ENSSAT
LANNION

Cette journée est coorganisée par

anticipa · LA FRENCH TECH BREST BRETAGNE OUEST · Images & Réseaux · PHOTONICS BRETAGNE Photonics Innovation Hub

Avec le soutien de

AAEE Association des anciens élèves de l'Enssat · cnrs · Inria · foton · IRISA · IETR

Nos partenaires et sponsors

EKINOPS · exail · Fondation Université de Rennes · IDIL Fiber Optics Group · KERDRY HEF PHOTONICS · LE VERRE FLUORÉ FIBER SOLUTIONS · LUMIBIRD MORE THAN LASER · orange · OXXIUS Simply Light · LANNION-TRÉGOR COMMUNAUTÉ LANNUON-TREGER KUMUNIEZH

INSCRIPTION

40 ANS
ENSSAT
LANNION

Journée d'innovation et recherche

Présentation de l'école

Simon Peeters - directeur

Cette journée est coorganisée par

anticipa · LA FRENCH TECH BREST BRETAGNE OUEST · ir Images & Réseaux · PHOTONICS BRETAGNE Photonics Innovation Hub

Nos partenaires et sponsors

EKINOPS · exail · Fondation Université de Rennes · IDIL Fiber Optics Group · KERDRY HEF PHOTONICS · LE VERRE FLUORÉ FIBER SOLUTIONS · LUMIBIRD MORE THAN LASER · orange · OXXIUS Simply Light · LANNION-TRÉGOR COMMUNAUTÉ

Avec le soutien de

AAEE Association des anciens élèves de l'Enssat · cnrs · Inria informatics mathematics · foton · UMR IRISA · IETR

40 ANS ENSSAT LANNION

Université de Rennes · École affiliée IMT

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE
Liberté
Égalité
Fraternité

Histoire dans nos couloirs

#exposition #découverte #histoire

Du 15 janvier au 25 mars 2026

L'exposition **« L'origine des télécommunications dans le Trégor »** explore de manière synthétique et visuelle l'épopée des télécommunications dans le Trégor.

LANNION-TRÉGOR COMMUNAUTÉ LANNUON-TREGER KUMUNIEZH

Cité des Télécoms

ENSSAT
LANNION

Le 7 octobre 1985, François Mitterrand annonce officiellement à Yves Nédélec, maire de Lannion de 1983 à 1989 :

« Monsieur le Maire, vous aurez votre école d'ingénieurs »

17 mars 1986 : création école et 2 laboratoires inf. & élec.

- 1987 : Création 3ème laboratoire (optique)

1997 : l'Enssat s'aggrandit : 2 nouveau bâtiments

- 1998 : systèmes embarques

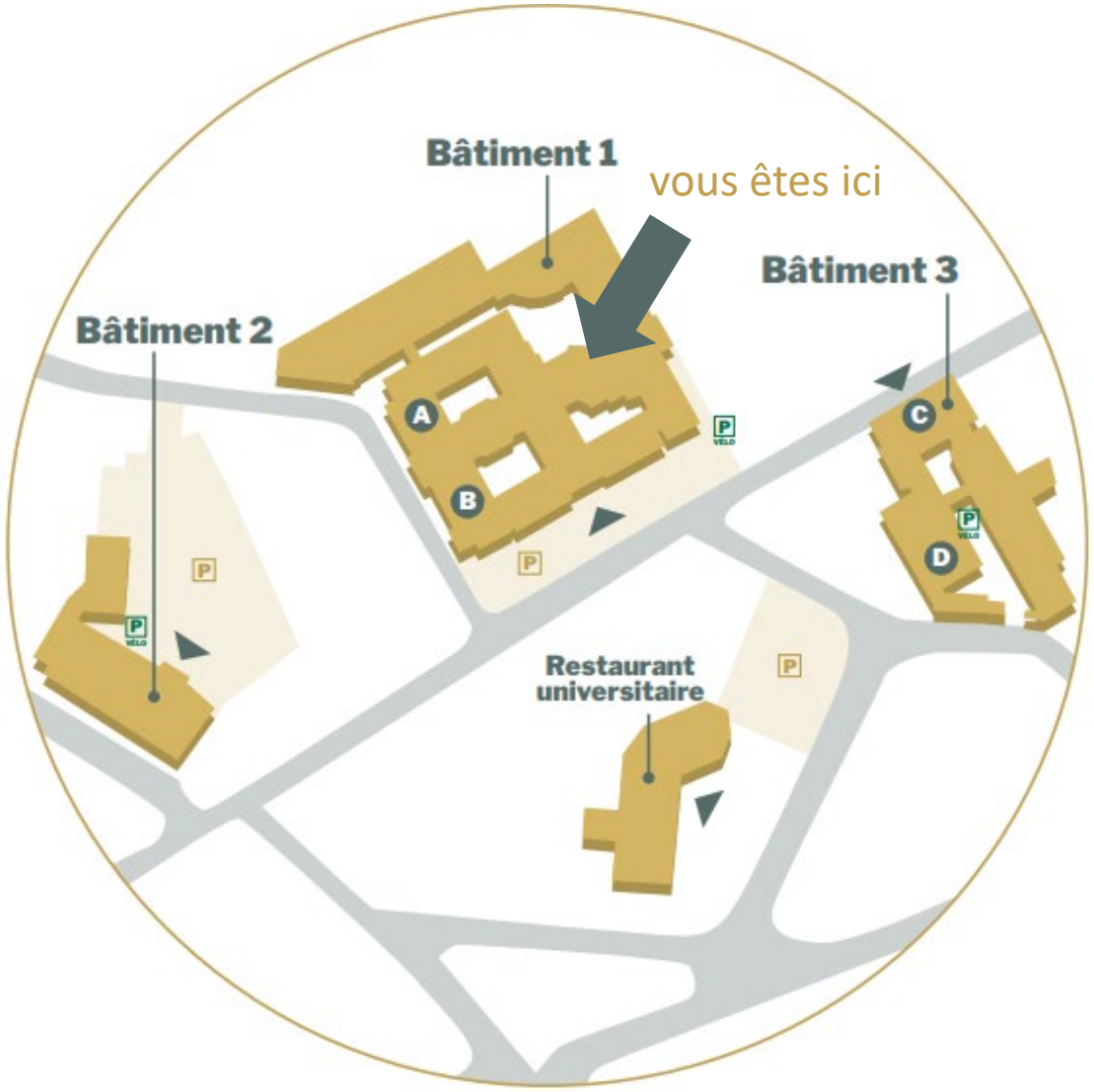
2000 : création Orange, diversification sur le plateau

- 2001 : Création de CCLO
- 2004 : Changement Institute FOTON

2016 : entré dans le Concours Mines-Télécoms

- 2020 Première summer school
- 2026 Arrivée de FISA Cybersécurité

Structure de l'école



A. PLATEFORMES D'ÉTUDE DES RADIOCOMMUNICATIONS

Cet équipement est dédié à l'étude des radiocommunications aux normes actuelles (ZigBee, Lora, 5G...).

B. SALLE CEM

Équipement d'étude de la compatibilité électromagnétique équipé d'une cage de Faraday anéchoïque et du matériel nécessaire à des tests de pré-certification.

C. PERSYST

Infrastructure et expertise pour la réalisation de projets de recherche collaboratifs ou de prestations de services, pour des tests et caractérisations de composants ou dispositifs dans le domaine des télécommunications optiques et de l'optique intégrée.

D. CCLO

Centre Commun Lannionnais d'Optique
Plateforme technologique de recherche, de l'institut Foton, dédiée à la réalisation et aux caractérisations des matériaux et de circuits optiques intégrés.
Elle est équipée de salles de chimie et de salles blanches (160 m^2).

