
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA
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ARTIFICIAL INTELLIGENCE RESEARCH INSTITUTE
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CLUJ-NAPOCA ▪ ROMANIA
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1925: Searching for Alien Intelligence



1925: Searching for Alien Intelligence





1925: Searching for Alien Intelligence







2025: ReSearching for Artificial Intelligence

1925: Searching for Alien Intelligence





2025: ReSearching for Artificial Intelligence



Space-Time Continuum in (Re)Searching on AI

From comets to asteroids discovery with AI

Victor Daimaca (1943)

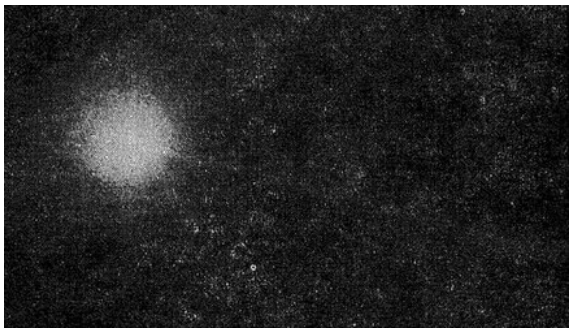




From comets to asteroids discovery with AI

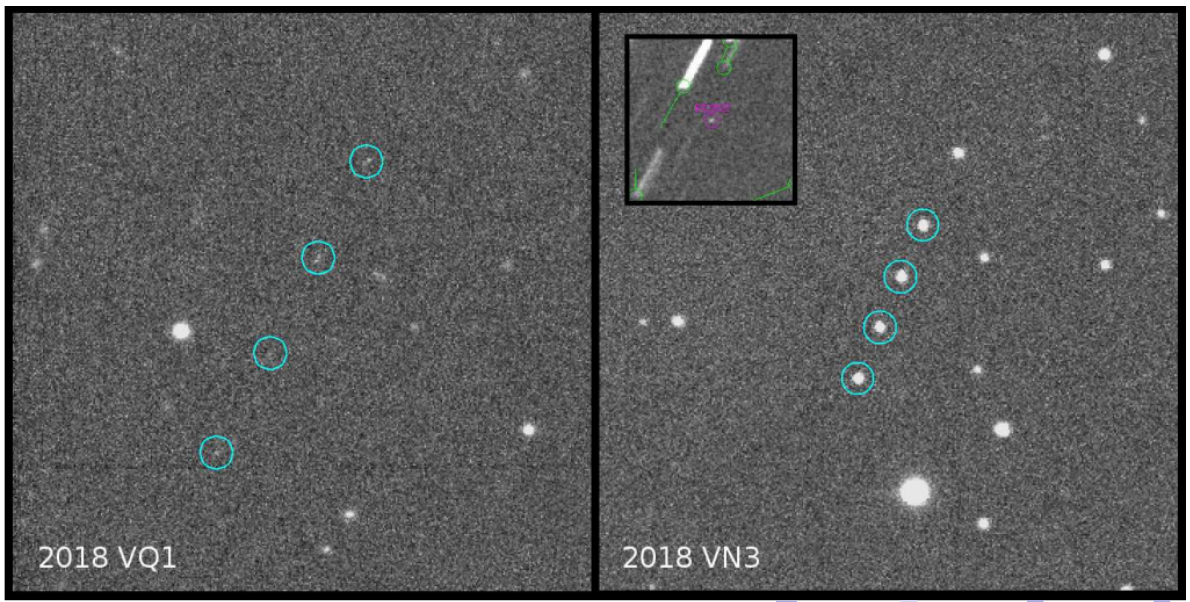
Victor Daimaca (1943)





Victor Bacu (2018)





From observing cromosphere to predicting geomagnetic storms with AI

Nicolae Donici



Cromosphere and solar events (1929)

