

ISEN
ALL IS DIGITAL!
OUEST



ISEN ENGINEERING SCHOOL

Digital and Advanced Technologies

ayman.al-falou@isen-ouest.yncrea.fr



yncréa

**3 ENGINEERING
SCHOOLS**

6 DIPLOMAS

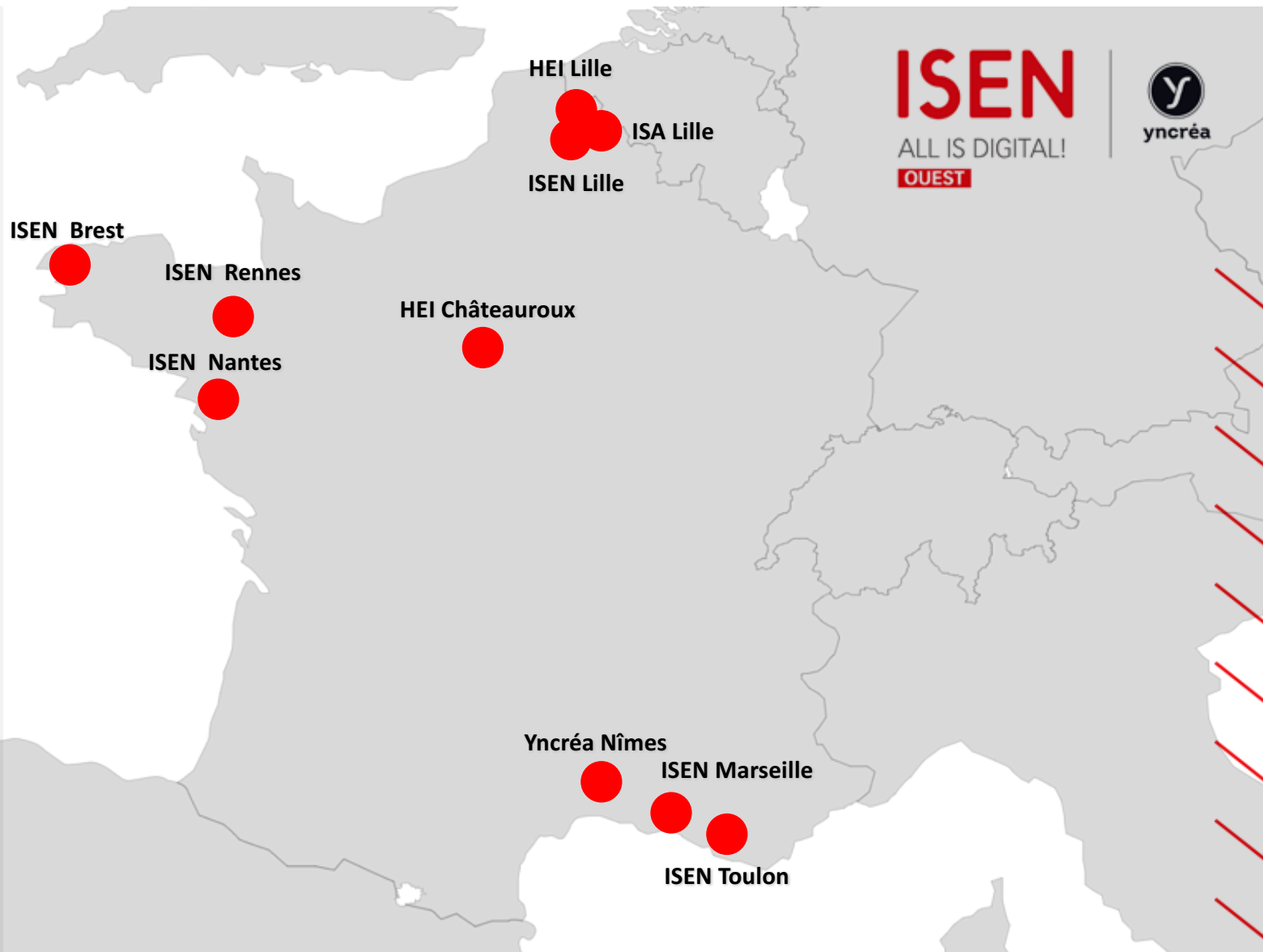
**1100 GRADUATES
per year**

5500 STUDENTS

27000 ALUMNI

400+ PARTNERS

**96% EMPLOYMENT
after 5 months**

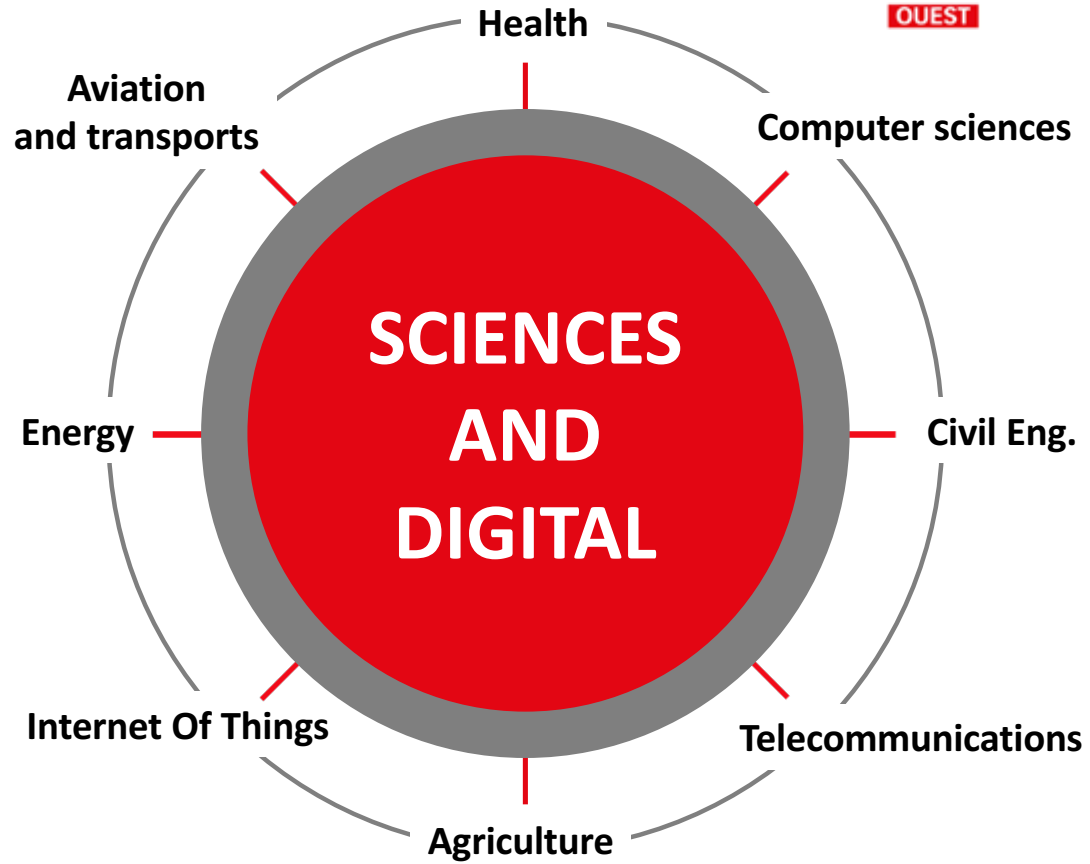


ayman.al-falou@isen-ouest.yncrea.fr



**ENGINEER
FOR
SCIENCES
AND
DIGITAL
TECHNOLOGIES**

ISEN
ALL IS DIGITAL!
OUEST





yncréa

ISEN Yncréa Ouest

3 CAMPUSES

700 STUDENTS



ayman.al-falou@isen-ouest.yncrea.fr



BREST CAMPUS



NANTES CAMPUS



RENNES CAMPUS

ISEN
ALL IS DIGITAL!
OUEST



SOUS CONTRAT

ÉDUCATION
NATIONALE
MINISTÈRE
ESRI



HABILITÉ

COMMISSION
DES TITRES
D'INGÉNIEURS



MEMBRE

CONFÉRENCE
DES GRANDES
ÉCOLES



LABEL

EUR-ACE

INTÉRÊT GÉNÉRAL

EESPIG



LABEL

SPORTIFS DE
HAUT
NIVEAU



DEAN OF ISEN-YNCREA OUEST



MARC FAUDEIL

BOARD OF DIRECTORS



GÉRARD JOUSSET

**CHAIRMAN OF THE
BOARD OF
DIRECTORS**

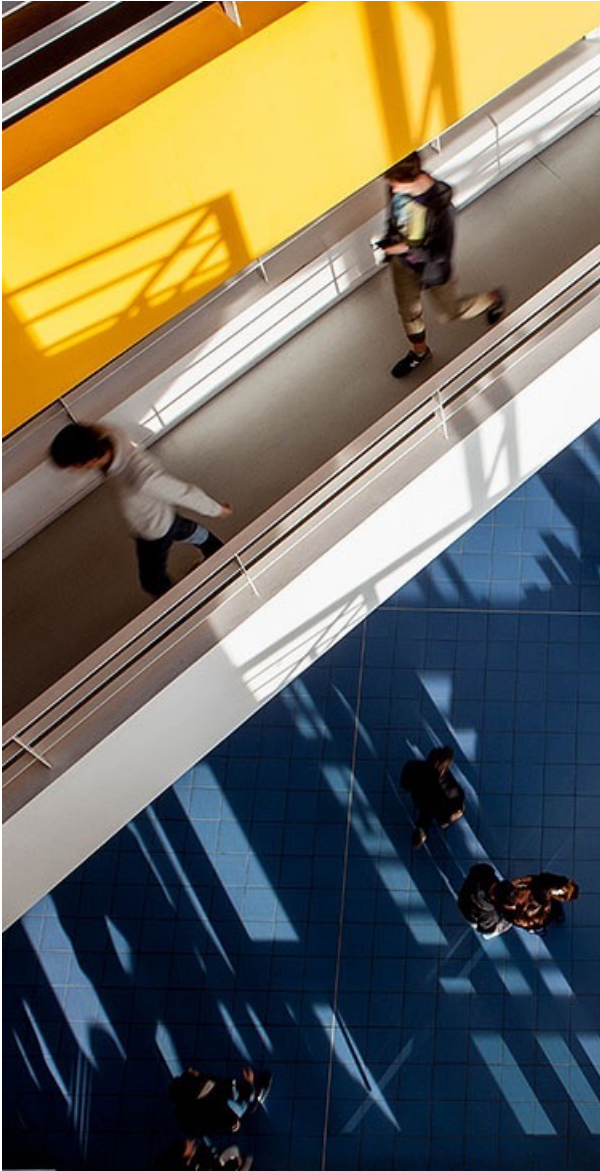
Former Director General of
IBM France

THALES



NAVAL
GROUP





ISEN
ALL IS DIGITAL!
OUEST



ISEN Research L@bISEN-Yncrea Ouest

