

# LCIS Scientific Day

Thursday 30 March 2023

[lcis.grenoble-inp.fr](http://lcis.grenoble-inp.fr)

**9h00 - 9h30: Welcome coffee and opening of the day (room D030)**

**9h30 - 10h15: Connected sensors for health and autonomy**  
Norbert Noury (Univ. de Lyon)

**10h15 - 11h00: Security of complex and heterogeneous SoCs - the enemy within**  
Lilian Bossuet (Univ. Jean Monnet Saint-Etienne)

**11h00 - 11h50: Poster presentations (hallway building C)**

**11h50 - 12h20: On the research and teaching activities of the Chair SmartGrids**  
Marie-Cécile Alvarez-Hérault (dir. Chair SmartGrids, G2lab - Grenoble INP)

**12h20 - 13h40: Lunch (room C080)**

**13h45 - 14h30: Explanation for Humans, for Machines, for Human-Machine Interactions**  
Alain Mille (Univ. de Lyon)

**14h30 - 15h10: Language approaches for safety and security**  
Laure Gonnord (CTSIS team, LCIS - Grenoble INP).

**15h10 - 16h00: Poster presentations (hallway building C)**

**16h00 - 16h40: Bistable and switchable materials for RF applications and equipment purchased within the ERC ScattererID project**  
Etienne Perret (ORSYS team, LCIS - Grenoble INP)

**16h40 - 17h20: Progressive structuring of agent behaviors: from sensorimotor to social behaviors**  
Francois Suro (CO4SYS team, LCIS - UGA)

**17h20 - 17h50: On the opportunities for Esisar and LCIS to develop a common academic Chair**  
Gabriel Blanchard, Charles Reboul (Esisar - Grenoble INP), Yann Kieffer (LCIS - Grenoble INP)

**17h50 - 18h00: Closing of the day (room D030)**

**Potluck dinner (room C080)**



The inscription is mandatory at the following link:  
[link for inscription.](#)

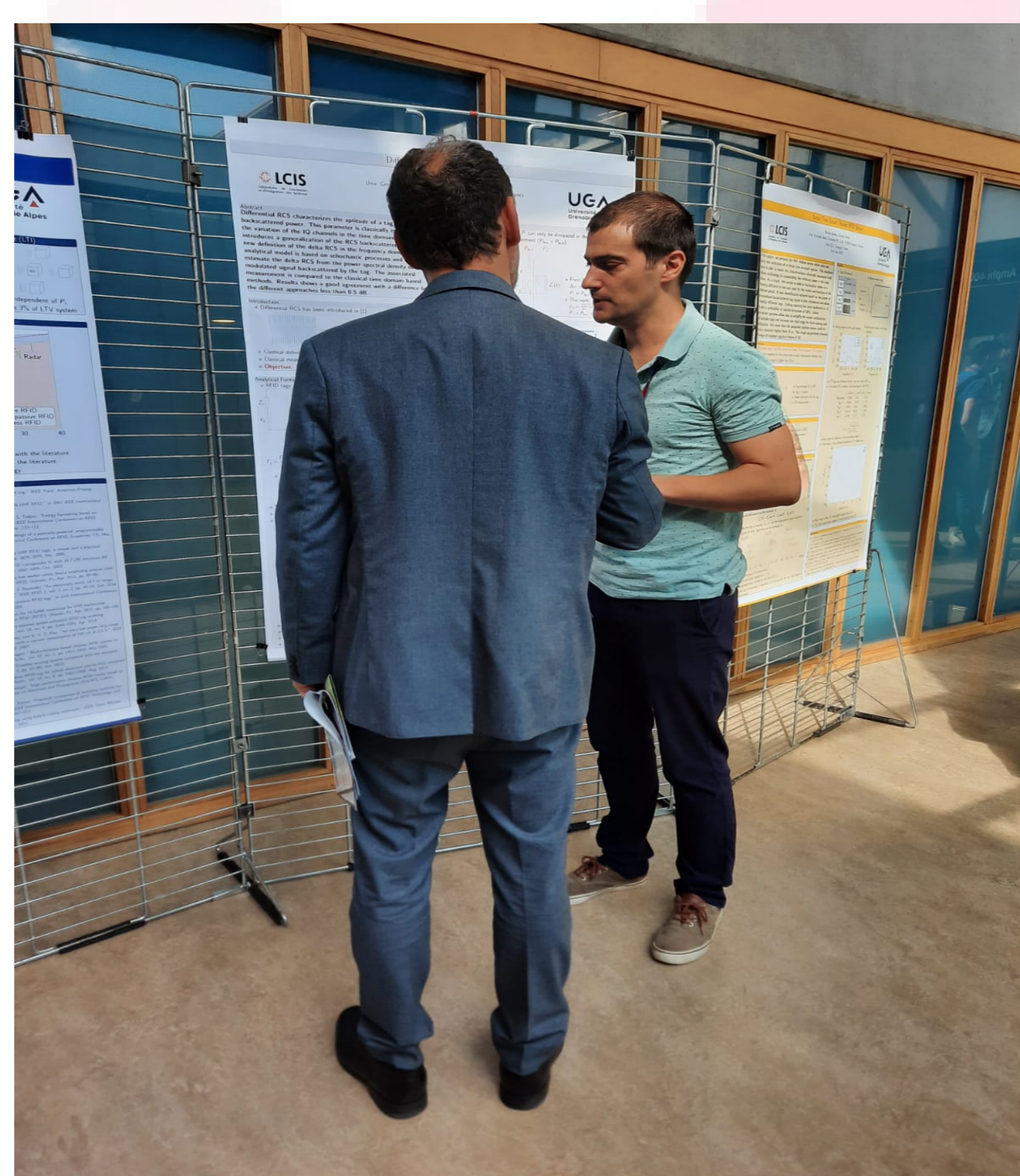
This event will take place from 9h00 to 18h00 mainly in the room D030 of Esisar, Grenoble INP, Univ. Grenoble Alpes, 50 rue Barthélémy de Laffemas, 26000, Valence. For more info you can contact:  
[ionela.prodan@lcis.grenoble-inp.fr](mailto:ionela.prodan@lcis.grenoble-inp.fr).

