytorch and large databases
- Research and development of a deep reinforcement-learning algorithm for localizing anatomical structures in 3D images

PUBLICATIONS

* stands for equal contributions

Peer-Reviewed

- [1] **M. Etcheverry**, C. Moulin-Frier, P.-Y. Oudeyer, and M. Levin, *AI-driven Automated Discovery Tools Reveal Diverse Behavioral Competencies of Biological Networks*, Accepted at **eLife journal** [\[Paper\]](#) [\[Executable Paper\]](#) [\[Tutorials\]](#) [\[Code\]](#), 2024.
- [2] **M. Etcheverry**, M. Levin, C. Moulin-Frier, and P.-Y. Oudeyer, *SBMLtoODEjax: Efficient simulation and optimization of ODE SBML models in JAX*, Accepted at **AI4Science Workshop - NeurIPS 2023** [\[Paper\]](#) [\[Code\]](#) [\[Documentation\]](#) [\[Tutorials\]](#), 2023.
- [3] E. Plantec, G. Hamon, **M. Etcheverry**, P.-Y. Oudeyer, C. Moulin-Frier, and B. W.-C. Chan, *Flow-Lenia: Towards open-ended evolution in cellular automata through mass conservation and parameter localization*, Accepted at **ALIFE 2023 with Best Paper Award** [\[Paper\]](#) [\[Website\]](#) [\[Notebook\]](#), 2023.
- [4] **M. Etcheverry**, C. Moulin-Frier, and P.-Y. Oudeyer, *Hierarchically organized latent modules for exploratory search in morphogenetic systems*, Accepted at **NeurIPS 2020 with Oral presentation** [\[Paper\]](#) [\[Website\]](#) [\[Oral\]](#) [\[Poster\]](#) [\[Code\]](#), 2020.
- [5] C. Reinke*, **M. Etcheverry***, and P.-Y. Oudeyer, *Intrinsically Motivated Discovery of Diverse Patterns in Self-Organizing Systems*, Accepted at **ICLR 2020 with Oral presentation** [\[Paper\]](#) [\[Blogpost\]](#) [\[Website\]](#) [\[Oral\]](#) [\[Code\]](#), 2020.
- [6] **M. Etcheverry**, P.-Y. Oudeyer, and C. Reinke, *Progressive growing of self-organized hierarchical representations for exploration*, Accepted at **BeTR-RL Workshop - ICLR 2020** [\[Paper\]](#) [\[Oral\]](#), 2020.
- [7] **M. Etcheverry**, B. Georgescu, B. Odry, T. J. Re, S. Kaushik, B. Geiger, N. Mariappan, S. Grbic, and D. Comaniciu, *Nonlinear adaptively learned optimization for object localization in 3d medical images*, Accepted at **DLMIA Workshop - MICCAI 2018**, as well as **MED-NeurIPS Workshop - NeurIPS 2018** [\[Paper\]](#) [\[Poster\]](#), 2018.

Preprints

- [8] G. Hamon*, **M. Etcheverry***, B. W.-C. Chan, C. Moulin-Frier, and P.-Y. Oudeyer, *Discovering sensorimotor agency in cellular automata using diversity search*, **In Submission** [\[Paper\]](#) [\[Blogpost\]](#) [\[Website\]](#) [\[Notebook\]](#) [\[Code\]](#), 2023.
- [9] **M. Etcheverry**, B. W.-C. Chan, C. Moulin-Frier, and P.-Y. Oudeyer, *Meta-diversity search in complex systems, a recipe for artificial open-endedness?*, **GECCO 2021 Competition, Runner-up Prize** [\[Video\]](#) [\[Blogpost\]](#), 2021.

Patents

- [10] **M. Etcheverry**, B. Georgescu, S. Grbic, D. Comaniciu, B. L. Odry, T. Re, S. Kaushik, B. Geiger, and M. S. Nadar, *Adaptive nonlinear optimization of shape parameters for object localization in 3d medical images*, [\[US Patent App. 16/270,918\]](#), 2019.