Smart and Autonomous Systems

Ayman Alfalou : ayman.al-falou@isen-ouest.yncrea.fr

ayman.al-falou@isen-ouest.yncrea.fr



ISEN
ALL IS DIGITAL!
OUEST




yncréa 
OUEST

ISEN 
ALL IS DIGITAL!
BREST

L@bISEN
Yncréa
Ouest
Laboratory

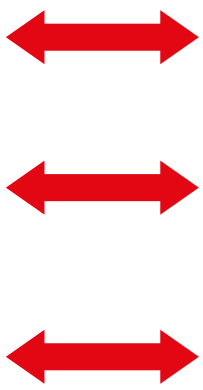
Pôle Mer
Atlantique Bretagne 

Doctoral schools:
SM, SICMA 

Institut de Recherche
Dupuy de Lôme
FRE CNRS 3744 IRDL 

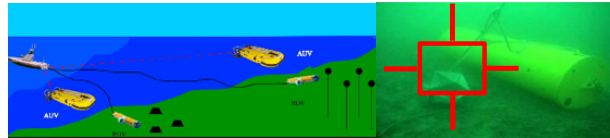
SEA TEST BASE
Powered by **ISEN** 
ALL IS DIGITAL!

THALES
Joint laboratory: WAVES



L@bISEN Yncréa Ouest

4 TEAMS



VISION

Video, signal, Image, optics and digital

Headed by A. Alfalou – Professor HDR

11 Associate Professors

1 post-doc - 6 PhD Students

Publications 2012-2016:

85 = 39(J)+4(BC)+42 (Conf)



ESE : Energy and electromechanical systems

Headed by G. Feld - Dr

3 Associate Professors

1 Post Doc

4 PhD Students

Publications 2012-2016:

40 = 19(J)+1(BC)+20(Conf)

ISEN

ALL IS DIGITAL!

OUEST



SEACOM

Embedded systems, acoustics, communications and robotics

Headed by Y. Auffret – Dr

8 Associate Professors

3 PhD Students - 2 Research Engineers

Publications 2012-2016: 23 = 11(J)+3(BC)+9(Conf)



