Mathieu **Goutay**

Ph.D. graduate - Nokia Bell Labs, Paris Saclay, France

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Summary

Recently graduated with a Ph.D. in machine learning applied to signal processing at Nokia Bell Labs France. Graduated from INSA Lyon, France, with an MSc. in telecom engineering. Technology enthusiast who discovered signal processing and machine learning at university and enjoyed combining these two topics over the course of doctoral studies. Presently seeking to apply the acquired expertise and take up new challenges.

Education

Nokia Bell Labs — *Paris Saclay, France*

Ph.D. thesis in machine learning applied to signal processing in wireless communication systems — *2019 - Now*

- Preparation of a Ph.D thesis co-supervised by Dr. Jakob Hoydis and Dr. Jean-Marie Gorce, from Nokia Bell Labs, Paris Saclay, and Inria, Lyon.
- Publication of five research articles, including one in the highest-ranked journal of my category. Nine patents awarded or under examination.
- Writing of a library using Tensorflow and Python to enable end-to-end training of communication systems.
- Improving the predistortion of power amplifiers while satisfying complexity requirements using neural network optimization techniques.
- Enhancing MIMO receivers under latency constraints using convolutional neural networks (CNNs) and hypernetworks with weight sharing.
- Designing waveforms tailored for specific needs using recurrent neural networks, CNNs, and ResNets.

INSA Lyon — *Villeurbanne, France*

MSc. in engineering (telecommunications) : obtained with jury's congratulations — *2013 - 2018*

- Learning about communication systems, networks, and machine learning. Preparatory School with 95% of classes in English.
- Main courses: signal processing, information theory, computer science, machine learning, algebra, calculus, and probabilities.
- Heavily invested in the associative life: head of communication for the BAL INSA Lyon, member of the student office's board of directors...

New Jersey Institute of Technologies — *Newark, NJ, USA*

Echange student : GPA 4.0/4.0 — *Sept. 2016 - Dec. 2016*

- Learning about Processors, Networks, Technical Writing, Security.

Paul Sabatier High School — *Carcassonne, France*

Baccalauréat (high-School degree) in mathematic : obtained with jury's congratulations — *2010 - 2013*

Work and Academic Experiences

Nokia Bell Labs — *Paris Saclay, France*

AI research intern — *Feb. 2018 - Aug. 2018*

- Using various machine learning techniques to enable the end-to-end learning of a communication system without a channel model.
- Publication of a research article including a theoretical analysis of the proposed solution and numerical evaluations.

Alstom - Innovation Department — *Villeurbanne, France*

R&D intern — *Mar. 2017 - Jun. 2017*

- Using Bluetooth Low Energy and other technologies to help people with reduced mobility to take common transports. Patented solution.
- Realization of a working prototype able to localize disabled passengers and produce corresponding audio and visual actions.

INSA Lyon — *Villeurbanne, France*

Innovation project — *Sept. 2017 - Jan. 2018*

- Large-scale room monitoring to reduce the energy consumption of shared buildings. Elected as the best project out of 16 competitors.

Research project — *Sept. 2017 - Jan. 2018*

- Extra project for students interested in research. Publication of an article on the impact of beamforming in machine-type communications.

Teaching

INSA Lyon — *Villeurbanne*

Part-time Teacher (70h) — *2020 - 2021*

- Creation of tutorials and projects about deep learning, reinforcement learning, deep reinforcement learning, and Tensorflow: 50h.
- Creation, supervision and grading of a project on deep learning for the physical layer of communication systems: 20h.

Publications

Learning OFDM Waveforms with PAPR and ACLR Constraints

Mathieu Goutay, Fayçal Ait Aoudia, Jakob Hoydis, and Jean-Marie Gorce *2021*

Submitted to IEEE Transactions on Wireless Communications (journal)

End-to-End Learning of OFDM Waveforms with PAPR and ACLR Constraints

Mathieu Goutay, Fayçal Ait Aoudia, Jakob Hoydis, and Jean-Marie Gorce *2021*

2021 IEEE Global Communications Conference (GLOBECOM), Madrid, Spain

Machine Learning-enhanced Receive Processing for MU-MIMO OFDM Systems

Mathieu Goutay, Fayçal Ait Aoudia, Jakob Hoydis, and Jean-Marie Gorce *2021*

2021 IEEE 21st International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Lucca, Italy

Machine Learning for MU-MIMO Receive Processing in OFDM Systems

Mathieu Goutay, Fayçal Ait Aoudia, Jakob Hoydis, and Jean-Marie Gorce *2020*

IEEE Journal on Selected Areas in Communications (JSAC) - Machine Learning in Communications and Networks

Deep HyperNetwork-Based MIMO Detection

Mathieu Goutay, Fayçal Ait Aoudia, and Jakob Hoydis *2020*

2020 IEEE 21st International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Atlanta, Georgia, USA

Deep Reinforcement Learning Autoencoder with Noisy Feedback

Mathieu Goutay, Fayçal Ait Aoudia, and Jakob Hoydis *2019*

Workshop on Machine Learning for Communications WMLC 2019, WiOpt 2019, Avignon, France

Massive Machine Type Communications Uplink Traffic: Impact of Beamforming at the Base Station

M. Goutay, L. S. Cardoso and C. Goursaud *2018*

2018 25th International Conference on Telecommunications (ICT), St. Malo, 2018, pp. 493-497

Patents

Ten patents submitted, including six patents under examination by patent offices and four already awarded :

- **A receiver for a communication system (WO2020EP52103)**
- **Apparatuses and methods for providing feedback (WO2021083521A1)**
- **Communication system having a configurable modulation order and an associated method and apparatus (US20200403723A1)**
- **Method for assisting the movement of a mobility-impaired person in a public transport means, associated computer program product and system (EP3495773A1)**

Foreign Languages

English : Business fluent, 990/990 TOEIC (2018) **Spanish** : Basic

Hobbies

- Head of communication for the first edition of a music festival gathering 1500 persons: the tendrestival. Website - Facebook - Instagram.
- Long-time photography passionate, particularly interested in portraits. Instagram : @mgoutay - Street photography project on issuu.
- Keeping up with the latest technology news.

Honors & Awards

2019	**First Place in the Machine Learning Challenge**, 6th IRACON Training School on Machine & Deep Learning Techniques for (Beyond) 5G Wireless Communication Systems	*CTTC, Barcelona*
2018	**Best Student**, Nokia France Student Awards	*Paris Saclay, France*

Referees

Dr. Jean-Marie Gorce
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Dr. Jakob Hoydis
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