AI computing cluster

Research Center for AI (AI.nnovation Space)

Universidad Politécnica de Madrid

Javier Bajo
Director AI.nnovation Space

Research Center in AI

AI.NNOVATION SPACE

- **Plan, promote, carry out and disseminate research, development and technological innovation activities in the field of Artificial Intelligence**

- **2017** Founded

- **36** Faculty
  - 12 Full Professors
  - 20 Associate Professors
  - 3 Assistant Professors

- **80+** Members
  - PostDoc, PhD, MSc students
  - Administrative staff

Research Center in AI

UNIVERSIDAD POLITÉCNICA DE MADRID

UPM Montegancedo Campus

AI Ecosystem

Research

AI.nnovation Space
Professors
Researchers
Students
Stakeholders

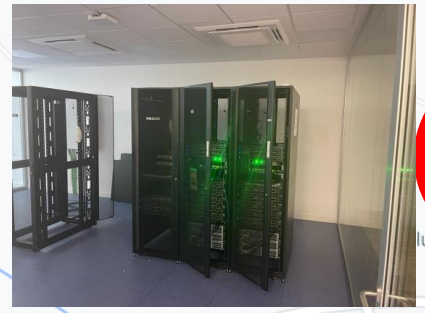
Education

Professors (184 ETSIINF, 39 DIA)
Students (2512 ETSIINF)

Innovation

Business Center
CAIT
Professors
Researchers
Students

School of Computer Science ACADEMIC



Business Center
AI INFRACTRUCTURE
IPTC Research Laboratory
INNOVATION

AI Neurotech Research Lab
NEUROTECH
DEFENCE

AI Research Center
RESEARCH
INNOVATION

AI Computing Cluster and Neurotechnology equipment

- Two AI clusters
  - Supercomputing - 6 nodes for HPC, Lenovo Thinksystem SR670 bi-processor, with 4 GPUs A100
  - Intelligent Data Spaces - 18 Dell Servers (computing and storage – iSpaces – Gaia-X)
- Flexibility and adaptability for Research in AI

Neurotechnology

Department of AI at UPM

AI ACADEMIC OFFER

	Academic Degree	Year Creation	Duration	Students per year	Language
BACHELOR level (BSc)	BSc in Data Science and AI	2020	4 years	50	Spanish
MASTER level (MSc)	Research Mater in Artificial Intelligence	1986	1 year	~70	English
	European Master in AI for Public Administrations (AI4GOV)	2020	1 year	50	English
	Research Master in Data Science	2019	1 year	40	English
	Research Master in Computational Biology	2018	1 year	30	English
	EIT Health Master in Health and Medical Data Analytics	2020	2 years	6	English
	EIT Digital Master in Data Science	2013	2 years	50	English
	Master Universitario en Ingeniería Informática	2013	2 years	50	Spanish
DOCTORATE level (PhD)	PhD in Artificial Intelligence	1986	3 years	15	English
Practical Oriented Teaching	Fundamentos y aplicaciones de la IA	2021	1 ½ year	-	Spanish
	Ad-Hoc AI courses	1986	Ad-Hoc	-	Spanish

➢ NEUROTECH AI

IP UPM: Enrique J. Gómez Aguilera
enriquejavier.gomez@upm.es

IP: Ignacio Oropesa
i.oropesa@upm.es

IP: Bryan Strange
Bryan.strange@upm.es

IP: Rosa Arnaldo
rosamaria.arnaldo@upm.es

IP: Javier Bajo
Javier.bajo@upm.es

IP: Giorgos Kontaxakis
g.kontaxakis@upm.es

Ainara Carpio
ainara.carpio.chicote@fgupm.upm.es

Ana Sanmartín
annysandomenech@gmail.com

Maria Zamarreño
maria.zamsuarez@upm.es

Laura Melgar
Laura.melgar@upm.es

Mario Lobo
mario.lobo.alonso@alumnos.upm.es

Teresa Iglesia
t.iglesia@alumnos.upm.es

Leyi Wu
leyi.wu@alumnos.upm.es

Pablo Torija
Pablo.torijam.@alumnos.upm.es

MAIN PROGRAMME RESEARCH AREAS

1. **Measurement and monitoring of physiological variables** (EEG, ECG, SpO2, HR, eye-tracking, GSR) **and cognitive state of pilots** and airplane crew in simulation and real situations.
2. **Training and evaluation of pilots.**
   a. Training of cognitive capacities in simulation.
   b. Evaluation of cognitive workload and performance in simulation and in real scenarios.
   c. Cognitive and physical augmentation in simulation and in real scenarios.
3. **Automatic detection of pilot´s cognitive risk situations.**
   a. Application to detection of hypoxic situations in training.
   b. Application to automatic control of the plane in risky or uncontrolled situations.
4. **Cognitive Pilot Helmet:**
   a. Integration of neuromonitoring and neurostimulation technologies in the pilot helmet.
   b. Enabling pilot-aware smart avionics.
   c. Evaluation of cognitive workload and performance in real missions.
   d. Advanced graphical UI and visualization of physiological signals.
5. **Non-invasive interfaces for remote control of defence devices.**

MONITORING OF PHYSIOLOGICAL VARIABLES AND COGNITIVE STATE OF PILOTS

DETECTION OF HYPOXIC PILOT SITUATIONS

COGNITIVE PILOT HELMET

DEFENCE

- EICACS. European Initiative for Collaborative Air Combat Standardization. 2022-2026. EDF.
  - Trustworthy AI
- EPIIC. Enhanced Pilot Interfaces & Interaction for fighter Cockpit
  - Indra
  - Human System Trust
- Spanish Airforces.
  - Explainability, Bias, …

NATO OTAN