SIAM

Security, computer science and e-learning

Headed by J.P. Gerval – Dr

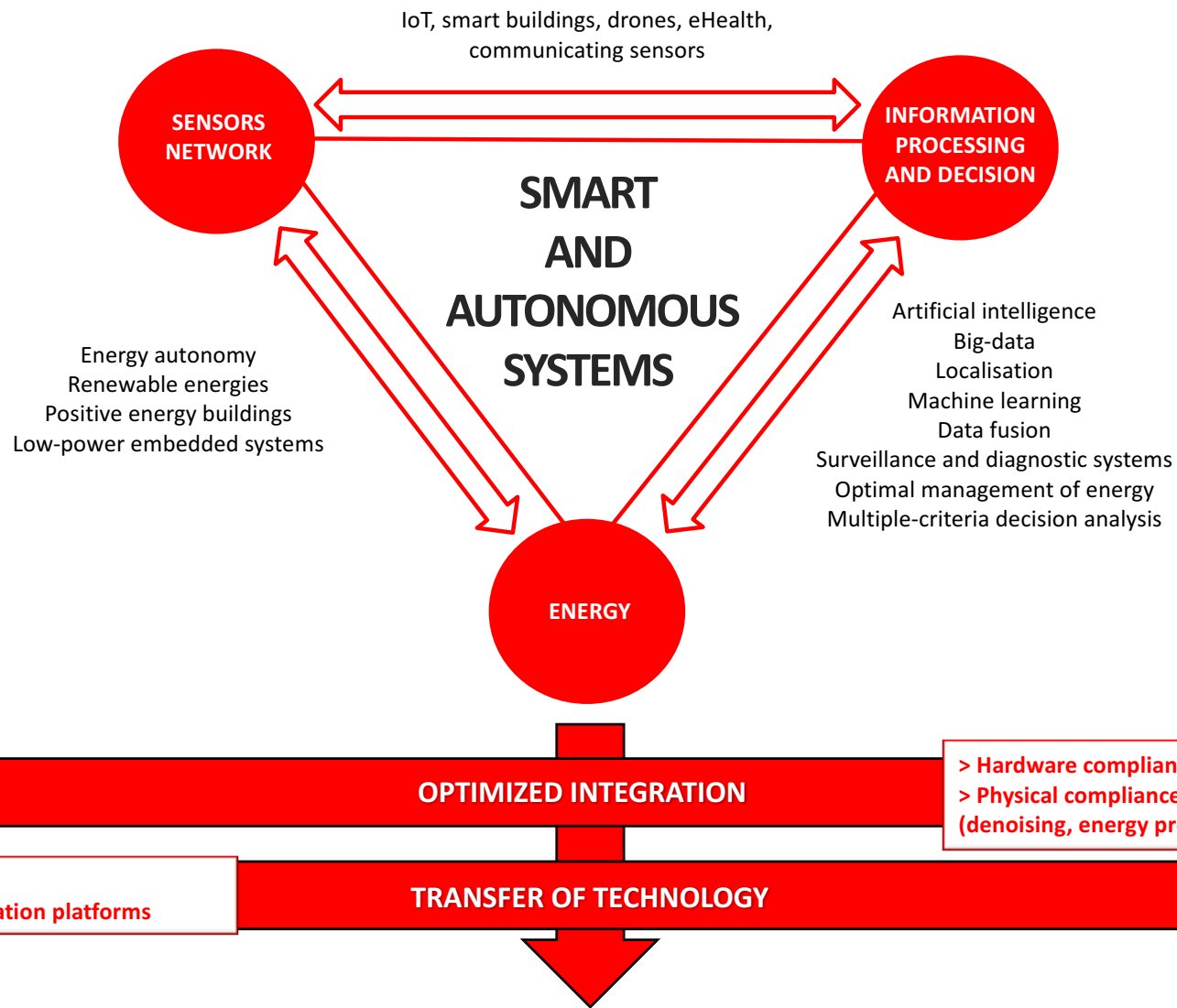
3 Associate Professors

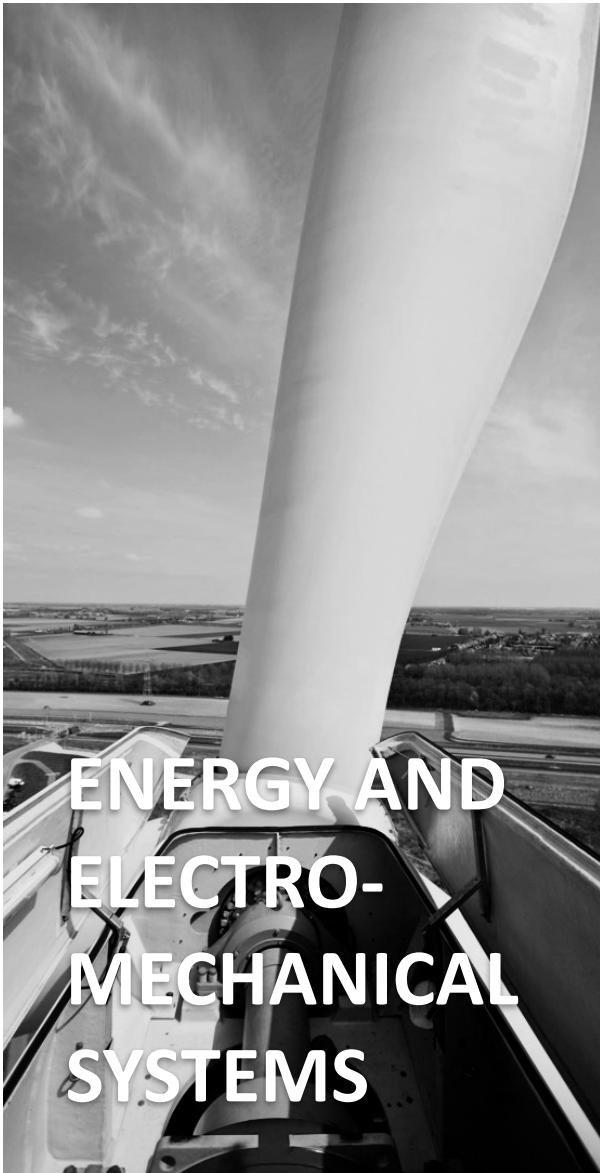
1 Research Engineer

Publications 2012-2016:

10 = 2(BC)+8(Conf)

L@bISEN
Yncréa Ouest
4 TEAMS

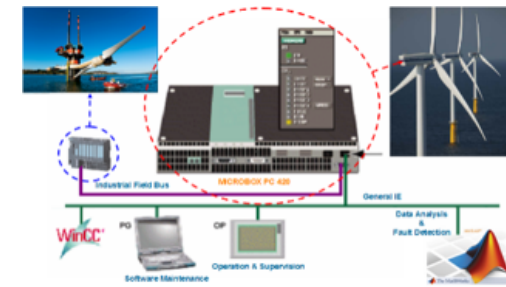
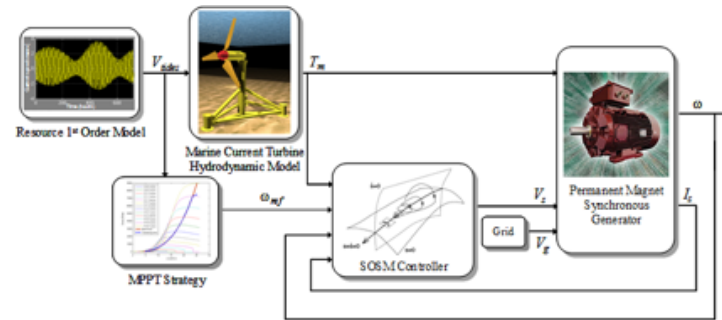




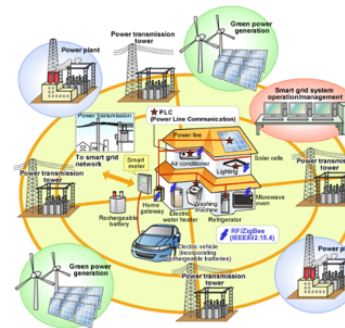
ENERGY AND ELECTRO-MECHANICAL SYSTEMS

POWER QUALITY ENHANCEMENT IN RENEWABLE ENERGY CONTEXT

ISEN
ALL IS DIGITAL!
OUEST



POWER ELECTRONICS AND CONTROL

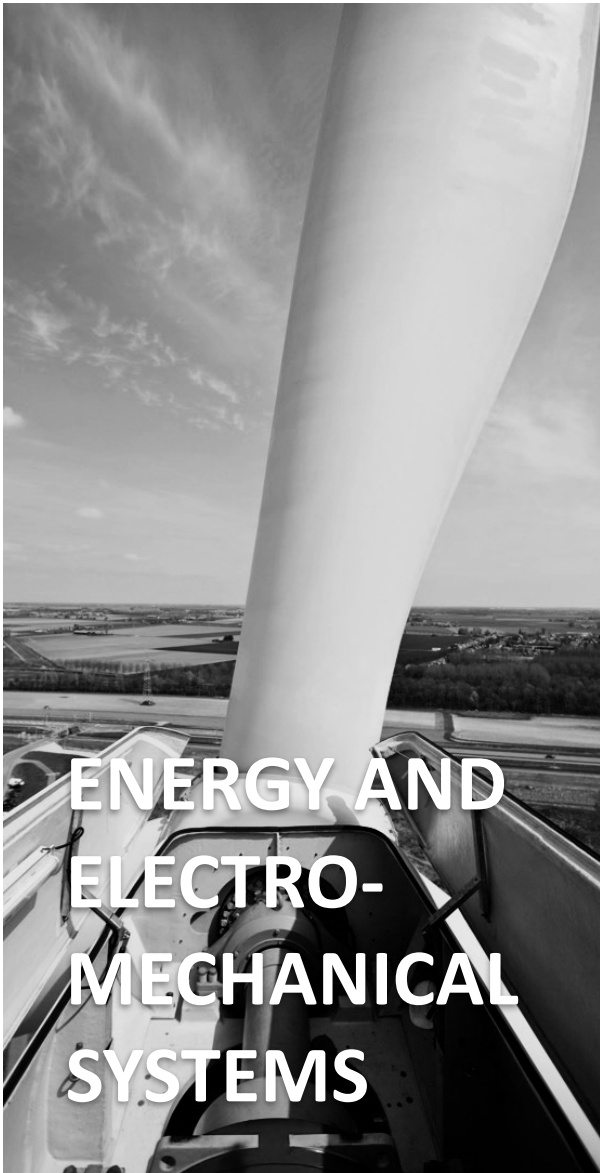


FAULT DETECTION AND DIAGNOSTIC

SMART GRIDS

Gilles Feld <gilles.feld@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr



ENERGY AND ELECTRO- MECHANICAL SYSTEMS

CONTROL AND ENERGY MANAGEMENT

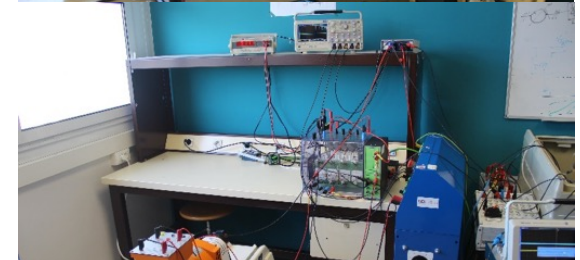
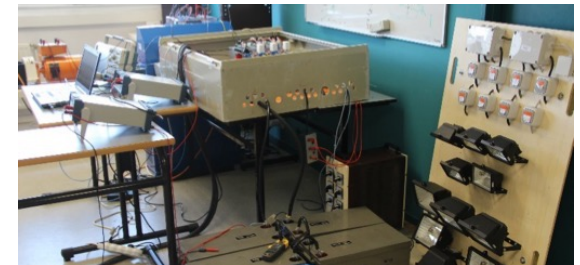
TIDAL TURBINE / WIND ENERGY CONVERSION SYSTEM EMULATOR WITH STORAGE SYSTEM

Control design for distributed generators:
wind energy conversion system, marine tidal
power generation...

