Stéphane Rivaud

Curriculum Vitae

TAU Team
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Github *Linkedin*

Research interests: Distributed/Decentralized Computing, Functional Optimization, Generative Modeling, Geometric Deep Learning, Signal Processing

Education

2016–2020 **PhD in Artificial Intelligence**, *Sony CSL and University of Reims*, Paris.
Integrating expert knowledge in Generative Modeling: Application to Music Production

2014-2015 **Master in Acoustics, Signal Processing and Computer Science applied to Music (ATIAM)**, *IRCAM, Centre George Pompidou*, Paris.

2013 **Agrégation of Mathematics with major in Computer Science.**, *ENS Rennes*, Rennes.

2010-2014 **Magistère of Mathematics**, *ENS Rennes*, Rennes.

Research Experience

Post-doc

Sept 2024 – present ***Neural Architecture Growth for Frugal AI***.
Developing growing methods to expand neural networks during training within a function gradient descent framework.

Advisor : **Dr. Guillaume Charpiat**, *Chargé de Recherche*, INRIA, TAU Team (*Personal Web-page*)

May 2022 – May 2024 ***Decentralized Training of Deep Neural Networks***.
Developing parallelizable alternative to backpropagation for decentralized neural network training.

Advisor : **Dr. Edouard Oyallon**, *Chargé de Recherche CNRS*, ISIR, Sorbonne Université (*Personal Web-page*)

Thesis

May 2016 – June 2020 ***Integration of Expert Knowledge into Generative Models: Application to Music Production***.
Explores generative modeling techniques suited for music production application. Constrained Sampling of Graphical Models is used to generate music scores. Generative Adversarial Networks with perceptual geometry on the data space are used for audio synthesis. (Lead to patenting and commercial applications)

Advisor : **Emmanuel Deruty**, *Music Team Leader*, Sony CSL, Paris (*Personal Web-page*)

Publications

In Conference Proceedings

2025 Stella Douka, Manon Verbockhaven, Théo Rudkiewicz, Stéphane Rivaud, François P Landes, Sylvain Chevallier, and Guillaume Charpiat. Growth strategies for arbitrary dag neural architectures. *arXiv preprint arXiv:2501.12690 (accepted at ESANN 2025)*, 2025.

2024 Stéphane Rivaud, Louis Fournier, Thomas Pumir, Eugene Belilovsky, Michael Eickenberg, and Edouard Oyallon. Petra: Parallel end-to-end training with reversible architectures. *arXiv preprint arXiv:2406.02052 (accepted at ICLR 2025)*, 2024.

2023 Louis Fournier, Stéphane Rivaud, Eugene Belilovsky, Michael Eickenberg, and Edouard Oyallon. Can forward gradient match backpropagation? In *International Conference on Machine Learning*, pages 10249–10264. PMLR, 2023.

2016 Stephane Rivaud, François Pachet, and Pierre Roy. Sampling markov models under binary equality constraints is hard. *Journées Francophones sur les Réseaux Bayésiens et les Modéles Graphiques Probabilistes; Clermont-Ferrand, France*, 2016.

Patent

2022 Emmanuel Deruty, Stéphane Rivaud. Adressing interferences in multi-channel audio mixing, US PATENT 11363377, 2022.

Open Research

2020 Stéphane RIVAUD. *Integration of Expert Knowledge in Generative Modelling: Application to Music Generation*. PhD thesis, Université de Reims, 2020.

2017 Stéphane Rivaud and François Pachet. Sampling markov models under constraints: Complexity results for binary equalities and grammar membership. *arXiv preprint arXiv:1711.10436*, 2017.

Communications

Dec 2024 **Growing Modules: Implementing Neural Network Growth**, *MANOLO bi-annual meeting*, Nuremberg.

Nov 2024 **Functional Gradient Descent for Neural Network Growth**, *Ateliers Franco-Taïwanais*, Taipei.

June 2019 **The How to of Generative Adversarial Networks**, *ROMI Meeting*, ENS Lyon.

March 2018 **Constraint Programming and Statistical Sampling for Music Score Generation**, *Collegium Musicæ "Analyse | Création"*, IRCAM.

Sept 2018 **Deep Learning AND Neural Networks**, *Etincelle Seminar*, Sony CSL.

Teaching

Fall 2024 **Applied Statistics**, *M1 Artificial Intelligence*, Université Paris-Saclay, Lectures and Practical Sessions.

Fall 2023 **Advanced Machine Learning and Deep Learning**, *M2 DAC*, Sorbonne Université, Practical Sessions.

Fall 2019 **Introduction to Neural Networks**, *M2 Computer Science*, Université de Reims, Lectures.

Fall 2017 & 2018 **Introduction to Artificial Intelligence**, *M1 & M2 Computer Science*, Université de Reims, Lectures.

Fall 2013 **Analysis and Algebra**, *L3 Mathematics*, Université de Rennes, Oral Examiner.

Mentorship

2022 – 2024 **Louis Fournier**, *Parallelizable training in deep learning through local and distributed approaches*, PhD Student, (co-supervised with Dr. Edouard Oyallon).

2022 **Bozhang Huang**, *Bird Vocalization Classification with Few-Shot Learning*, M2 Intern, (co-supervised with Dr. Olivier Scwhander).

Academic Project Involvement

2024 – Now **MANOLO**, *European Project*, Consortium, Grant 101135782.

2023 – Now **SHARP Project**, *PEPR IA*, Consortium, project ANR-23-PEIA-0008.

2022 – 2024 **Asynchronous Decentralized Optimization for Machine Learning Models (ADONIS)**, *ANR Project*, PI: Edouard Oyallon, project ANR-21-CE23-0030.

2017 – 2018 **RObotics for MIcrofarms (ROMI)**, *European Project*, PI: Peter Hanappe, Grant 773875.

2016 – 2017 **Flow Machines**, *European Project*, PI: François Pachet, Grant 641187.

Referees

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