Organisation

Pascal Besnard, directeur adjoint

<u>Quatre piliers de l'école</u>

Direction Supports

Direction Admission, Communication, International

Direction des Formations

Direction recherche, industrie, et innovation ⇒

Philippe Quémerais
responsable.relations-entreprises@enssat.fr

STATUT ÉTUDIANT

INFORMATIQUE

coloration du cursus avec des majeures-mineures

Cybersécurité, intelligence artificielle, systèmes embarqués

PHOTONIQUE

Technologies laser, biophotonique, télécoms, photonique quantique

---

STATUT APPRENTI

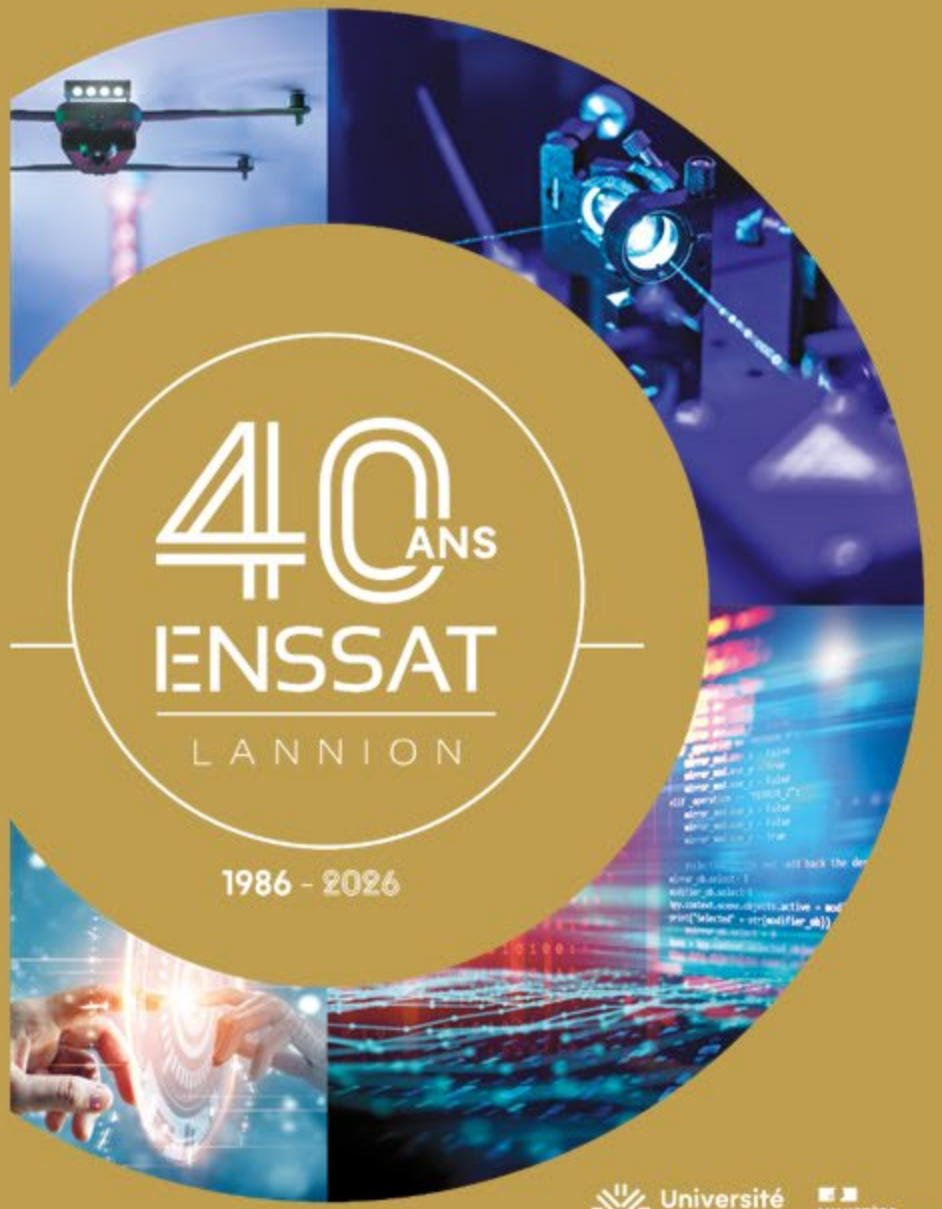
INFORMATIQUE

2 parcours :

Cybersécurité (logiciels et réseaux)
ou IA & multimédia

PHOTONIQUE & ÉLECTRONIQUE

Technologies laser, systèmes électroniques, instrumentation et mesure



Université de Rennes
École affiliée IMT

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE

CUPGE

cycles universitaires préparatoires aux grandes écoles

14

28

2 ans

Physique et photonique	Cybersécurité
photonique et électronique	informatique et réseaux

Premier rentrée en 2026-2027

cycle ingénieur

3 ans

Photonique	Informatique IA, cybersécurité, systèmes embarqués


1re année 2025-2026: >130 étudiants
FISA Informatique; 29
FISE Informatique; 60
FISEA Photonique; 25
FISE Photonique; 20
ENSSAT
LANNION
École Nationale Supérieure des Sciences Appliquées et de Technologie
PROMOTION 2028
« Un ingénieur ou une n'est pas qu'un ou une scientifique »


Soutenez l'Enssat !
École d'ingénieur·es connectée à l'industrie, tournée vers l'avenir.
Continuez de « surfer » sur la vague de l'innovation
avec nous, fléchez votre taxe d'apprentissage :
code UAI 0221809X
École affiliée
IMT
ENSSAT
LANNION
Université
de Rennes

ENSSAT
LANNION

RELATIONS ENTREPRISES

Une offre à proposer ? Un besoin ?

Anne-Perrine CONSTANTIN
Assistante des relations entreprises

Ce que nous pouvons vous proposer :

Contrats d'Apprentissages

- 2 ans (Photonique)
- 3 ans (Informatique)

Nous pouvons vous présenter des profils aujourd'hui : repartez avec des CV 😇 !

Stages Courts (1er ou 2è année) : 6 semaines

Stages Longs (3è année) : 6 mois

Contrats de Professionnalisation (3è année) : 1 an

ENSSAT LANNION | Université de Rennes

Connect
Université de Rennes

**REJOIGNEZ CONNECT,
LE RÉSEAU PROFESSIONNEL**
DE L'UNIVERSITÉ DE RENNES

**Toutes vos ressources
sur une seule plateforme :
Communautés d'alumni, offres d'emploi,
stage, alternance**

connect.univ-rennes.fr

Une plateforme pour retrouver :

- **Le réseaux Alumni**
- **La CVthèque**
- **Les Offres d'emploi & de stages**

Lancement aujourd'hui !

Pour s'inscrire :

connect.univ-rennes.fr

École Nationale Supérieure des Sciences Appliquées et de Technologie

ENSSAT
LANNION

European Digital UniverCity

Bientôt : Corée du Sud, Inde, Ouzbékistan, Pays-Bas, …

Co-funded by the
Erasmus+ Programme
of the European Union

4 formations d'**ingénieur·e**

www.enssat.fr

Recherche & innovation

STATUT ÉTUDIANT

INFORMATIQUE
Cybersécurité, IA, systèmes embarqués, objets communicants, développement logiciel

PHOTONIQUE
Technologies laser, biophotonique, télécoms, photonique quantique

STATUT APPRENTI

INFORMATIQUE
Cybersécurité, science des données et du multimédia, IA

PHOTONIQUE & ÉLECTRONIQUE
Technologies laser, systèmes électroniques, instrumentation et mesure

Université de Rennes
École affiliée IMT

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE
Liberté
Égalité
Fraternité

ENSSAT hosts (parts of) three research laboratories

IETR: electronics and digital technology **(5+ people)**
The main theme is: acquisition and AI-based multi-level analysis of hyperspectral images.