- Maximum power extraction
- Energy management

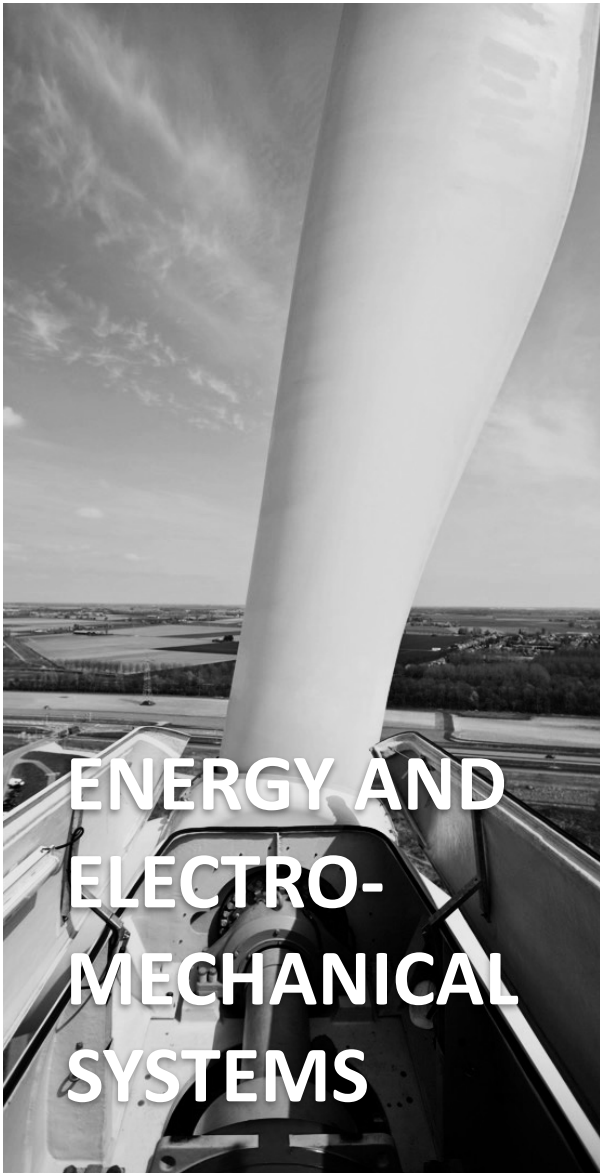
Gilles Feld <gilles.feld@isen-ouest.yncrea.fr>

ISEN
ALL IS DIGITAL!
OUEST



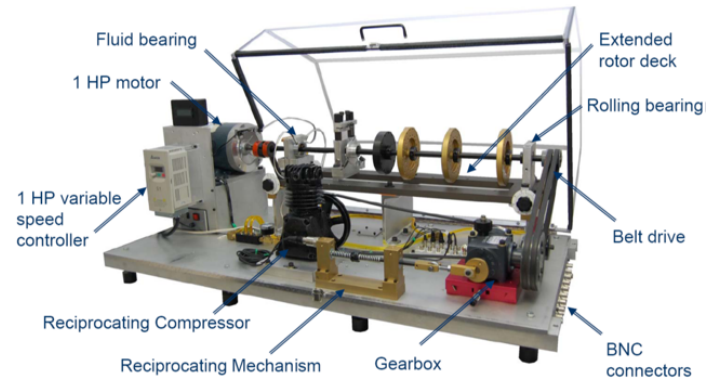
Test Rig and Real system

ayman.al-falou@isen-ouest.yncrea.fr



ENERGY AND ELECTRO- MECHANICAL SYSTEMS

DIAGNOSTIC



Test rig



Real system

Fault detection using machine current signature (maintenance cost reduction)

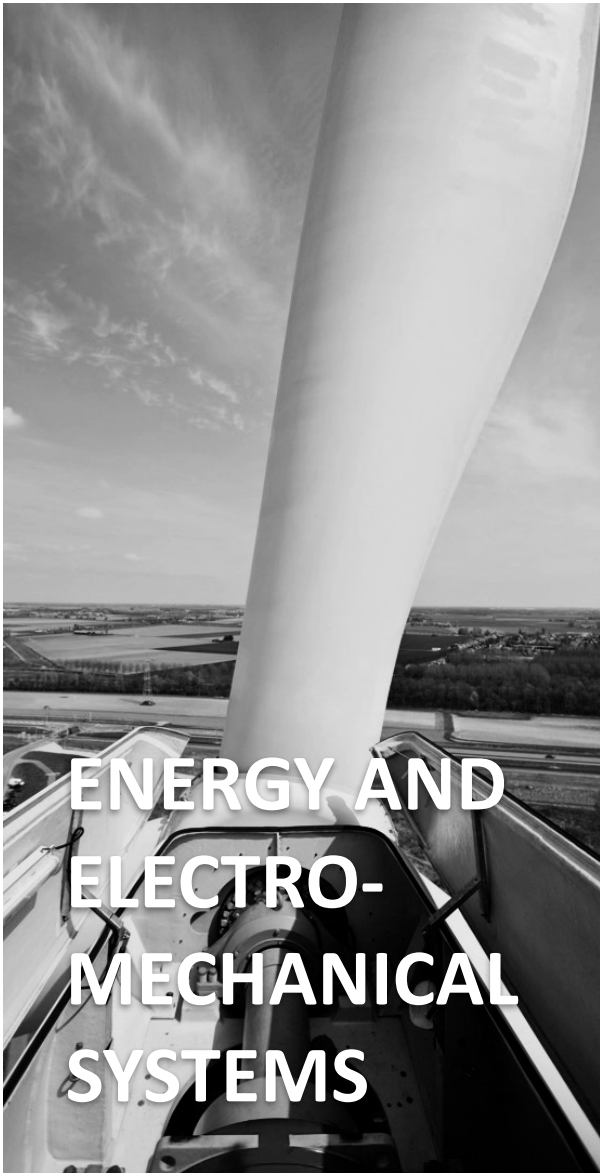
- Electric generators.
- Both mechanical and electrical faults

