

Master Thesis Projects 2019



SPINTRONIQUE et TECHNOLOGIE des COMPOSANTS

<http://www.spintec.fr>



SPINTEC IN BRIEF

SPINTEC is located within the innovation research site of MINATEC in Grenoble, France. Our mission is to act as a bridge between academic research and technological applications in the field of spintronics, which is today recognized as one of the major innovation routes for future microelectronics industries, sensing technology and bio-applications. As such, we are at the cross-roads of nanosciences and technology, with outputs measured with both high-rank publications and a broad portfolio of patents. Our activities are performed in collaboration with academic and industrial partners from around the world. SPINTEC has circa 100 staff, encompassing researchers, engineers, post-doc and PhD students, working cooperatively in an open structure organized around focused research topics.

The research activity of SPINTEC covers the whole spectrum from theory to demonstrators, including the development of innovative functional materials, the experimental validation of novel physics concepts, up to the realization of test structures. The application-oriented topics are: magnetic random access memories, design of spin-based integrated circuits, sensors, microwave components, biotechnology. Academic research concerns spinorbitronics, spintronics in 2D materials, magnetization and spin wave dynamics, antiferromagnetic spintronics, and exotic spin textures.



SPINTEC FOR YOUR MASTER OR PHD PROJECT

With the objective to train tomorrow's researchers in an active and growing research field, SPINTEC proposes every year topics for (paid) Master projects. The majority of the Master projects will lead over to a PhD thesis project with financial support coming from a variety of funding sources, either from research institutions (bourses ministère, CFR CEA, local foundations), academic contracts (ANR, EU) or industrial partners (bourses CIFRE).

At SPINTEC, you will find a dynamic and multicultural environment that provides all facilities to advance your research project and get yourself known in the academic world via participation at international conferences. Three years after defending their PhD, 90% of our students have a position in academics or in the industry. Come and join us to be part of those who like to revolutionize microelectronics research and applications!

Hoping to see you soon,

Lucian PREJBEANU, Director.

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TOPICS FOR MASTER THESIS

MRAM memories

1. Magnetic memories optimized for ultra-low power consumption
2. Exploring the scalability of spintronics for 3D devices
3. All-optical switching in spintronic devices

Magnetic sensors

4. Miniature and ultra-sensitive magnetic sensor for space applications

Magnetization dynamics and microwave devices

5. Spintronic oscillator networks: taming a non-linear dynamical system of coupled non-isochronous and distributed oscillators
6. Long-range dynamic interaction between insulating ferromagnetic films mediated by phonons

2D Spintronics and Spinorbitronics

7. Study of magnetic skyrmion properties for spintronics applications
8. Magnetic skyrmion in ultrathin nanostructures
9. Importance of chiral phenomena for domain wall shift registers
10. Enhancing Spin Orbit torques for magnetic memory applications

Spin textures

11. Spin-Hall effect in chemically-grown metal/ferromagnetic bilayers

Health and Biology

12. 3D spheroids for the study of magneto-mechanical cancer cells destruction

Theory and Simulation

13. Theoretical studies of spin-orbit phenomena at interfaces comprising magnetic and nonmagnetic materials in a view of memory devices
14. Atomistic modeling of all-optical switchable magnetic materials

Spintronic IC design

15. Modeling and design of hybrid CMOS/magnetic circuits based on newly discovered spintronics phenomena
16. System-level simulation and design space exploration of non-volatile neuromorphic architectures

