

Solène BERNARD

PostDoc in Deep Learning applied to Drug Discovery

solene.bernard@pasteur.fr
[Google Scholar](#)

EDUCATION

- From 2022* | PostDoc *AI for Antibacterial Drugs*, INSTITUT PASTEUR, Paris
The project aims at using deep learning to analyze microscopic images, to find new antibiotics against bacteria automatically. The final objective would be to find new computational methods for drug development and new insights into the molecular targets of compounds active against *Helicobacter pylori*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Mycobacterium tuberculosis*. Supervisor: [Christophe Zimmer](#)
- 2018 - 2021 | Ph.D. in Steganography and Machine Learning, CRISTAL, Lille and Prague
Steganography of numerical images via neural networks with an adversary. Supervisors : [Patrick Bas](#) (CNRS), [John Klein](#) (Université de Lille) and [Tomas Pevny](#) (Czech Technical University in Prague)
- 2015 - 2018 | Student at the ÉCOLE CENTRALE DE LILLE : Graduate School of engineering | Specialization in Data Analysis and Decision making, Lille
Signal Processing, Decision making in large Systems, Soft Computing and Metaheuristic, Statistics and Probabilities, Markov Chains, Machine Learning, Information Security, Estimation.
- 2013 - 2015 | Preparatory classes at LYCÉE MARCELIN BERTHELOT, Saint-Maur-des-Fossés
Two-year undergraduate intensive course in mathematics (general algebra, linear algebra, analysis), physics and computer science. Preparation for the national competitive examination for admission to the French "Grandes Écoles".
- JUNE 2013 | Scientific **baccalauréat** at LYCÉE MARCELIN BERTHELOT, Saint-Maur-des-Fossés | With Honours

TEACHING

- 2021 (6h) | L3 practical session of Introduction to data science, [Christelle Garnier](#), IMT Lille Douai.
- 2019-2020 (62h) | L3 practical sessions of Signal Processing, [Pierre Chainais](#), École Centrale de Lille.
Filtering, time-frequency analysis, sampling theory.
- 2015-2018 | Giving private lessons of mathematics, from middle school to L1 students.

WORK EXPERIENCE

- SEPT 2017 - SEPT 2018 | Data scientist at ENGIE, Paris
Strategic marketing and BI department
Scoring, segmentation and open data exploitation.
- MAY-AUGUST 2017 | Research internship at DTU, Copenhagen
"Statistics and data analysis" department
Research in the center LearnT of new learning methods with machine learning.
Web site development.

AWARDS

- JUNE 2021 | **Best Student Paper Award**, ACM WORKSHOP ON INFORMATION HIDING AND MULTIMEDIA SECURITY.
For our paper "Optimizing Additive Approximations of Non-Additive Distortion Functions".
- JULY 2019 | **Best Student Paper Award**, ACM WORKSHOP ON INFORMATION HIDING AND MULTIMEDIA SECURITY.
For our paper "Exploiting Adversarial Embeddings for Better Steganography".

PUBLICATIONS

- 2022 | **Journal paper** : Solène Bernard, Patrick Bas, John Klein, Tomas Pevny : "Backpack: A Backpropagable Adversarial Embedding Scheme", IEEE Transactions on Information Forensics and Security 17, 3539 - 3554, <https://ieeexplore.ieee.org/abstract/document/9891839>
- 2021 | **Conference paper** : Solène Bernard, Tomas Pevny, Patrick Bas, John Klein : "Optimizing Additive Approximations of Non-Additive Distortion Functions", 9th ACM Workshop on Information Hiding and Multimedia Security, <https://hal.archives-ouvertes.fr/hal-03208143/>
- 2020 | **Journal paper** : Solène Bernard, Tomas Pevny, Patrick Bas, John Klein : "Explicit optimization of min max steganographic game", IEEE Transactions on Information Forensics and Security 16, 812-823, <https://ieeexplore.ieee.org/document/9186716>
- 2019 | **Conference paper** : Solène Bernard, Tomas Pevny, Patrick Bas, John Klein : "Exploiting adversarial embeddings for better steganography", Proceedings of the ACM Workshop on Information Hiding and Multimedia Security, <https://dl.acm.org/doi/abs/10.1145/3335203.3335737>
- 2019 | **Conference paper** : Solène Bernard, Tomas Pevny, Patrick Bas, John Klein : "Utilisation d'insertions adverses pour améliorer la stéganographie." GRETSI, Aug 2019, Lille, France <https://hal.archives-ouvertes.fr/hal-02177369/>