Gilles Feld <gilles.feld@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr

ISEN
ALL IS DIGITAL!
OUEST

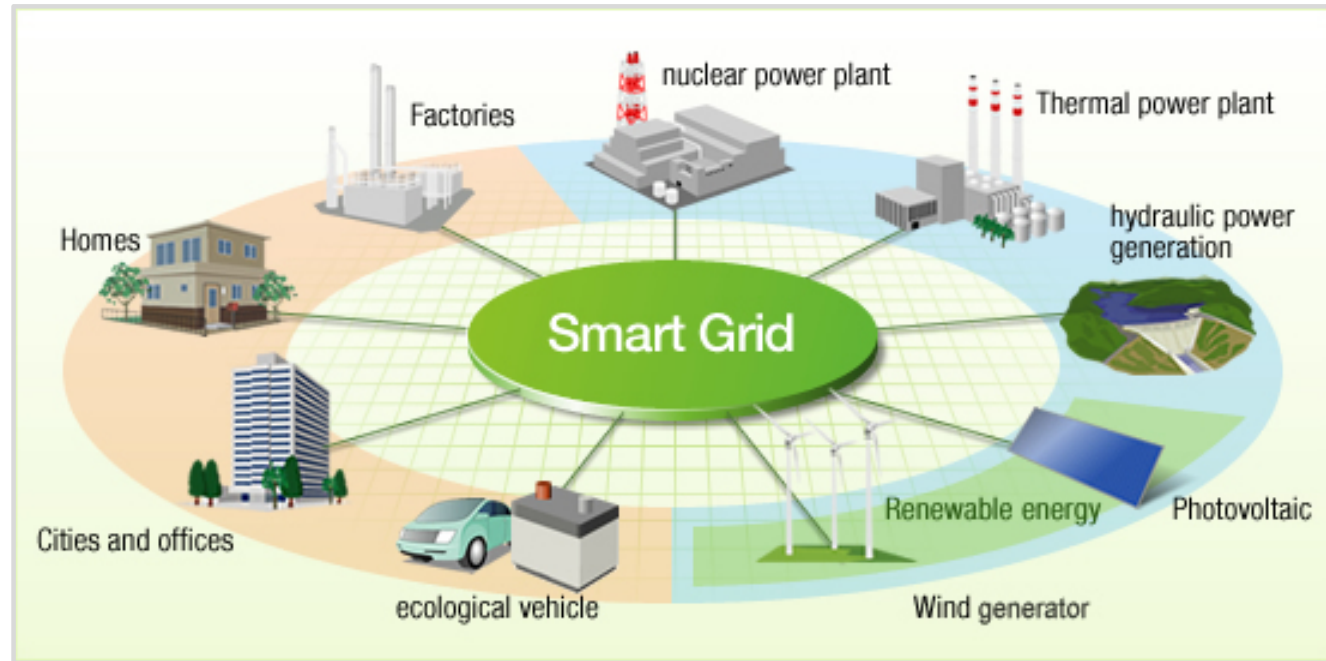




ENERGY AND ELECTRO- MECHANICAL SYSTEMS

SMART GRIDS

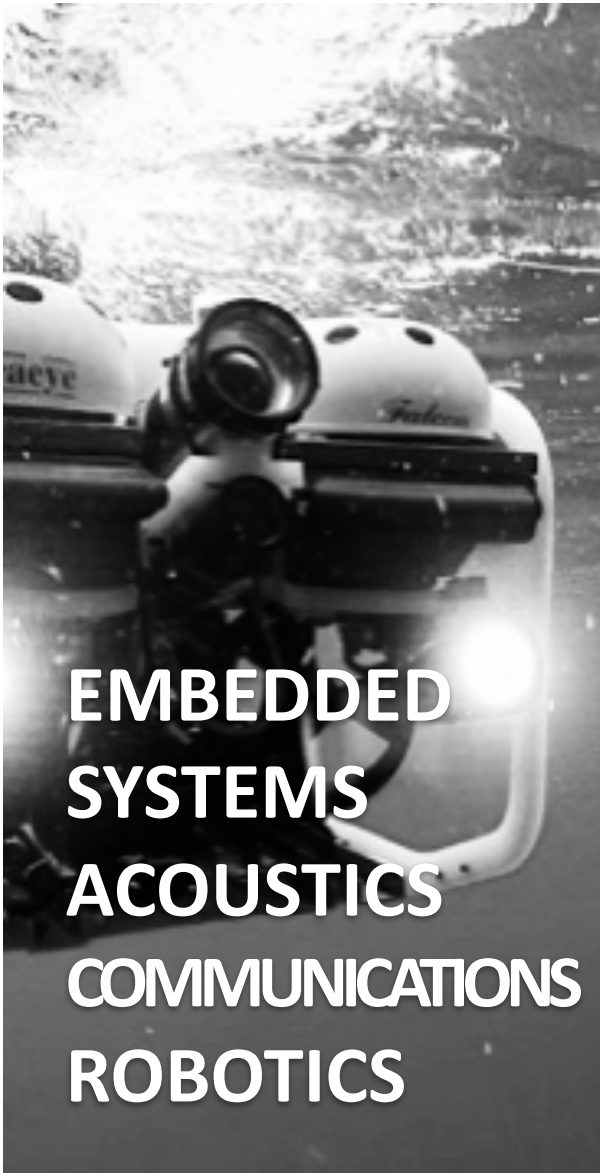
ISEN
ALL IS DIGITAL!
OUEST



- Hybrid power generation system sizing for remote areas
- Energy management and power flow control according to load variation

Gilles Feld <gilles.feld@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr



EMBEDDED SYSTEMS, ACOUSTICS, COMMUNICATIONS, ROBOTICS



RESEARCH ACTIVITIES

- Underwater acoustics
- Digital communication
- Time synchronization
- Embedded systems
- Marine observatories
- Marine robotics:
 - Positioning
 - Swarm

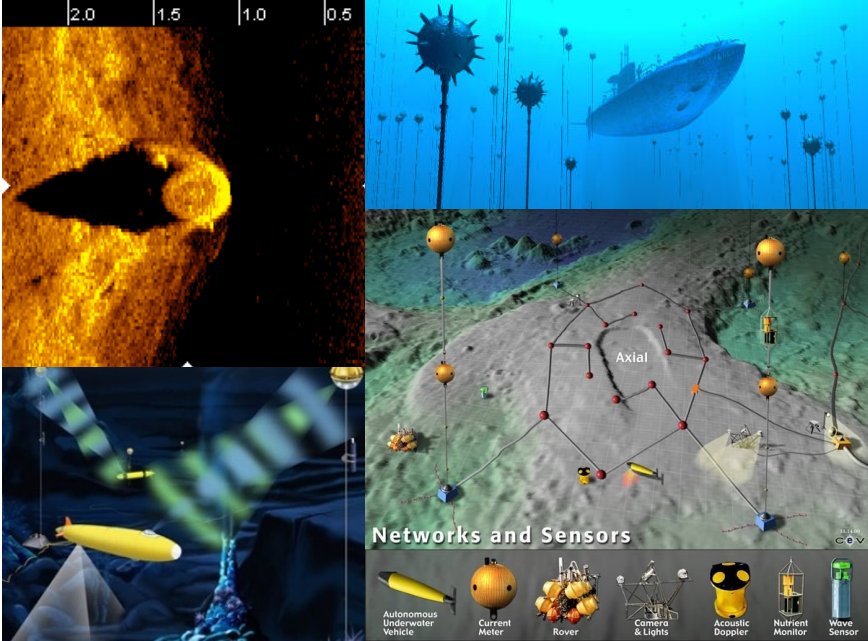


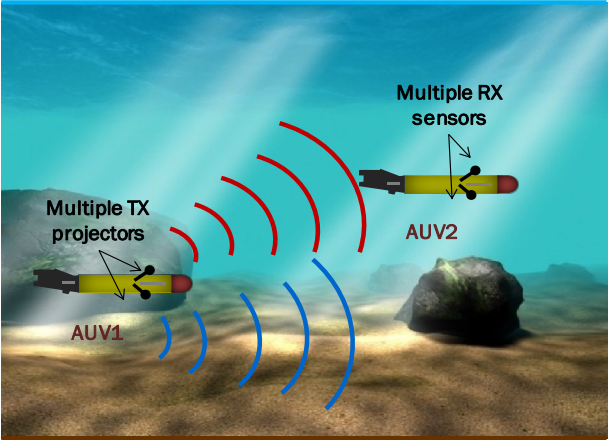
Photo : NEPTUNE Canada

Yves Auffret <yves.auffret@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr



MIMO TECHNOLOGY FOR UWA COMMUNICATIONS



- MIMO experimentation
 - Based on a remotely operated platform
 - Comparison between conventional and MIMO transmission
- Channel characterization
- Estimation of MIMO gain w.r.t. to conventional transmission

This work is supported by French General Delegation on Armament for Naval Techniques (DGA-TN) in the framework of RAPID project «Underwater acoustic MIMO modem »



Yves Auffret <yves.auffret@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr



**EMBEDDED
SYSTEMS
ACOUSTICS
COMMUNICATIONS
ROBOTICS**

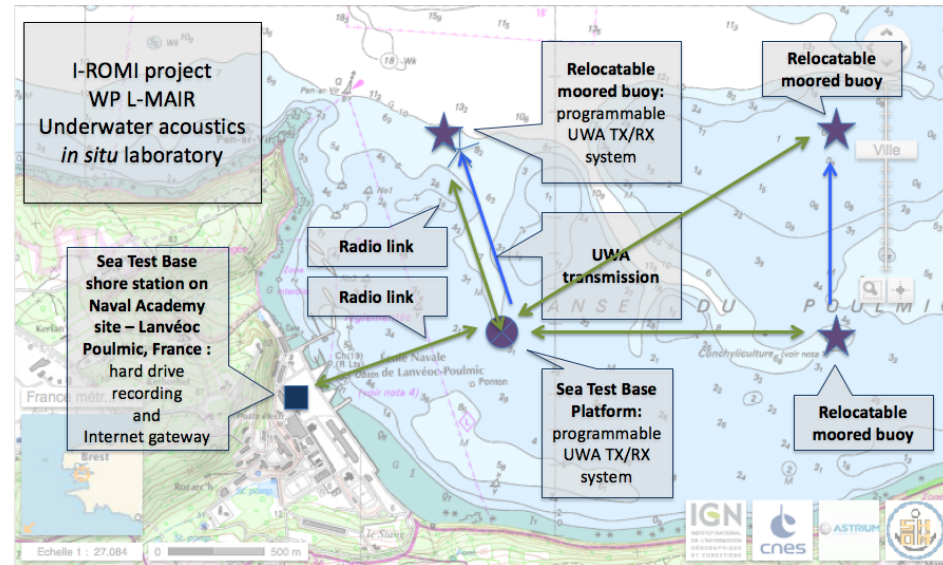
SEACOM LAB AND SEA TEST BASE ONGOING R&D PROJECTS



Research vessel for AUV and ROV experiments

I-ROMI project coordinated by ENSTA-Bretagne - ISEN-Brest: Mesh network with buoys for underwater acoustic experiments

AVEROES coordinated by Télécom Bretagne - Sea Test Base CELADON: R&D for ROV and AUV applications



Yves Auffret <yves.auffret@isen-ouest.yncrea.fr>

ayman.al-falou@isen-ouest.yncrea.fr



SEACOM TESTING FACILITIES

IN-HOUSE FACILITIES

- Water tank for underwater acoustics
- Acoustic sensors (TX and RX) and instruments
- Acoustic sensors calibration

MARINE FACILITIES

- Sea Test Base is located in the Lanvéoc Naval Academy site near Brest.
- Marina allowing to welcome ships up to 20 meters
- Real time data from an offshore pontoon for underwater acoustic experiments such as: R&D for acoustic transmission, remote control for Autonomous Underwater Vehicles (AUV)