Contact: Benoît Vozel benoit.vozel@univ-rennes.fr

FOTON Institute: photonics **(50+ people)**
The main themes are:
optical communications, guided optics and sensors, laser physics and applications.

Contact: Yannick Dumeige yannick.dumeige@univ-rennes.fr

IRISA: informatics **(70+ people)**
The main themes are:
artificial intelligence, cybersecurity, data management, energy-efficient systems.

Contact: François Goasdoué francois.goasdoue@univ-rennes.fr

CNRS Images. © Jean-Claude MOSCHETTI / IETR / CNRS Photothèque

MULTIP Research Group

Multimodal Un/self- supervised Learning

for

Tensor Image Processing

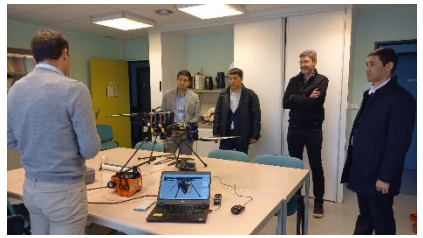
contact: benoit.vozel@univ-rennes.fr

More information about MULTIP:

https://www.ietr.fr/en/multip-multimodal-unsupervised-learning-tensor-image-processing-team

www.ietr.fr

MULTIP: Hyper-spectral images acquired by drone/plane



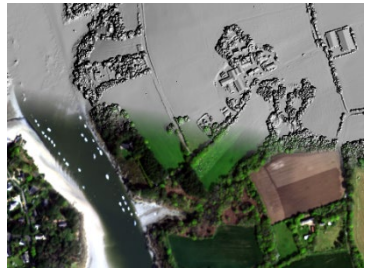
Classification of hyperspectral imaging (HSI)

Challenges :

- Integration of **multimodal data**
- **Unsupervised context**, with or without **self-learning**
- Innovative approaches and methodological recommendations for **estimating the distribution of unlabelled data in a reduced latent decision space**

Objectives :

- Deploying **automatic analysis and processing methods**
- **Agility and operational flexibility** across **multiple carriers** (**drones, aircraft, …**)

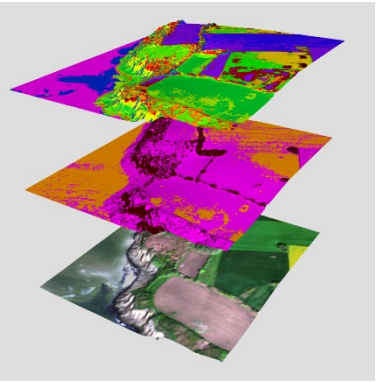


Lidar + HSI

HSI over DEM

Topics addressed:

- Development of **unsupervised criteria tailored to**:
  - **Pre-processing (compression, restoration and multimodal registration).**
  - **Multimodal clustering**
  - **Spatial and spectral anomaly detection**
  - **Image time series analysis**



HSI draping, classif. lidar, classif. lidar+hyper over DEM

More information about MULTIP:
https://www.ietr.fr/en/multip-multimodal-unsupervised-learning-tensor-image-processing-team

Current research projects

TNT-IA: (ANR ASTRID-DGA)

- Computational-enabled TNT Multiplexed Sensors Fabricated by Two-Photon Stereolithography

VEOLIA: (*covered by NDA*)

- Leak Localization Method for Water-Distribution Networks Using a Data-Driven Model

JumEAU: (*covered by NDA*)

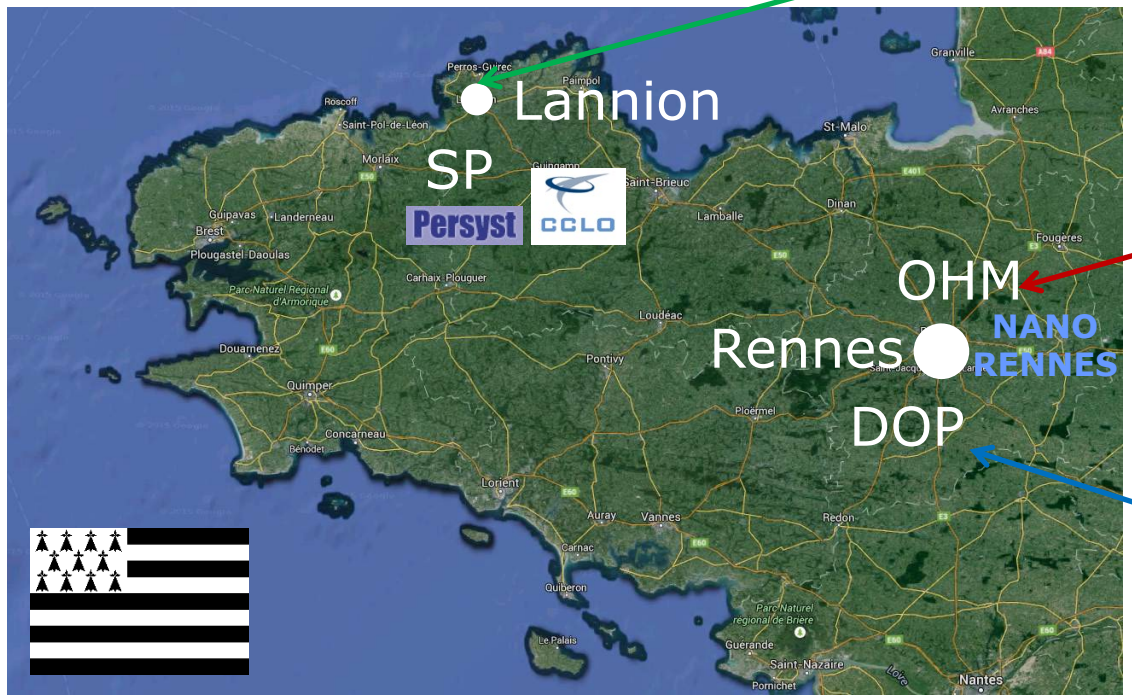
- Multiphysics digital twin for the intelligent monitoring of drinking water networks (e.g. leaks).

ANZAR: (*covered by NDA*)

- Sustainable and precision farming:
  - Early detection of diseases in cauliflower, shallot and artichoke crops
- Pollutant detection
- Optimization of Hyperspectral and AI Technologies for Biofertilizer Performance Detection

See drone and researchers in 020G

Institut Foton UMR CNRS 6082



SP
54 members

OHM
45 members

DOP
21 members

3 departments & 3 platforms

Photonics from atoms to systems.
At the frontier of physics (photonics) and ITS (Information Science and Technology)

Joint laboratories

- Smart-Facets
- Lab'Optic

Lab'Optics

Project partners: Orange, ENIB & IMT Atlantique (Lab-STICC), ENSSAT (FOTON)

Creation: February 2024

Research areas:

- Increased transmission capacity of optical transport networks
- Improving the efficiency of optical networks: latency, security, and energy efficiency
- New digital signal processing techniques and algorithms for very high-speed optical transmissions (at 1.6 Tbits/s and per wavelength and above)

Workforce: **About** 20 researchers

FOTON-SP : Already 5 CIFRE doctoral students and 1 collaborative research contract (CRC)