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Poster presentations  
Thursday 30 March 2023

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- [1] **Self-learning Self-test and Self-calibration for Integrated Millimeter-wave Systems**  
Olivier Occello, Philippe Ferrari, Manuel Barragan, Cédric Durand, M. Margalef-Rovira
- [2] **Conception d'un prototype de filtre compact en fabrication additive avec impression 3D**  
Bastien Peres, Pierre Lemaitre-Auger, Fabien Schwartz, Tan-Phu Vuong
- [3] **Chipless RFID based on Micro-Doppler Effect for Long Range Applications**  
Ashkan Azarfar, Nicolas Barbot, Etienne Perret
- [4] **Consistent Hardening against Hardware Vulnerabilities**  
Sébastien Michelland, Laure Gonnord, Christophe Deleuze
- [5] **ADT4HPC: Algebraic Data Types for High Performance Computing**  
Thais Baudon, Laure Gonnord, Gabriel Radanne
- [6] **MAKI: Multi-Agent Key Infrastructure**  
Arthur Baudet, Oum-El-Kheir Aktouf, Philippe Elbaz-Vincent, Annabelle Mercier
- [7] **Preuve vérifiable pour une blockchain embarquée basse consommation**  
Quentin Jayet, Vincent Beroulle, Christine Hennebert, Yann Kieffer
- [8] **Design and Evaluation of Countermeasures against Power Off Laser Fault Injection Attacks**  
Aghiles Douadi, Giorgio Di Natale, Vincent Beroulle, Paolo Maistri, Elena Ioana Vatajelu
- [9] **On the Organization of a Multi-Agent System for Cyber-defense**  
Julien Soulé, Jean-Paul Jamont, Michel Occello, Paul Théron, Louis-Marie Traonouez
- [10] **Mixed-integer Predictive Control of a 3-Phase Arc Furnace**  
Minh Tuan Dinh, Ionela Prodan, Olivier Lesage, Eduardo Mendes
- [11] **A Flatness-based Saturated Controller Design for a Quadcopter with Experimental Validation**  
Huu Thinh Do, Franco Blanchini, Ionela Prodan
- [12] **Predictive Control for a Spent Nuclear Fuel Treatment Plant**  
Duc-Tri Vo, Ionela Prodan, Laurent Lefèvre, Vincent Vanel, Sylvain Costenoble
- [13] **Reliable Motion Planning and Coordination for a Team of Aerial Drones**  
Vincent Marguet, Bogdan Gheorghe, Ionela Prodan, Florin Stoican
- [14] **Navigation in an Unknown Environment**  
Lois Rajaonson, Simon Gay, Ionela Prodan
- [15] **Distributed MPC for Motion Planning with Collision Avoidance of Multiple Drones**  
Cong Khanh Dinh, Ionela Prodan



The poster sessions will take place in the hallway of building C, Esisar, Grenoble INP, 50 rue Barthélémy de Laffemas, Valence.