Yves Auffret <yves.auffret@isen-ouest.yncrea.fr>

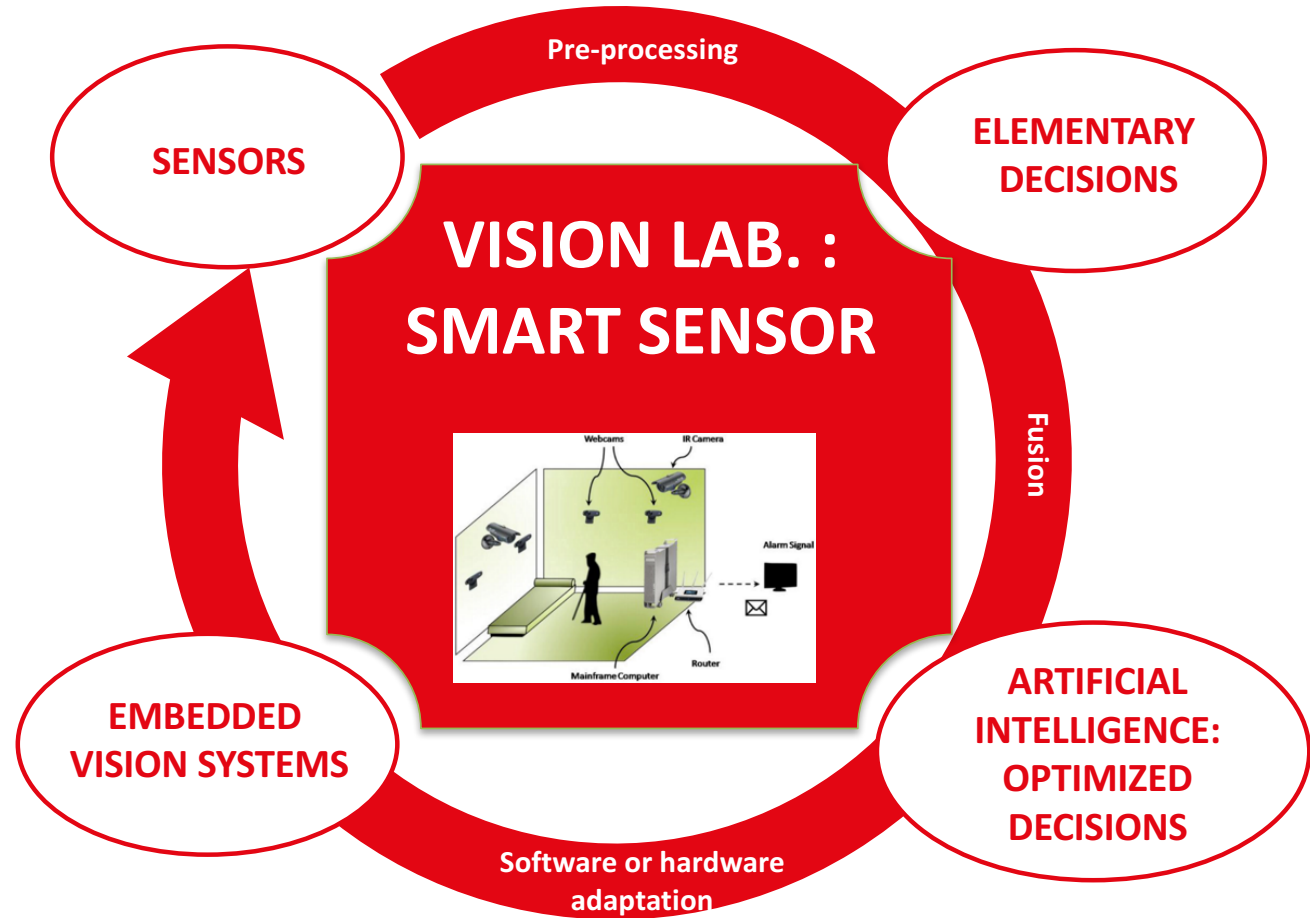
ISEN
ALL IS DIGITAL!
OUEST



ayman.al-falou@isen-ouest.yncrea.fr



VISION TEAM



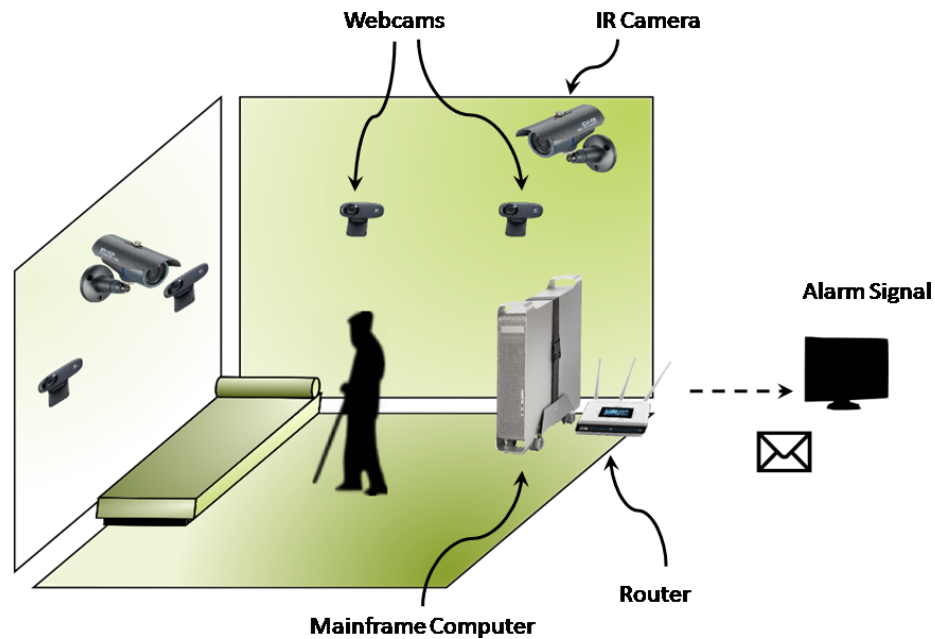


VIDEO
SIGNAL
IMAGE
OPTICS
AND DIGITAL

EXAMPLES OF SYSTEMS USING AI (1)

AN ELDERLY FALL DETECTION APPLICATION BASED ON JOINT TRANSFORM CORRELATOR AND ARTIFICIAL INTELLIGENCE

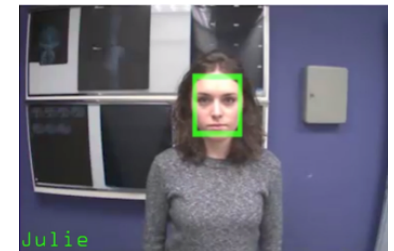
Development of an automated surveillance method that uses multiple image processing techniques to detect, analyze, and track movements for the identification of emergency situations.



ISEN
ALL IS DIGITAL!
OUEST



malakoff médéric
PRÉSENTS POUR VOTRE AVENIR

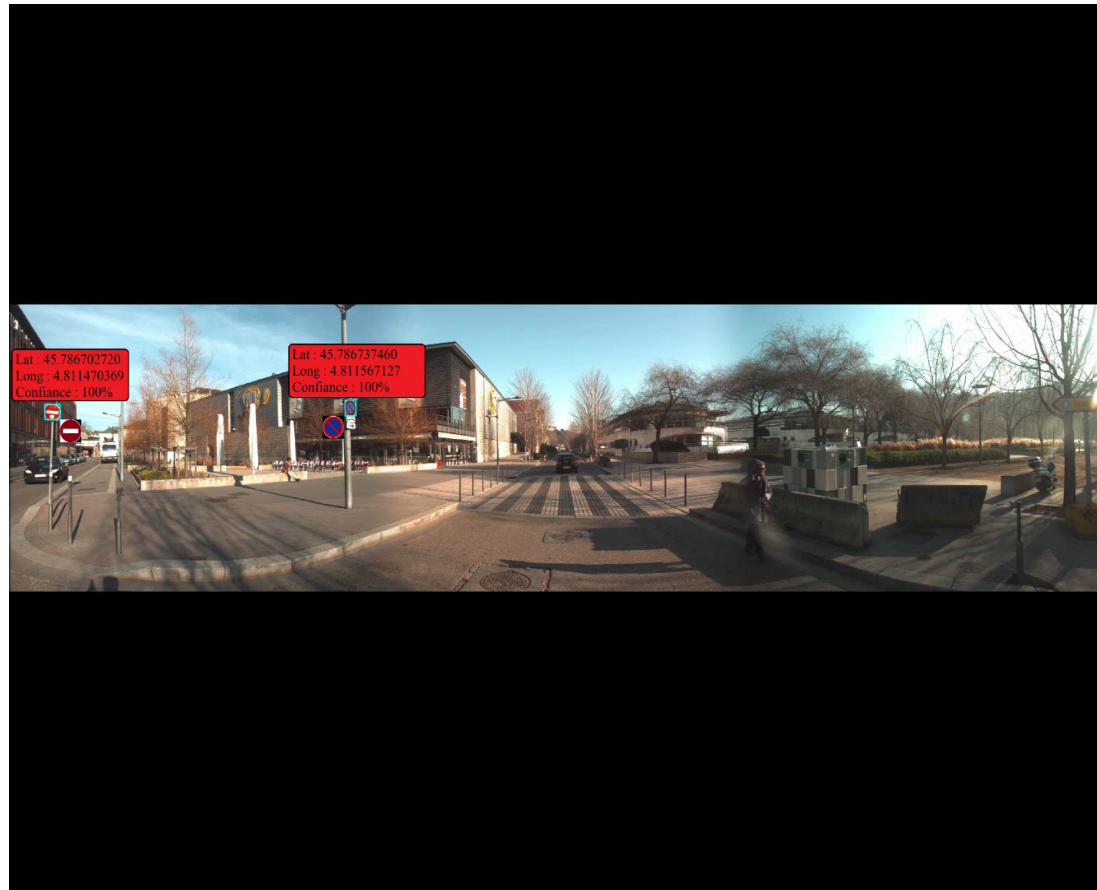




VIDEO
SIGNAL
IMAGE
OPTICS
AND DIGITAL

EXAMPLES OF SYSTEMS USING AI (2)

ROAD MARKING FEATURES EXTRACTION USING THE VIAPIX® SYSTEM



ISEN
ALL IS DIGITAL!
OUEST



Opticities
(Lyon Metropolis)

ayman.al-falou@isen-ouest.yncrea.fr



VIDEO
SIGNAL
IMAGE
OPTICS
AND DIGITAL

EXAMPLES SYSTEM USING IA (3)

OPTIMIZED SWIMMER TRACKING SYSTEM BASED ON A NOVEL MULTI-RELATED-TARGETS APPROACH



ISEN

ALL IS DIGITAL!

