

# Mayalen Etcheverry

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## RESEARCH INTERESTS

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AI for Science • Open-Endedness • Autotelic Learning • Complex systems • Collective Intelligence

## EDUCATION

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**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

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**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

**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**

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

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\* 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

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- 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 Mordvinsteu](#) 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

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- 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

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- [Sketch-Transformer](#): tutorial about augmenting and training a decoder-only transformer network architecture, from scratch in Pytorch, to learn to generate human-like sketches as a sequence of strokes
- [AutoDiscJax](#): software for automated exploration of gene regulatory network models written end-to-end 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

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- Co-organized the second Agent Learning in Open-Endedness Workshop at NeurIPS 2024 [\[Website\]](#)
- Reviewer
  - ICML 2024 (reviewed 3 workshop proposals)
  - ALife 2024 (reviewed 1 paper)
  - NeurIPS 2023 ALOE workshop (reviewed 2 papers)
  - Applied Intelligence journal (reviewed 2 papers)

## SKILLS

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

## LANGUAGES

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

## MENTORSHIP

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- 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