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My Webpage

Paul Lagouanelle

Academic career

Since March 2023 **Post-doctoral fellow**, *LATMOS, Sorbonne Université*, Paris, France.
Supervision: Alice Le Gall. Project title: "Scientific return of the electrical sensors on-board the Dragonfly mission to Titan (NASA)".

Education

Sept. 2019–Feb. 2023 **PhD in electrical engineering**, *GeePs, Université Paris-Saclay*, Gif-sur-Yvette, France, *Politecnico di Torino*, Turin, Italy.
Metamodel-based methodology for fast prediction of human exposure due to high power systems.
Supervision: Lionel Pichon (GeePs) and Fabio Freschi (Politecnico di Torino).
Defense: March 26th, 2023.
Reviewers:
- Alain Reineix, XLIM
- Giambattista Gruosso, Politecnico di Milano

Examiners:
- Eric Labouré, GeePs
- Luca Giaccone, Politecnico di Torino

2015–2019 **École Normale Supérieure Paris-Saclay diploma**, *ENS Paris-Saclay*, Gif-sur-Yvette, France (*Formerly* ENS Cachan), Civil servant and student.
- M2 Physique et Ingénieurie de l'Énergie at Université Paris-Saclay, *summa cum laude* (computational electromagnetics, power electronics, magnetic materials, electric power distribution, electromagnetic compatibility).
- Pre-doctoral research year abroad.
- M1 and Bachelor's Degree in Physics at ENS Cachan in partnership with Université Pierre et Marie Curie (now Sorbonne Université), *magna cum laude* PHYTEM (Physics, Theory, Experimentation, Modelization).

2012–2015 **Lycée Pierre de Fermat**, *CPGE PCSI-PSI**, Toulouse, France, *summa cum laude*.
Three intensive years of training in physics, mathematics and engineering, in order to take competitive examinations and enter the most prestigious engineering or research schools.

Research Experience

March – July 2019 **GeePs, Université Paris-Saclay**, *Internship*, Gif-sur-Yvette, France.
Surrogate models for the human exposure to simple wireless power transfer systems for electrical vehicles. Internship supervised by Prof. Lionel Pichon.

2017 – 2018 **DTU Energi**, *Pre-doctoral year of research abroad*, Copenhagen, Denmark.
Internship supervised by Prof. Kaspar Kirstein Nielsen, Prof. Christian Bahl and Prof. Rasmus Bjørk, on "Permanent magnet bearings for levitating flywheels"

April – August 2017 **Massey University**, *Internship*, Palmerston North, New Zealand.
Internship supervised by Prof. Stephen Marsland and Prof. Matthieu Vignes, in the Deprtement of Statistics on "Solving the Schrödinger's equation using path integrals".

May – June 2016 **LAPLACE, Université Paul Sabatier**, *Internship*, Toulouse, France.
Modeling and simulations of electromagnetic waves in a resonant cavity thruster (EmDrive). Supervised by Prof. Jérôme Sokoloff and Prof. Nathalie Raveu

Supervision

April – Sep. 2024 **LATMOS, Université Paris-Saclay**, *M1 internship supervisor*, Guyancourt, France.
Mentoring of Master's student Bruno Martin Peña from ESTACA on "Data acquisition for the DIEL Sensor from the Dragonfly mission: sensitivity analysis and optimization of design parameters" with Prof. Alice Le Gall.

May – July 2024 **LATMOS, Université Paris-Saclay**, *Bachelor internship supervisor*, Guyancourt, France.
Mentoring of Bachelor's student Pierrot Cadeilhan from ENS Paris-Saclay on "Feasibility of Schumann Resonances' measuring using multimodal measurements from the EFIELD experiment on-board Dragonfly" with Prof. Alice Le Gall.

May – June 2019 **GeePs, Université Paris-Saclay**, *Bachelor internship supervisor*, Gif-sur-Yvette, France.
Mentoring of Bachelor's student Sahil Deshmukh from Indian Institute of Information Technology, Nagpur on "Assessment of human exposure with stochastic models for wireless charging of electrical vehicles" with Prof. Lionel Pichon.