OUEST



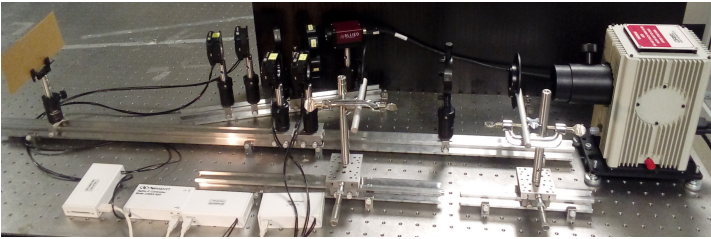
yncréa



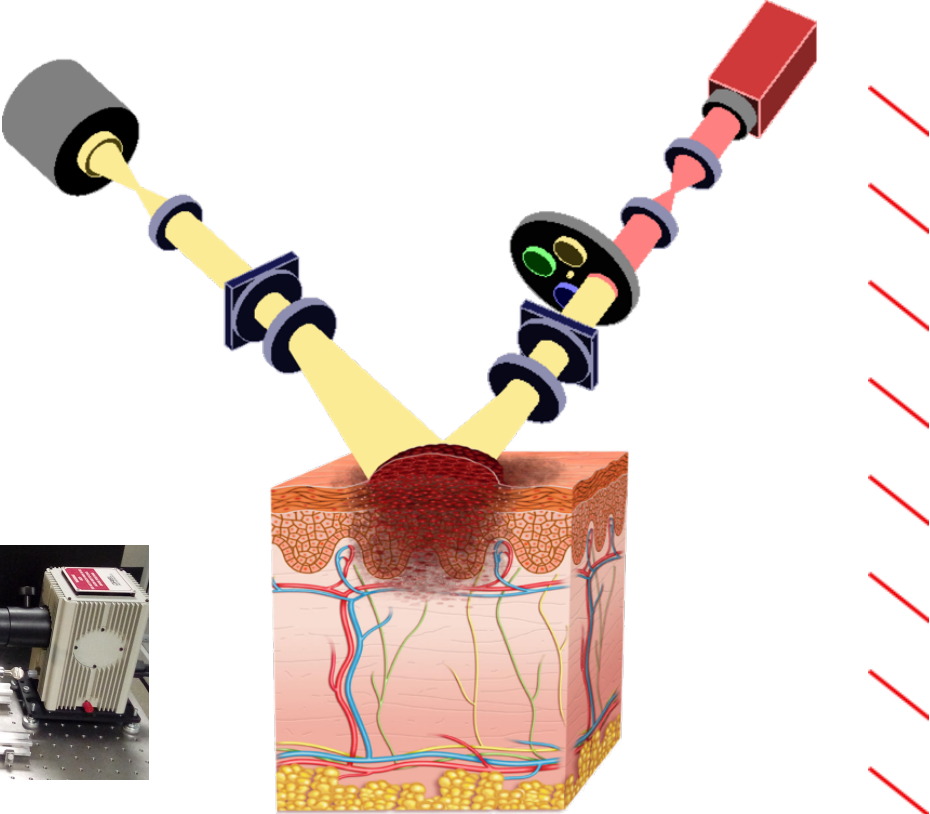
EXAMPLES SYSTEM USING IA (4)

DESIGN OF A POLARIMETRIC IMAGING SYSTEM: APPROACHES FOR THE EARLY DETECTION OF CUTANEOUS MELANOMA

Development of a functional optical setup that can perform a variety of polarization measurements to validate the interest of polarization for the analysis of two markers of melanoma development.



Optical setup





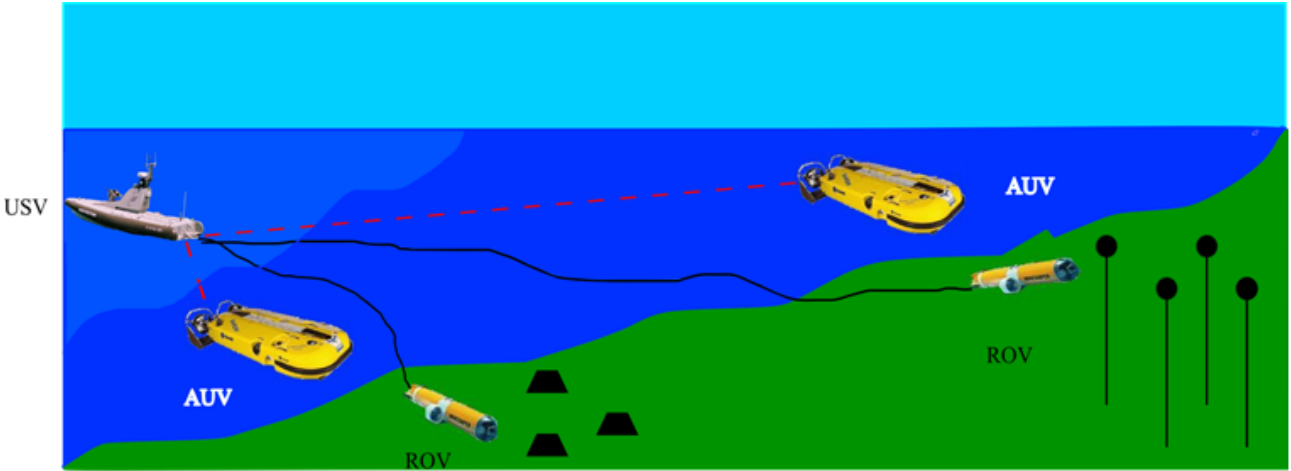
EXAMPLES SYSTEM USING IA (5)



SENSITIVE TEST FOR SEA MINE IDENTIFICATION BASED ON POLARIZATION-AIDED IMAGE PROCESSING

We use polarization as a preprocessing step for denoising underwater images before applying the algorithm for mine detection.

We use a single wavelength polarimetric camera in order to denoise the images. Once a mine is detected, the protocol for identifying it is applied.



