

Deep Red Industrial Chair: artificial intelligence in support of infrared imaging

Fondation Grenoble INP is launching Deep Red, a new teaching and research Chair, in partnership with Lynred, a global leader in designing and manufacturing high-quality infrared technology. This Chair aims to support research activities that address future artificial intelligence (AI) issues in infrared imaging and provide training within this area of expertise.

Deep Red, with an initial five-year term, is supported by the Grenoble INP – Ense3 and Grenoble INP - Phelma schools in the area of training and by Gipsa-lab* for research. Jocelyn Chanussot¹, professor at Grenoble INP - UGA and researcher at Gipsa-lab, holds this Chair.

Jocelyn Chanussot, holder of the Deep Red chair explains, *“whether it be for monitoring greenhouse gas or for safety through night driving assistance, infrared imaging plays a crucial role. The aim is to develop advanced algorithms for digital data processing in order to maximize the potential for automatic analysis or better visual interpretation.”*

“Image fusion and visual perception are complex issues and Grenoble INP schools and laboratories possess all the skills needed to address them across many areas: signal processing, physical interpretation, algorithms, AI, embedded electronics, or in terms of cognitive sciences, which play a key role in perception. This is why we called upon Fondation Grenoble INP to create this Chair,” David Billon-Lanfrey – Strategy, Communication and Technology Director.

In the area of research, various strategies are being explored within Deep Red to improve the readability of imaged scenes, both for human operators and processing algorithms, which are used, for example, to detect anomalies or objects.

- The fusion of visible and thermal infrared images, intended primarily for augmented reality, automotive and autonomous system applications, help to enhance resolution, reduce noise and improve colorimetry and contrast etc.
- Fusion with other modalities (radar, lidar, NIR, SWIR, MWIR, LWIR)
- Deep learning models for noise reduction, information fusion or the detection of objects based on the image correction strategy used

Development and sharing of knowledge

The Chair will promote exchanges and reflection between Lynred, engineering students, PhD students and Master's students at Grenoble INP – UGA.

They will receive training and gain an awareness of the potential and issues involved in infrared imaging through classes, research units or practical work integrated into their programs. They will also be able to become participants in these developments through engineering projects and internships in these areas.

Participating students will primarily come from Grenoble INP – Ense3 and Grenoble INP – Phelma, particularly from Signal Image Communication Multimedia (SICOM, a joint program for both schools,

managed by Phelma). Students from Grenoble INP – Ensimag et de Grenoble INP - Esisar will also be able to get involved.

1 Jocelyn Chanussot teaches Signal and Image Processing and Hyperspectral Imaging, primarily through the joint SICOM (Signal, Image, Communication, Multimedia) program for Grenoble INP – Ense3 and Grenoble INP – Phelma. He is an honorary member of the Institut Universitaire de France (IUF, 2012-2017) and is currently attached to INRIA (2019-2022).

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About

The Grenoble INP Foundation: inspiring a sustainable society through progress and science:

The Grenoble INP Foundation's mission is to support the ambition and development strategy of Grenoble INP - UGA in terms of scientific excellence, international influence and shared success (promoting citizenship and equal opportunities). Since its creation in 2010, the Foundation has supported innovative projects contributing to the development of Grenoble INP - UGA. It hosts chairs of excellence to advance knowledge and science in partnership with companies; it enables students to carry out projects that are close to their hearts and within the framework of the Foundation's values of citizenship, excellence and international scope. Find out more at <https://fondation-grenoble-inp.fr/>

In figures

- *More than €13.3 million of patronage mobilised*
- *3 patronage programmes developed*
- *12 chairs of industrial, research and teaching excellence*
- *871 scholarships provided, 92 association and school projects funded, for a total of €2.530 million*

LYNRED

Lynred and its subsidiaries, Lynred USA and Lynred Asia-Pacific, are global leaders in designing and manufacturing high-quality infrared technologies for aerospace, defense and commercial markets. Lynred has a vast portfolio of infrared detectors that covers the entire electromagnetic spectrum from near to very far infrared. The Group's products are at the center of multiple military programs and applications. Its IR detectors are the key component of many top brands in commercial thermal imaging equipment sold across Europe, Asia and North America. The organization is the leading European manufacturer for IR detectors deployed in space.

www.lynred.com