Teaching responsibilities

Sep. 2016 – present **Lycée Buffon**, *Physics oral examiner*, Paris, France.
Oral examiner for CPGE pre-bachelor students in Physics (PSI)

2020 – 2021 **IUT de Cachan, Université Paris-Saclay**, *Physics teacher*, Cachan, France.
Introduction course to general physics (General mechanics, electromagnetics, thermodynamics) for first year students at IUT de Cachan

April – Aug. 2017 **Massey University**, *French assistant teacher*, Palmerston North, New Zealand.
Tutoring for students in various levels at the university

Sep. 2016 – March 2017 **Lycée Buffon**, *Math assistant teacher*, Paris, France.
Lessons and tutoring for high school students

Collective responsibilities

Sep. 2023 – present **Co-organizer of the monthly young researchers seminar at LATMOS**, *LATMOS, Université Paris-Saclay*.

Jan. 2023 – present **Post-doctoral fellow representative at LATMOS lab council**, *LATMOS, Université Paris-Saclay*.

March 2021 – Feb. 2023 **Responsible of the GeePs lab cafeteria**, *GeePs, Université Paris-Saclay*.

Dec. 2020 – Dec. 2022 **PhD student representative at GeePs lab council**, *GeePs, Université Paris-Saclay*.

2015 – 2019 **Involvement in various student associations**, *ENS Cachan*.
Co-founder of the climbing club "Club Caillou" (2016-2019) and the cooking club "Bon Viv[ens]" (2018-2019), active member of the student union (2016-2017).

Grants and awards

2023 **DIM ACAV+ Program**, *Région Île-de-France*, Post-doctoral grant.
Funding from the "Domaine d'Intérêt Majeur" ACAV+ on "Astrophysics and Conditions for the Emergence of Life"

2021 **Vinci Program**, *Franco-Italian University*, 6k€.
Funded research stay for PhD cotutelle in Turin, Italy.

2019 **CDSN**, *ENS Paris-Saclay, Université Paris-Saclay*.
PhD funding from ENS Paris-Saclay.

2015 **Civil servant competitive exam**, *ENS Cachan*.
Laureate of the competitive exam at the end of CPGE PSI to become a civil servant at ENS Cachan (now ENS Paris-Saclay).

Miscellaneous skills

Programming Languages	Advanced level in MATLAB, Fortran90 and Python.
Office	Proficient in LaTeX, beamer and office tools.

Languages

English	Cambridge C1 diploma.
French	Native language.
Italian	Advanced, B2-C1.
German	Intermediate, Goethe Institute B1 diploma.

Publications

2025 **Lagouanelle, Paul** and Alice Le Gall. Schumann Resonances as a tool to constrain the depth of Titan's buried water ocean: Re-assessment of Huygens observations and preparation of the EFIELD/Dragonfly experiment. *Icarus*, volume 428, page 116372, 2025.

2024 **Lagouanelle, Paul**, Fabio Freschi, Lionel Pichon, and Luca Giaccone. Fast and Reliable Human Exposure Assessment Around High Power Systems Using Surrogate Modeling. *IEEE Access*, volume 12, pages 34835–34845. IEEE, 2024.

2023 **Lagouanelle, Paul**, Fabio Freschi, and Lionel Pichon. Adaptive sampling for fast and accurate metamodel-based sensitivity analysis of complex electromagnetic problems. *IEEE Transactions on Electromagnetic Compatibility*. IEEE, 2023.

2023 **Lagouanelle, Paul**, Charles Boulitrop, Lionel Pichon, Fabio Freschi, and Marc Lambert. Conception des systèmes de transfert inductifs pour véhicules électriques, Optimisation multi-objectifs rapide par métamodélisation. *Revue de l'Electricité et de l'Electronique (REE)*, 2023.

2021 **Lagouanelle, Paul**, Oriano Bottauscio, Lionel Pichon, and Mauro Zucca. Impact of parameters variability on the level of human exposure due to inductive power transfer. *IEEE Transactions on Magnetics*, volume 57, pages 1–4. IEEE, 2021.