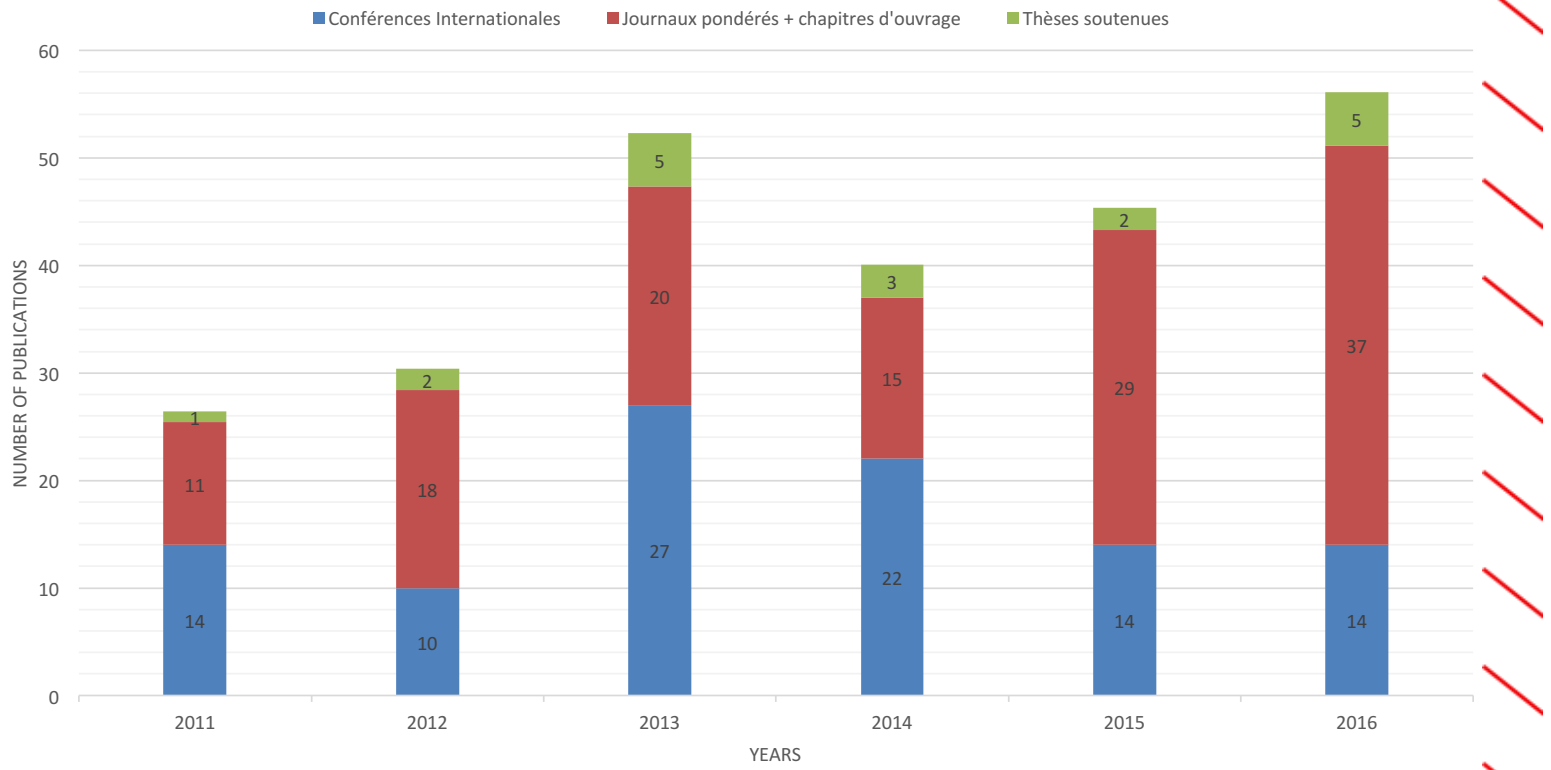
I. Leonard, A. Alfalou, and C. Brosseau, "Sensitive test for sea mine identification based on polarization-aided image processing," Opt. Express 21, 29283-29297 (2013)
<http://www.opticsinfobase.org/oe/abstract.cfm?URI=oe-21-24-29283>



L@bISEN
Yncréa Ouest

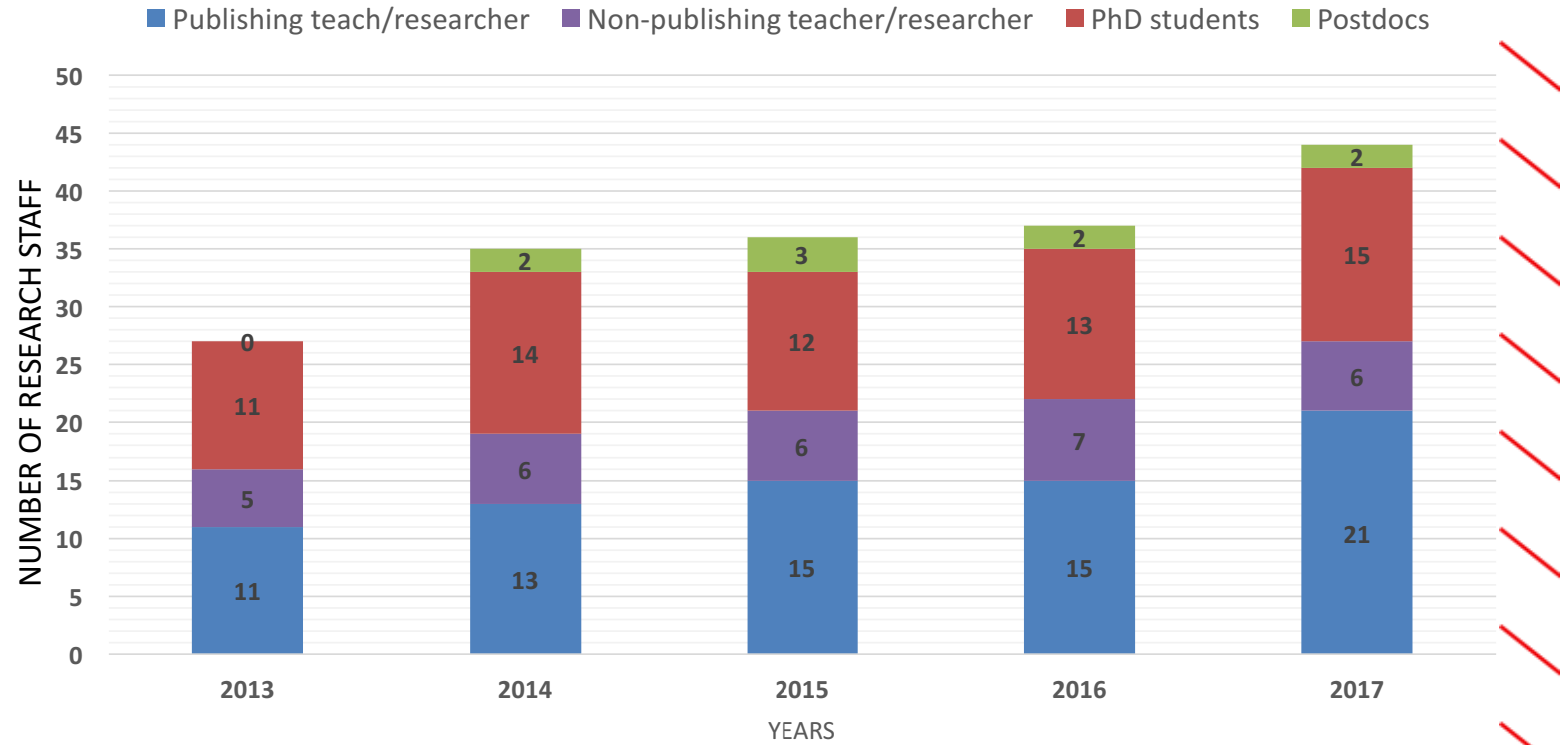
GENERAL
FIGURES

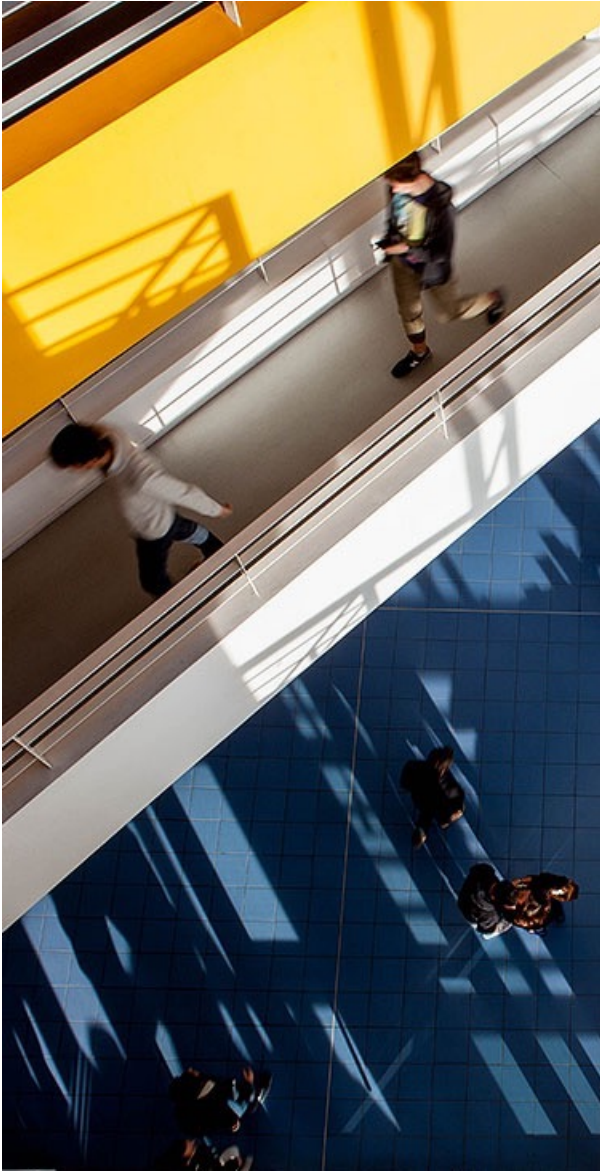
Publications





Research staff





ISEN
ALL IS DIGITAL!
OUEST



THANK YOU!

ayman.al-falou@isen-ouest.yncrea.fr