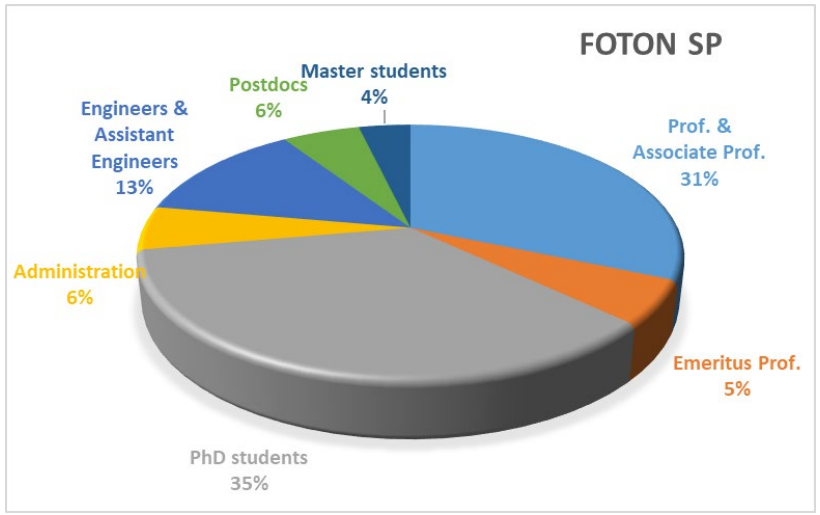
Fonctions Optiques pour les Technologies de l'informatiON

FOTON Institute

Photonic Systems Department

FOTON Institute workforce in Lannion

Total: 54 members



One Department: Foton SP

and 2 platforms: PERSYST & CCLO

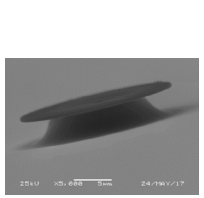
Photonic Systems Department research areas

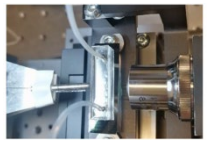
Optical Communications

Guided Optics and Sensors

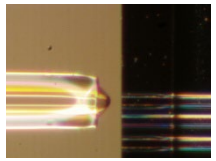
Laser Physics and applications

Micro-optics and Sensors

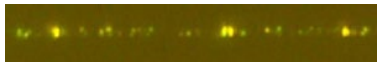




Interconnections



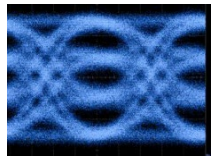
Quantum photonics

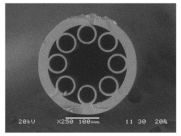


Innovative photonics systems for optical communications, sensor systems and laser architectures

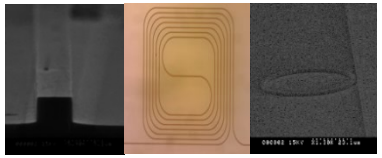
Lasers

Optical transmissions and functions

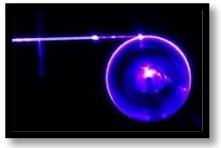


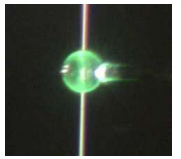


Integrated Optics



Optical Microcavities





From **fundamental to applications:** communications, environment, medical, agriculture - agri-food, industry....a priority of Brittany (smart specialization strategy), a priority of Europe (KET)

Photonics

SUSTAINABLE DEVELOPMENT GOALS

United Nations

foton

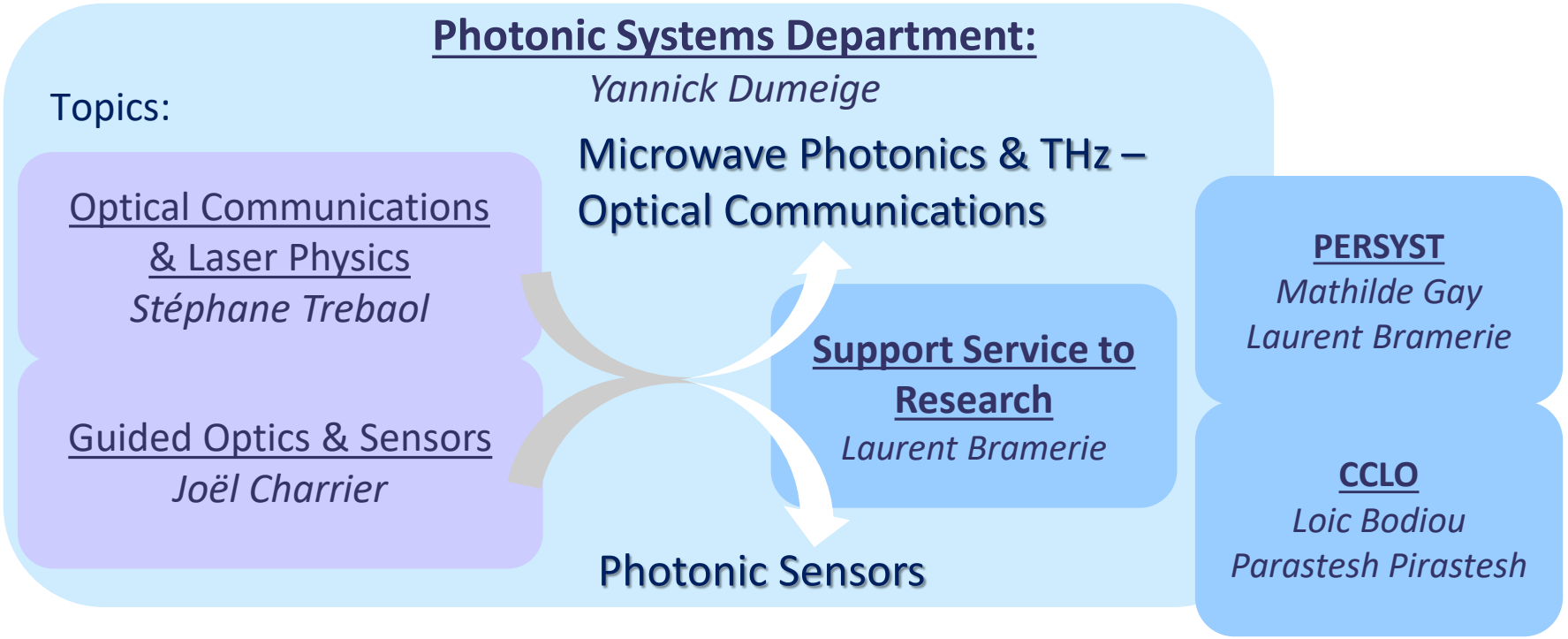
Research axes & organization of SP Department

3 Strategic axes of FOTON Institute:

- Microwave Photonics & Terahertz – Optical Communications
- Photonic Sensors
- Photo generation & storage of energy

Photonic Systems (SP) Department organization & PF in Lannion:

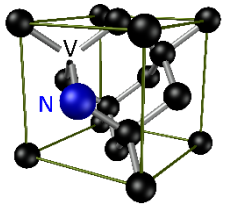
- Research areas contribute to **2** of the 3 FOTON Institute axes

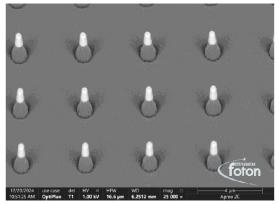


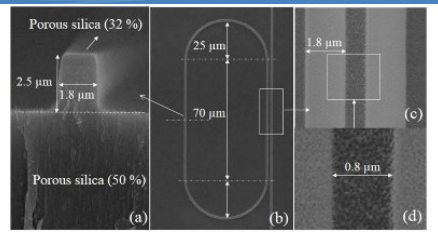
Technological Platform: CCLO

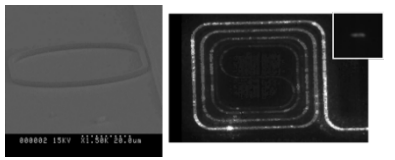
- Technological expertise of the CCLO platform :
  - **Materials and photonic integrated circuits: new PICs in the UV, Near and Mid-infrared**
  - **Equipex "E-Diamant", NV centers for sensors applications**