2020 Sahil Deshmukh, **Lagouanelle, Paul**, and Lionel Pichon. Assessment of human exposure in case of wireless power transfer for automotive applications using stochastic models. *Applied Computational Electromagnetics Society Journal*, volume 35, 2020.

Communications

2024 **Lagouanelle, Paul** and Alice Le Gall. Measuring Schumann Resonances on Titan: Constraints on the internal ocean from PWA/Huygens and future EFIELD/Dragonfly observations. In *Europlanet Science Congress 2024*, volume 17, pages EPSC2024–186, 2024.

2024 **Lagouanelle, Paul** and Alice Le Gall. Measurement Uncertainty of Schumann Resonances with the EFIELD Experiment on Board Dragonfly. In *2024 IEEE 21st Biennial Conference on Electromagnetic Field Computation (CEFC)*, pages 1–2. IEEE, 2024.

2023 **Lagouanelle, Paul**, Charles Boulitrop, Lionel Pichon, Fabio Freschi, and Marc Lambert. Metamodel multi-objective optimization of 3F3 Ferrites Core in a WPT system for automotive applications. In *Journées scientifiques d'URSI-France*, 2023.

2023 **Lagouanelle, Paul**, Charles Boulitrop, Lionel Pichon, Fabio Freschi, and Marc Lambert. Gradient-based Metamodel optimization for the design of 3F3 Ferrites Core in a WPT system. In *COMPUMAG 2023, the 24th International Conference on the Computation of Electromagnetic Fields*, 2023.

2023 **Lagouanelle, Paul** and Alice Le Gall. Measuring Schumann Resonances on Titan with the EFIELD/DraGMet experiment on board Dragonfly. In *Titan Through Time VI*, 2023.

2023 Alice Le Gall and **Lagouanelle, Paul**. Titan's Surface Dielectric Constant Measurements with the *DIEL/DraGMet* experiment on board Dragonfly. In *Titan Through Time VI*, 2023.

2022 **Lagouanelle, Paul**, Fabio Freschi, Lionel Pichon, and Giaccone Luca. Worst Case Scenario Assessment For The Human Exposure Around High Power Magnetic Field Sources. In *Compumag 2021*, 2022.

2022 **Lagouanelle, Paul**, Fabio Freschi, Lionel Pichon, and Giaccone Luca. Metamodel-based methodology for fast prediction of human exposure to high power systems. In *GDR Ondes*, 2022.

2022 **Lagouanelle, Paul**, Fabio Freschi, and Lionel Pichon. Uncertainty Quantification For The Assessment Of Human Exposure Around High Power Transfer Systems. In *Journées annuelles du GDR SEEDS, Conférence des Jeunes Chercheurs en Génie Electrique*, 2022.

2021 **Lagouanelle, Paul**, Fabio Freschi, and Lionel Pichon. Identification of main factors impacting human exposure in inductive power transfer systems. In *Mathematical and Statistical Methods for Metrology*, 2021.

2021 **Lagouanelle, Paul**, Giulia Di Capua, Nicola Femia, Fabio Freschi, Antonio Maffucci, Lionel Pichon, and Salvatore Ventre. Sensitivity analysis in dynamic WPT systems based on non-intrusive stochastic methods. In *SMACD/PRIME 2021; International Conference on SMACD and 16th Conference on PRIME*, pages 1–4. VDE, 2021.

2021 Yao Pei, **Lagouanelle, Paul**, and Lionel Pichon. Uncertainty quantification and metamodeling in the design of inductive power transfer systems. In *2021 Joint IEEE International Symposium On Electromagnetic Compatibility, Signal & Power Integrity, EMC Europe*, 2021.

2019 **Lagouanelle, Paul**, Van-Lang Krauth, and Lionel Pichon. Uncertainty quantification in the assessment of human exposure near wireless power transfer systems in automotive applications. In *2019 AEIT International Conference of Electrical and Electronic Technologies for Automotive (AEIT AUTOMOTIVE)*, pages 1–5. IEEE, 2019.