**Talks abstracts**  
[lcis.grenoble-inp.fr](http://lcis.grenoble-inp.fr)

[1] **Capteurs connectés pour la santé et l'autonomie (Health IoT)**

**Norbert Noury** (Prof. Polytech Lyon 1)

**Abstract:** Information and communication technologies offer the potential to meet the needs for monitoring the health and autonomy of the subject in a mobile situation. This raises new issues in terms of design and usage rules, with additional regulatory and ethical constraints.

[2] **Sécurité des SoC complexes et hétérogènes - l'ennemi de l'intérieur**

**Lilian Bousuet** (Prof. Univ. Jean Monnet, Laboratoire Hubert Curien, Saint-Etienne)

**Abstract:** Récemment, plusieurs travaux académiques ont montré qu'il est envisageable et faisable de réaliser des attaques par injection de fautes et par analyse de canaux auxiliaires (consommation de puissance et temps d'accès aux mémoires caches) en interne à un système-sur-puce hétérogène (qui embarque des microprocesseurs et des parties matérielles reconfigurables du type FPGA). C'est-à-dire qu'une partie du système-sur-puce peut attaquer physiquement une autre partie, logicielle ou matérielle). Cette présentation fera le point sur l'émergence de cette nouvelle menace pour les SoC complexes et hétérogènes et discutera des enjeux de recherche relatifs à cette problématique.

[3] **Explanation for Humans, for Machines, for Human-Machine Interactions**

**Alain Mille** (Prof. Univ. de Lyon)

**Abstract:** The XAI concept was launched by the DARPA in 2016 in the context of model learning from data with deep learning methods. Although the machine learning community quickly took up on the topic, other communities have also included explanation in their research agenda (e.g. Emerging Systems, Robotics, Internet of Things). In this contribution, we propose to broaden the question of explanation to any type of situation in which users exploit the possibilities of decision support agents for their own decisions. We denote this evolution "UXAI" (User eXplainable Artificial Intelligence) because we consider that users should be the main actors in the dynamics of any explanation process.

[4] **Approches langages pour la sûreté et la sécurité**

**Laure Gonnord** (Prof. LCIS, Grenoble INP, UGA)

**Abstract:** Dans cet exposé, je présenterai le cadre général de mes travaux autour des langages de programmation et de leur compilation. Je parlerai en particulier de mon expérience en développement d'analyses de programmes au sein du compilateur LLVM, et notamment des travaux passés qui ont permis d'améliorer des diagnostics d'accès illégaux à la mémoire dans des programmes C. Je poursuivrai en parlant de compilation pour la sécurité, travaux en cours avec Sébastien Michelland et Christophe Deleuze dans CTSYS.

[5] **Bistable and switchable materials for RF applications and equipment purchased in the ERC ScattererID project**

**Etienne Perret** (Prof. LCIS, Grenoble INP, UGA)

**Abstract:** I had the opportunity several times in the last years to present my research activities, in particular the ScattererID project on which I worked in the last years. So I decided for this occasion to present other elements, namely my activities in technology transfer, as well as on switchable bistable materials for RF applications. I will talk about phase change materials (PCM) as well as memristors. I will also talk about the latest equipment that has been purchased for the ScattererID project.

[6] **Progressive structuring of agent behaviors: from sensorimotor to social behaviors**

**Francois Suro** (Mcf. LCIS, UGA)

**Abstract:** In the field of developmental robotics, the acquisition of behaviors in an open-ended and continuous way favouring long-term development ("Lifelong agent learning") remains an open question. In this presentation, we will focus on the MIND (Modular Influence Network Development) architecture created specifically for the progressive and long-term structuring of behaviors, satisfying the constraints of heterogeneity and changes in the definition of means and goals. We will see that it is possible to learn, through a curriculum, sensorimotor behaviors using simple neurocontrollers, which can be successively combined into increasingly complex behaviors involving internal representations or multi-agent coordination.