Adrien Bardes

PhD student at Inria & Meta AI

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Research Interests

My research interests lie between theory and practice of self-supervised learning from visual inputs. I strongly believe that vision is a core component of human intelligence and that future AI systems will understand the world by self-learning from visual data such as images and videos.

Education

Current **PhD in Computer Science**, *Inria, Meta AI.*
Advisors: Yann LeCun and Jean Ponce
Subject: Self-supervised vision algorithms with regularized latent variables

2019 - 2020 **M.Sc in Machine Learning, Year 2, MVA**, *Ecole Normale Supérieure Paris-Saclay*, with highest honors, GPA: 16.54/20.

- Object Recognition and Computer Vision
- 3D Computer Vision
- Medical Image Analysis
- Numerical Imaging
- Probabilistic Graphical Models
- Reinforcement Learning
- Deep Learning
- Speech and natural language processing

2018 - 2019 **M.Sc in Machine Learning, Year 1, MPRI**, *Ecole Normale Supérieure Paris-Saclay*, with highest honors, GPA: 16.39/20 - Rank 11/31.

- Statistical Machine Learning
- Convex and Combinatorial Optimization
- Introduction to Computer Vision
- Deep Learning
- Robotics and Robot Motion Planning
- Algorithmics and Bioinformatics
- Lambda-calculi and Categories
- Initiation to research

2017 - 2018 **B.Sc in Theoretical Computer Science**, *Ecole Normale Supérieure Paris-Saclay*, with honors, GPA: 13.76/20 - Rank 13/28.

- Computability and Complexity
- Algorithmic
- Programming theory
- Discrete Mathematics
- Systems and Networking
- Logic
- Formal Languages
- Databases
- Lambda calculus
- Cryptography

June 2017 **Admission to the Ecole Normale Supérieure Paris-Saclay**.
French elite school oriented toward research.

2014 - 2017 **B.Sc in Computer Science**, *Université Paris-Est Créteil*, with highest honors, GPA: 17,42/20 - Rank 1/80.

Experience

Current **Research Assistant**, *Inria, Meta AI*, Paris, France.
with Jean Ponce and Yann LeCun

Apr - Sep 2020 **Research Internship**, *Inria*, WILLOW team, Paris, France.
Self-supervised vision algorithms with regularized latent variables, *with Jean Ponce and Yann LeCun*

Apr - Aug 2019 **Research Internship**, *Carnegie Mellon University*, The Robotics Institute, Pittsburgh, USA.
Research in machine learning for computer vision applications, *with Martial Hebert*

Jun - Jul 2018 **Research Internship**, *Université de Strasbourg*, ICube, Strasbourg, France.
Study and improving of a case-based reasoning system for perennial crop allocation, *with Florence Le Ber*

Apr - May 2017 **Software Engineering Internship**, *Smart Prospective*, Paris, France.
Development of a mobile Android library (SDK)

Publications

[1] **Adrien Bardes**, Nicolas Ballas, Mido Assran, Quentin Garrido, Pascal Vincent, Mike Rabbat, Yann LeCun, *V-JEPA: A Joint-Embedding Predictive Architecture For Self-Supervised Learning From Videos*, **2023**

[2] Micah Goldblum, Hossein Souri, Renkun Ni, Manli Shu, Viraj Uday Prabhu, Gowthami Somepalli, Prithvijit Chattopadhyay, **Adrien Bardes**, Mark Ibrahim, Judy Hoffman, Rama Chellappa, Andrew Gordon Wilson, Tom Goldstein, *Battle of the Backbones: A Large-Scale Comparison of Pretrained Models across Computer Vision Tasks*, **2023**

[3] **Adrien Bardes**, Jean Ponce, Yann LeCun, *MC-JEPA: A Joint-Embedding Predictive Architecture for Self-Supervised Learning of Motion and Content Features*, **2023**

[4] Randall Balestriero, Mark Ibrahim, Vlad Sobal, Ari Morcos, Shashank Shekhar, Tom Goldstein, Florian Bordes, **Adrien Bardes**, Gregoire Mialon, Yuandong Tian, Avi Schwarzschild, Andrew Gordon Wilson, Jonas Geiping, Quentin Garrido, Pierre Fernandez, Amir Bar, Hamed Pirsiavash, Yann LeCun, Micah Goldblum, *A Cookbook of Self-Supervised Learning*, **ICML Tutorials 2023**

[5] Ihab Bendidi, **Adrien Bardes**, Ethan Cohen, Alexis Lamiable, Guillaume Bollot, Auguste Genovesio, *No Free Lunch in Self-Supervised Representation Learning*, arXiv preprint arXiv:2304.11718, **2023**

[6] Florian Bordes, Randall Balestriero, Quentin Garrido, **Adrien Bardes**, Pascal Vincent, *Guillotine Regularization: Why Removing Layers is Needed to Improve Generalization in Self-Supervised Learning*, in **TMLR, 2023**

[7] **Adrien Bardes**, Jean Ponce, Yann LeCun, *VICRegL: Self-Supervised Learning of Local Visual Features*, in **NeurIPS 2022**

[8] Yubei Chen*, **Adrien Bardes***, Zengyi Li, Yann LeCun, *Bag of Image Patch Embedding Behind the Success of Self-Supervised Learning*, arXiv preprint arXiv:2206.08954, **2022**

[9] Quentin Garrido, Yubei Chen, **Adrien Bardes**, Laurent Najman, Yann Lecun, *On the Duality Between Contrastive and Non-Contrastive Self-Supervised Learning*, **ICLR 2022, Best paper award honorable mention**

[10] **Adrien Bardes**, Jean Ponce, Yann LeCun, *Vicreg: Variance-Invariance-Covariance Regularization for Self-Supervised Learning*, **ICLR 2022**

[11] Liangke Gui*, **Adrien Bardes***, Ruslan Salakhutdinov, Alexander Hauptmann, Martial Hebert, Yu-Xiong Wang, *Learning To Hallucinate Examples From Extrinsic and Intrinsic Supervision*, in **ICCV 2021**

[12] **Adrien Bardes**, Yu-Xiong Wang, Ruslan Salakhutdinov, Martial Hebert, *Learning with Rich Experience, Progressive Knowledge Distillation For Generative Modeling*, in **NeurIPS Workshop 2019**

Talks

[1] Self-supervised learning, theory and applications, Swood Partners, 2023
[2] Self-supervised learning of local visual features, Mila Computer Vision Meeting, 2022
[3] Self-supervised learning and thrust-worthy AI, Confiance.AI, 2022
[4] Self-supervised learning of local visual features, NeurIPS poster session, 2022

[5] Variance-Invariance-Covariance for Self-Supervised Learning, ICLR poster session, 2022

[6] Variance-Invariance-Covariance for Self-Supervised Learning, FAIR Workshop, 2021

Academic Services

Journals IJVC, ML (Springer)

Conferences ICLR 2022-2023 , NeurIPS 2022-2023, CVPR 2023, ICCV 2023

Teaching

2021-2023 Object Recognition and Computer Vision, Project advisor - Master level (MVA)

Computer science skills

Python (Numpy, PyTorch), C, C++, Ocaml, Java, Scala, Assembly, Bash, Git, LaTeX