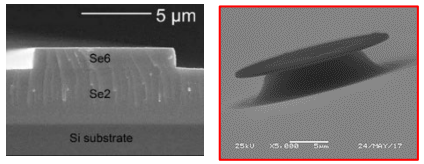
Rahul Chembra Vasudevan, PhD (OHM)
Silpadas Nedoolil, PhD (SP)
Abdelali Hammouti, Postdoc (OHM/SP)











- Equipment:

Clean rooms with technological instruments for the **photolithography** process, **deposition**, **etching**, …
Scanning electronic microscope, **µRaman spectrometer**, …

RENATECH+ Le réseau français de nanofabrication

CCLO

Centre Commun Lannionnais d'Optique

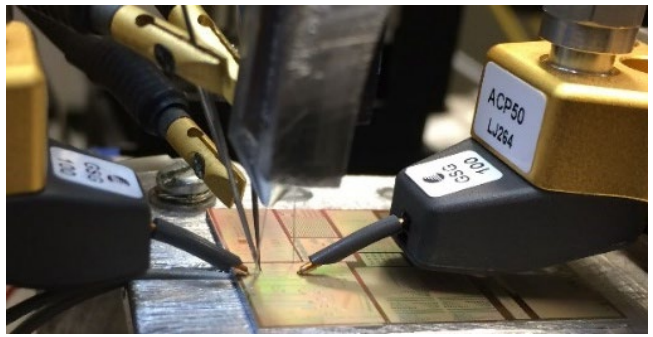
Contacts:
Technical head: parastesh.pirasteh@enssat.fr
Scientific head: loic.bodiou@univ-rennes.fr

PERSYST platform : http://persyst.foton.cnrs.fr

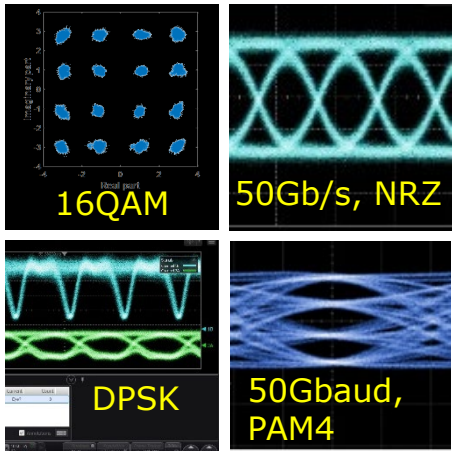
Provides **expertise and technical facilities** for the evaluation of **high speed optical communication devices and systems**

- Collaborative research and commercial service to SMEs, larger companies or research infrastructures
- **From on chip characterizations to system assessment**

Optical, DC and RF probing on a PIC



Various modulation formats

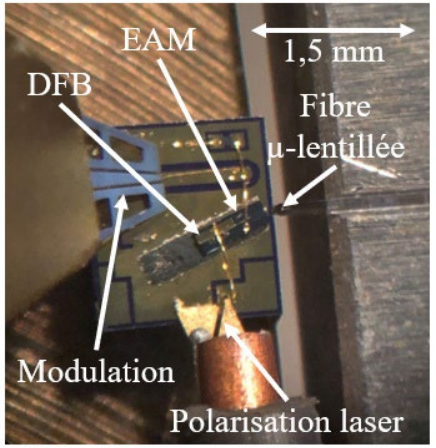


Head: Mathilde Gay and Laurent Bramerie

Contact: persyst@listes.institut-foton.eu

Optical communications

Chip, devices and subsystem characterization



Persyst

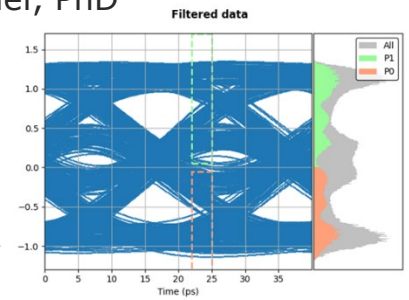
Optical communications

Brendan Torillec, PhD

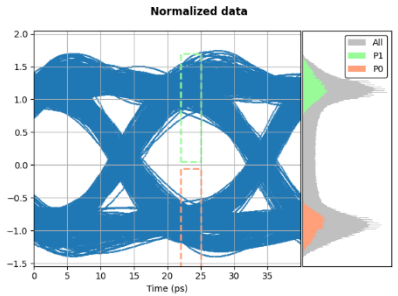
Dylan Chevalier, PhD

orange

UMR IRISA



Degraded signal



Equalized signal

Hollow core fiber for telecommunications

Joseph Zandueta, PhD

orange

Free space communications

Toward satellite communications

Simon Lévêque, PhD

ThalesAlenia Space

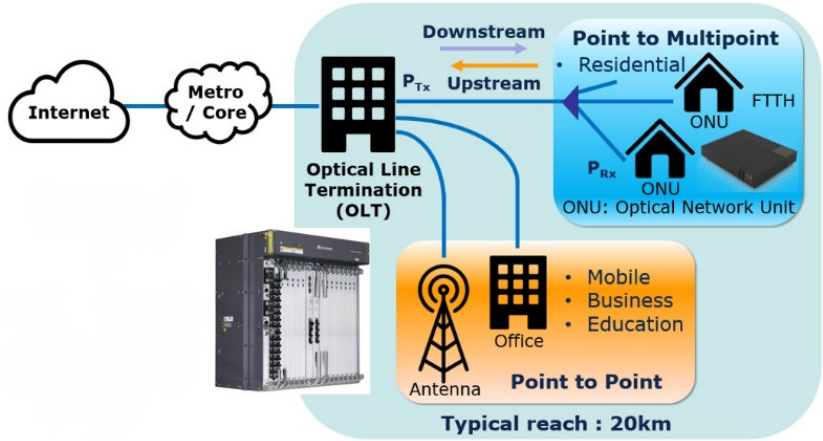
Syrlinks

Coherent beam combination study for telecommunication applications

Thomas Le Beux, PhD

ONERA THE FRENCH AEROSPACE LAB

DGA



Marin Dupuis, PhD

STMicroelectronics

Salma El Miz, PhD

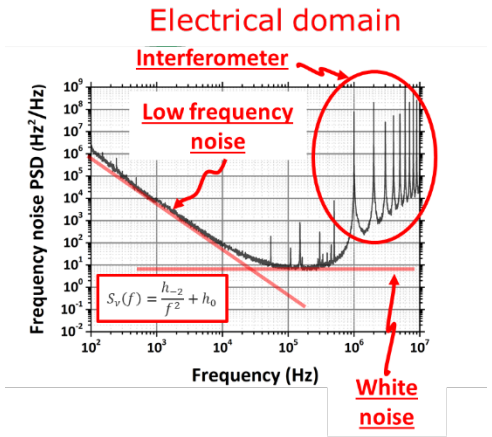
HUAWEI

foton

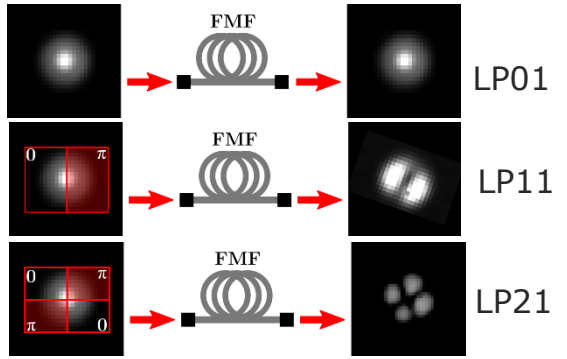
NIR Fibers and Lasers

Highly coherent lasers and their applications using Brillouin fiber Laser and SC lasers @ 1,55 µm