COMMUNICATIONS

- Ph.D. Defense - “Curiosity-driven AI for Science: Automated Discovery of Self-Organized Structures” (Bordeaux) [\[Video\]](#)
Jury: Pr. [Alan Aspuru-Guzik](#), Pr. [Sebastian Risi](#), Pr. [Melanie Mitchell](#), Pr. [Jeff Clune](#), Dr. [Nicolas Brodu](#) nov 2023
- Invited talk - [From Cells to Societies, Collective Learning across Scales](#) - ICLR Workshop (online) [\[Video\]](#)
Panel Discussion with [Alexander Mordvinsev](#) and Pr. [Richard A. Watson](#) april 2022
- Interview with Dr. [Nicholas Guttenberg](#) about my work (online) [\[Transcripts\]](#) feb 2022
- Oral presentation and poster, NeurIPS 2020 (online) [\[Video\]](#) [\[Poster\]](#) dec 2020
- Oral presentation - [Beyond “tabula rasa” in reinforcement learning](#) - ICLR 2020 Workshop (online) [\[Video\]](#) april 2020
- Poster - [Deep Learning in Medical Image Analysis](#) - MICCAI 2018 Workshop (Granada) [\[Poster\]](#) sep 2018

GRANTS AND AWARDS

- ALife 2023 [Best Paper Award](#) (Prize: 500\$) 2023
- Jean Walter Zellidja Mobility Research Scholarship, given by French Academy (Prize: 3700€) 2022
- UBGRS Mobility Research Scholarship, given by Bordeaux University (Prize: 4000€) 2022
- Runner-up prize at the [Minecraft open-endedness challenge](#) helded at GECCO 2021 (Prize: 500\$) 2021
- “Coup de coeur” prize for poster submission at [stereotype busters](#) national competition (Prize: 100€) 2016

OPEN-SOURCE PROJECTS

- [SimpleFOC AI Assistant](#): tutorial about using Retrieval Augmented Generation (RAG) to build a SimpleFOC AI Assistant
- [Sketch-Transformer](#): tutorial about augmenting and training a transformer network to generate human-like sketches
- [AutoDiscJax](#): software for automated exploration of biological network models in JAX, together with associated [tutorials](#)
- [SBMLtoODEjax](#): software for converting SBML models in python classes written end-to-end in JAX, together with associated [documentation](#) and [tutorials](#)
- [AdTool](#): interactive software for automated discovery of patterns in the exploration of complex systems
- [EvoCraftSearch](#): source code fo my participation to the MineCraft open-endedness challenge in GECCO 2021
- [HOLMES](#): source code fo the NeurIPS 2020 paper, together with the associated [webpage](#)
- [Automated Discovery of Patterns in Lenia](#): source code for the ICLR 2020paper, together with the associated [webpage](#)

ACADEMIC SERVICES

- Co-organized the second Agent Learning in Open-Endedness Workshop at NeurIPS 2024 [\[Website\]](#)
- Reviewer at several journals and conferences: ICML 2024 (reviewed workshop proposals), ALife 2024 (reviewed a journal paper), NeurIPS 2023 ALOE (reviewed workshop papers), Applied Intelligence journal (reviewed journal papers)

SKILLS

- **Programming:**
 - Python, PyTorch, Jax
 - C++, OpenGL, Matlab, Qt
 - Flask, HTML, CSS, JavaScript
 - Bash, Slurm
 - Git
- **Typesetting:** LaTeX
- **Operating Systems:** Linux / macOS

LANGUAGES

- **French:** native speaker
- **English:** advanced
 - **TOEFL:** score of 102/120
- **Spanish:** advanced
 - **OIB:** International Option Baccalaureate with Honors
- **Serbo-Croatian:** elementary

MENTORSHIP

- Supervision of master-level 6 months research internships (Gautier Hamon, Erwan Plantec)
- Supervision of license-level 3 months research internships (Marion Schaeffer, Lucie Galland, Théo Goix)
- Scientific mediation and mentoring for high-school student girls