Sabarinath Sunil, PhD



Spatial Division Multlipexing: Four Wave Mixing in Few Mode Fiber

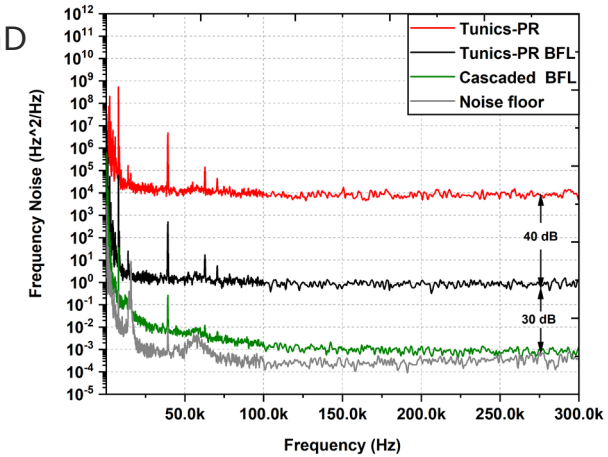


NIR Fibers and Lasers

Toward Ultrasensitive sensors based on ultracoherent Lasers

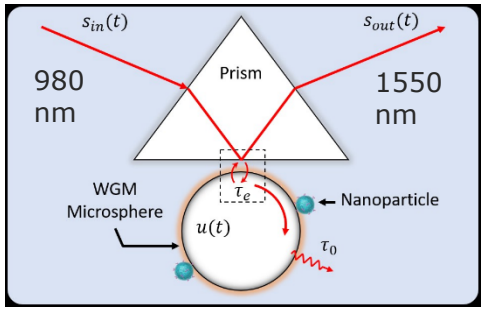
Thidsanu Apiphatnaphakul, PhD

Linewidth reduction by Brillouin effect. Detection of few photons



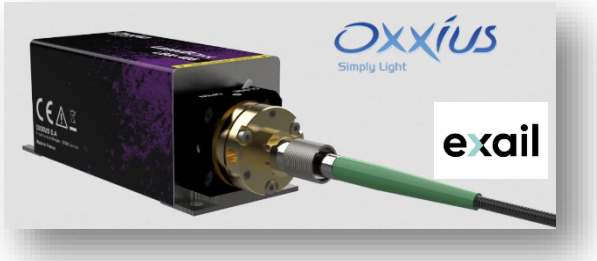
Toward NIR Active Micro-Sphere sensors (AM-2S)

Tijani Elmetouy, PhD



Coherent light sources in the near-UV & visible

NUV Laser diode for Raman spectroscopy

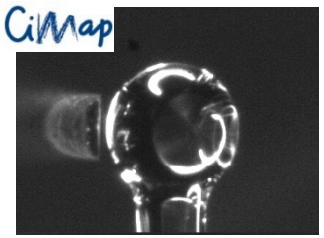


Visible singlemode Laser diodes for compact atomic clocks

Georges Perin, Post Doc

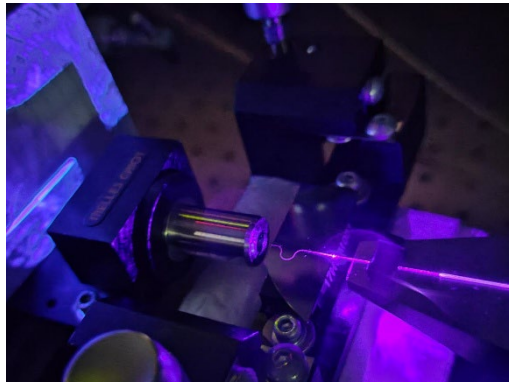
High Q factor microresonator for visible light emission

Abhishek Sureshkumar, PhD



Toward integrated NUV photonics >> Emerging activity (SiON with Foton OHM)

Ronan Kervazo, PhD

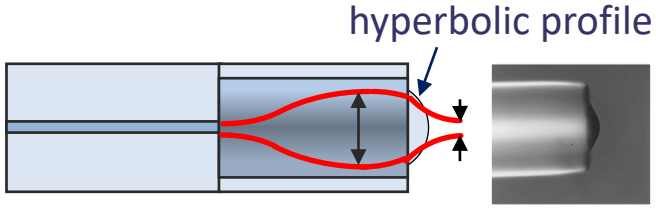


NUV and Visible photonics

Low frequency noise lasers at visible wavelengths for quantum technologies

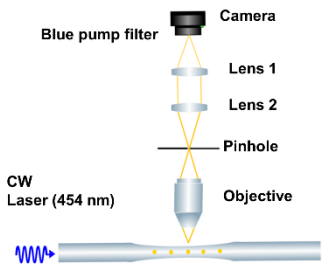
Sharon Sha, PhD

Microlenses for visible light



Rare earth based visible single photon sources

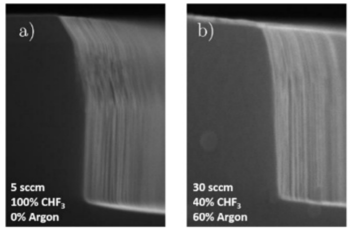
Silpadas Nedoolil, PhD
Abhishek Sureshkumar, PhD



Applications: High sensitivity Raman Spectroscopy, frequency and time metrology and quantum optics at NUV and visible wavelength

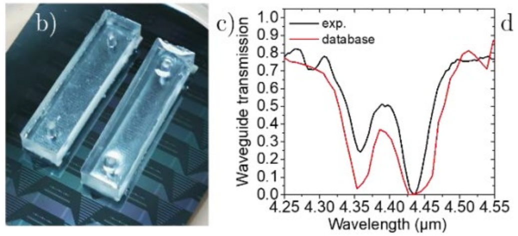
NIR and Mid-IR Photonic Integrated Circuit (PIC)

PIC based on Chalcogenide glasses for their large transmission range and high non-linear refractive index



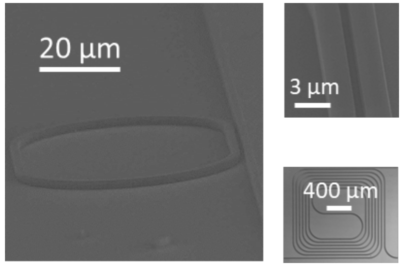
Anass Chalhal, PhD

PIC based on porous materials



Acetonitrile (liquid)

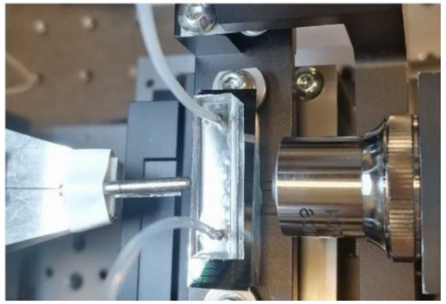
Kokab Sabir, PhD



Stimulated Brillouin Scattering based on very high light matter interaction in chalcogenide PICs (with FOTON DOP)

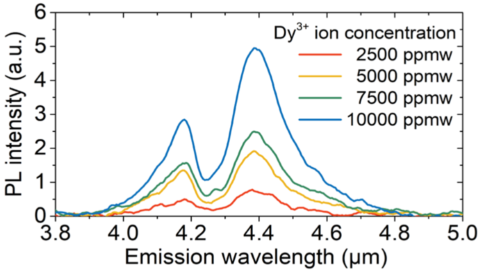
Youssef Ghandaoui, PhD

NIR and Mid-IR PIC



Asma Bouzid, Postdoc

Integrated light source based on rare earth ion doped chalcogenide waveguides

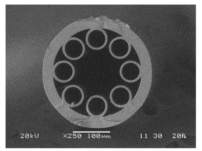


Applications : NIR and Mid-IR sensing

- Detection of emerging pollutants in water (BTEX, PAHs,…)
- Detection of gas (COx, NOx,…)
- Detection of VOC for health

Free space Mid-IR and NIR sensors

Optical gas sensor in harsh environment in Mid-IR with silica hollow core antiresonant fiber



SMOGLESS Project

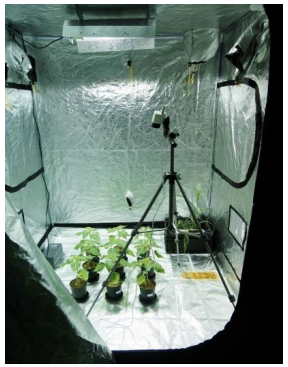
Toward Mid-IR Laser Velocimetry system (VelociMIR)

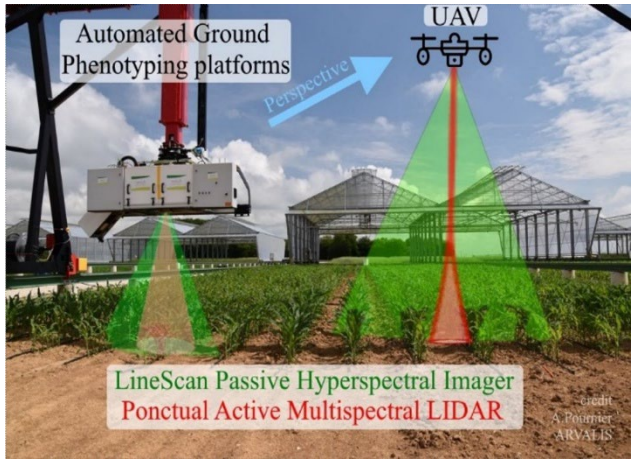
Mid-IR and NIR sensors

In fields photosynthesis measurement by fluorescence of plant covers

Benjamin Gac, PhD

Hyperspectral Mid-IR imaging : study of plant water stress





Applications : NIR and Mid-IR sensing : Detection of molecules, gas (COx, NOx,…); sensing for environment, medical, agri agro

FOTON SP - Highlights

• Support for the launch of companies within the *Laboratoire d'Optronique*, the predecessor of the FOTON laboratory:

- IDIL in 1995
- Optocom Innovation (→ Lumibird) in 1997
- Oxxius (P. Féron 2001, now collaboration with S. Trebaol)

Prize winners, for example:

• 2022: **Pascal Besnard** Transition Trophy (Persyst, Syrlinks)

• 2024: **Jean-Claude Simon** received the *Grand prix Léon Brillouin*

Most prestigious prize of the French Optical Society

• Two impactful papers representing the synergy between the research platforms and the SP research groups:

PERSYST / Optical Communications & Laser Physics: *170 Gbit/s transmission in an erbium-doped waveguide amplifier on silicon*. Optics Express **17** p. 22201 (2009)

CCLO / Guided optics and sensors: *Optical characterization at 7.7 µm of an integrated platform based on chalcogenide waveguides for sensing applications in the mid-infrared*. Optics Express **24** p. 23109 (2016)

IRISA at a glance

7 scientific departments

- D1: Secured and Large Scale Systems
- D2: Networks, telecommunication and services
- D3: Architecture
- D4: Language and software engineering
- D5: Virtual reality, virtual humans, interactions and robotics
- D6: Signal, images, language
- D7: Data and knowledge management

8 transversal themes

Art, culture and heritage

Artificial Intelligence

Cybersecurity

Energy

Environment and ecology

Health and biology

Mobility and intelligent transportation

Robotics and drones

IRISA in Lannion

70+ members (ENSSAT, IUT, CNRS, INRIA)

4 transversal themes

Art, culture and heritage

Artificial Intelligence

Cybersecurity

Energy

D2: Networks, telecommunication and services

- OCIF: *Communicating Objects for the Future Internet*
- SOTERN: *Self Protecting the Future Internet*

D3: Architecture

- GRANIT: *Adaptive algorithms and architectures for energy-efficient wireless systems*
- TARAN: *Domain-Specific Computers in the Post Moore's Law Era*

D6: Signal, image, language

- EXPRESSION: *Expressiveness in Human Centered Data/Media*

D7: Data and knowledge management

- BARD: *DRUID + SHAMAN – Databases and Artificial Intelligence*

SOTERN

21 members in Lannion and Rennes

- 11 permanents (2 in Lannion)
- 10 ongoing PhDs (3 in Lannion), 2 postdocs

Some topics on protecting networks:

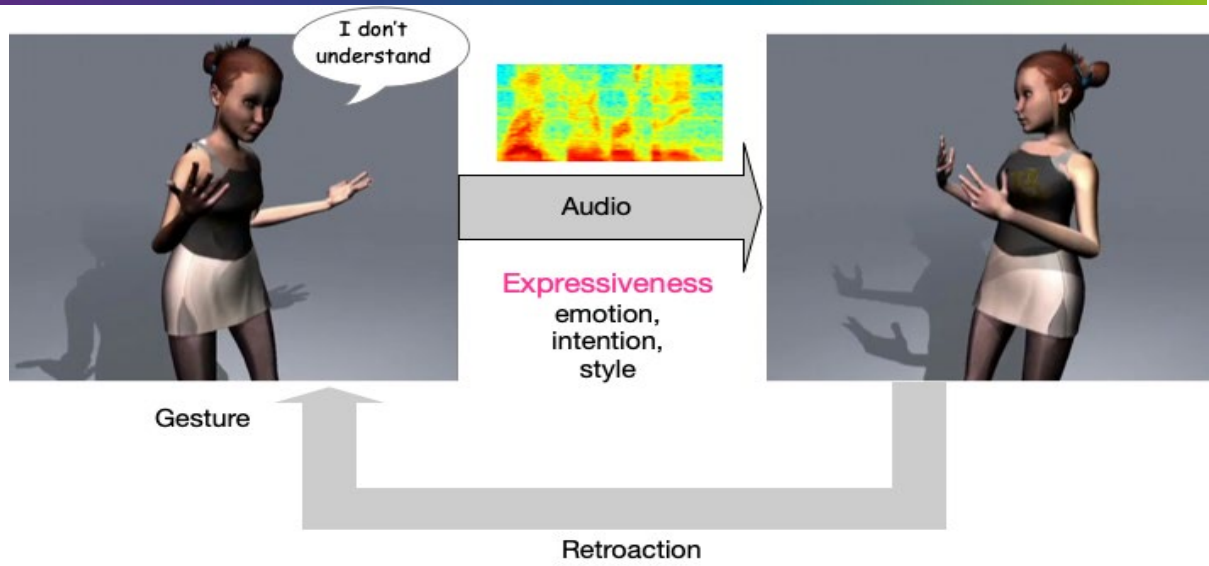
- **Autonomous security of networks**
  - Intent-based security: "Siri, protect my network"
  - Correlations between physical devices (smartphone) and network activity and network activity
- Anticipating threats for networks of the future
  - Stream manipulation in low-latency industrial networks

Some ongoing projets:

PEPR Cybersécurité; PEPR Réseaux du futur; BPI 5G-metavers;

EU CyberSecDome ; ANR JCJC BC4SSI

EXPRESSION



- **25-30 members in Lannion and Vannes**
  - 12 permanents,
  - 9 PhD theses in progress,
- **Expressivity in human language**
  - Gesture, Speech, Text
  - Generation, analysis and classification,
  - Multimodal data : understand and exploit interactions between them,
  - Deep learning : Evaluation, Explicability and Interpretability, Frugality
- **A selection of projects :**
  - **Speech Deepfake Detection**
  - Controlled generation of paraphrases
  - **Controlled text generation to combat disinformation**
  - Speech Prosody for TTS
  - Avatar communicating with sign language from text

DRUID & SHAMAN = BARD

Bringing Ai to Revisit Data Management

28 members in Lannion and Rennes

- 18 permanents (12 in Lannion)
- 10 ongoing PhDs (5 in Lannion)

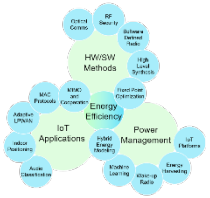
Credo : reasoning on data to fully exploit their potential

- Data analytics using background/domain/expert knowledge
- Data science and machine learning pipelines within database management systems
- Handling data quality in data management (imprecision, inconsistancy, uncertainty,…)
- Scalable reasoning-based data management in the cloud

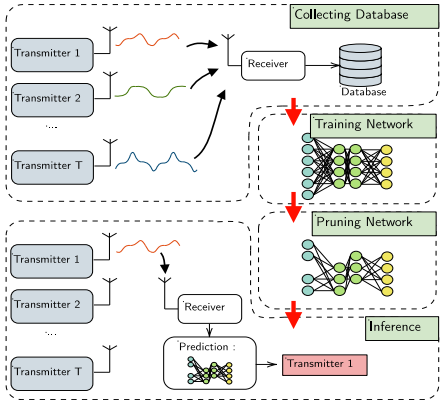
Sample applications

- Anomaly detection in maritime transportation (DGA RAPID with HSBC & SemSoft)
- Hardware acceleration of big data analytics (CIFRE PhD Nokia – UnivRen)
- Music score analytics (PhD LTC – UnivRen)
- Modeling and analysing human learning (PhD CD22 – UnivRen)

GRANIT: research topics on AI & Cyber

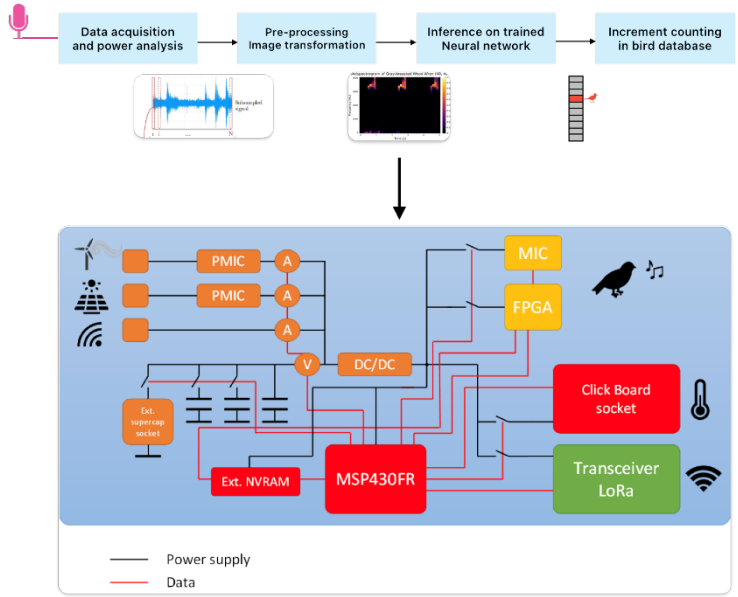


- **Bring AI to the edge**
  - Reduce data transmission and storage
  - Preserve privacy and reduce security leaks
  - GRANIT team : ~30 people in Lannion campus
- **Security Leaks of Spiking Neural Networks**
  - Based on device signature analog distortions
    - ANR SpiNNAch (2025-2028)
- **Frugal AI for RF Fingerprint Identification**
  - Based on device signature analog distortions
  - Investigate resilience with pruning for RFF
    - ANR JCJC RedInBlack (2023-2026)
    - 2 PhD Thesis (Creach Labs, with DGA-MI)
- **Neuronal audio codec compression**
  - 2 CIFRE PhDs with Orange Labs
- **AI for Non Intrusive Load Monitoring**
  - Spiral layers approach



PATENT

- **Ultra low power architectures for edge processing**
  - Leveraging energy harvesting and management
  - Non volatile RAM for intermittent processing
    - ANR Light-Swift (2023-2026) : France-Japan Edge AI call (NTT, NII, Wavely)
    - ANR OWL (2024-2027) : IA for Circuits call (LS2N, CNRS, INRIA)
    - ANR MiOT (2025-2028) : France-Swizerland (EPFL, UBS)



- **Collaborative projects with industry**
  - Orange Labs, Nokia, Ericsson, Eco-counter
  - Prolann/SeismoWave, CG Wireless, Feichter Audio, Ticatag

TARAN : research topics on AI & Cyber

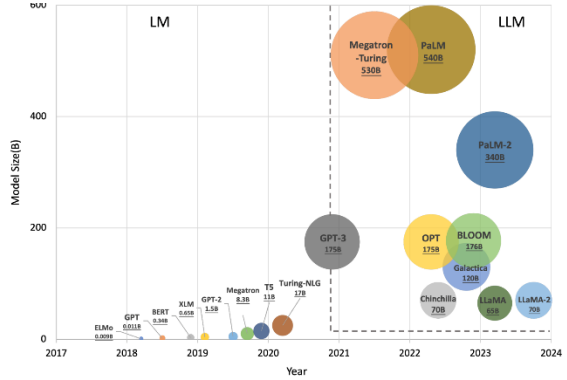
- **Context: HPC applications & Embedded Systems**
  - large models: increasing number of parameters & computing capacity needs
  - need to develop energy efficient computers
  - **accelerators for AI algorithms**

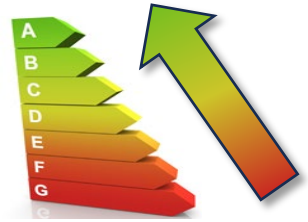
- **Taran : Domain-Specific Computer (6G, AI, …)**
  - **Development of high-level methods and tools to help hardware accelerator designers**
    - Constraints: energy efficiency, resilience, security, accuracy
  - ~40 people, Rennes and Lannion campuses
    - 9 Permanent Researchers, 3 PostDocs, 6 Research Engineers, 23 PhD Students

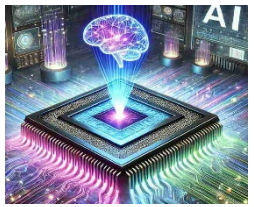
  - **Collaborations on these topics**: CEA, Safran, Nokia, Thalès, Orange, DGA, CNES, INL, …

  - **Involvements in AI & Cyber projects**
    - HOLIGRAIL Project leader – PEPR IA
    - PEPR Cyber Arsene, projet Cyberpros
    - EuroHPC DARE (RISC-V)
    - DGA AID Sniffer/expect
    - Project leader of future « Agence de programme Inria+CEA : Composants pour l'IA »

    - ~ 13 PhD on these topics







Cluster SequoIA

- AI for Trust and Security in and by Digital Systems
- One of the 9 clusters of excellence in France (France 2030 programme)
- Objectives:
  - Promote excellence in Education, Research and Innovation
  - Increase attractivity and visibility: international projects and events
- Tools (examples):
  - Datalabs, Hackathons, Apprenticeship
  - International tracks in graduate school
  - International chairs
- Contact: iacluster@univ-rennes.fr / http://cluster-sequoia.univ-rennes.fr/

Je vous souhaite une journée fructueuse

Cette journée est coorganisée par

Nos partenaires et sponsors

Avec le soutien de

10h50 : retour d'expérience « Recherche & Innovation » de 3 alumni Enssat

11h40 : table ronde
« du point de vue des industriels, quel doit être le rôle des écoles d'ingénieurs dans l'innovation ? »
animée par Estelle Keraval, directrice Anticipa

12h30 : cocktail - buffet – networking

Mini-conférences de 3 pépites chercheur·es de l'Enssat

14h : Hélène Ollivier, Institut Foton :
« Plateforme de tests pour les télécommunications quantiques »

14h20 : Robin Gerzaguet, Irisa :
« Whispering devices - the overlooked attack surface »

14h40 : Jonathan Chevelu, Irisa :
« grands modèles de langage : fonctionnement, contrôle et utilisations intelligentes »

15h présentations des activités de recherche par les chercheur·es, visites possibles des laboratoires