From observing cromosphere to predicting geomagnetic storms with AI

Nicolae Donici

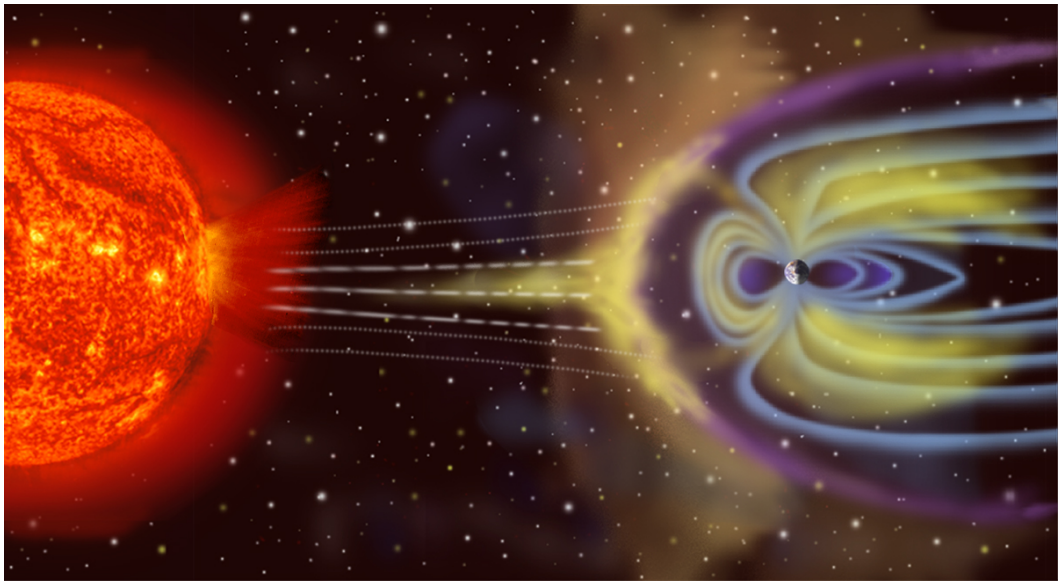


Cromosphere and solar events (1929)

Anca Marginean (2022)



Will a Coronal Mass Ejection trigger a Geomagnetic Storm?



Predicting the Geoeffectiveness of CMEs Using Machine Learning, Astrophysics, 2022

A collaborative task: tracking artificial satellites

3 observatories: Cluj-Bucuresti-Timisoara (1980)



Ongoing collaboration as part of Romanian AI Hub (5 years, 11 mil EUR)

A collaborative task: tracking artificial satellites

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Ongoing collaboration as part of Romanian AI Hub (5 years, 11 mil EUR)

Radu Danescu (2022)



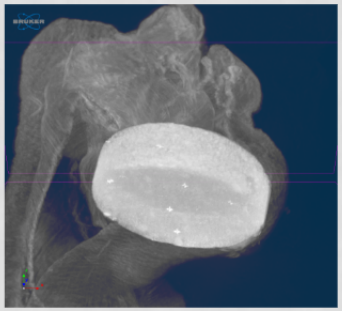
Automatic association between known objects and the detected objects

From Stars to Cells

Catalin Popa (2024)

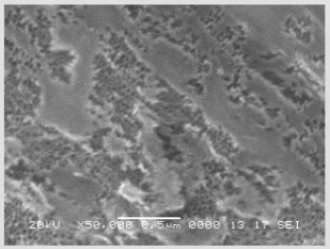


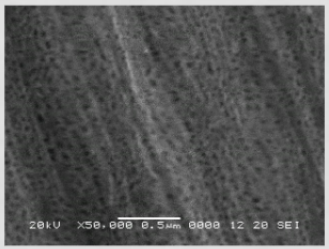
TITANIUM IMPLANTS



Bone implant
[Micro CT analysis]

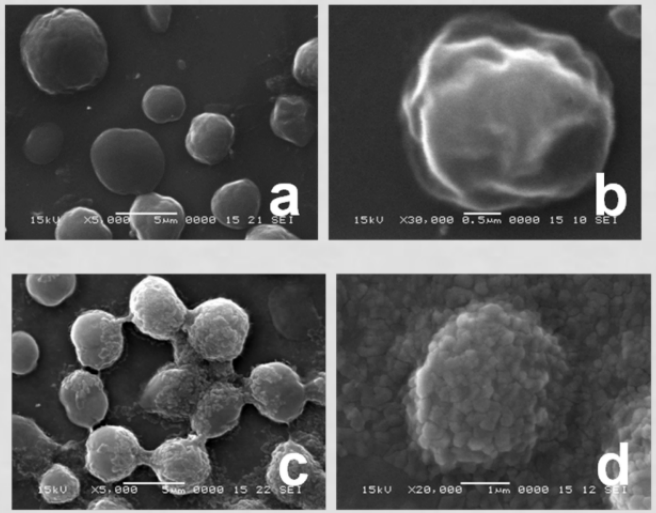
AI: Effective computing of bone density in various regions





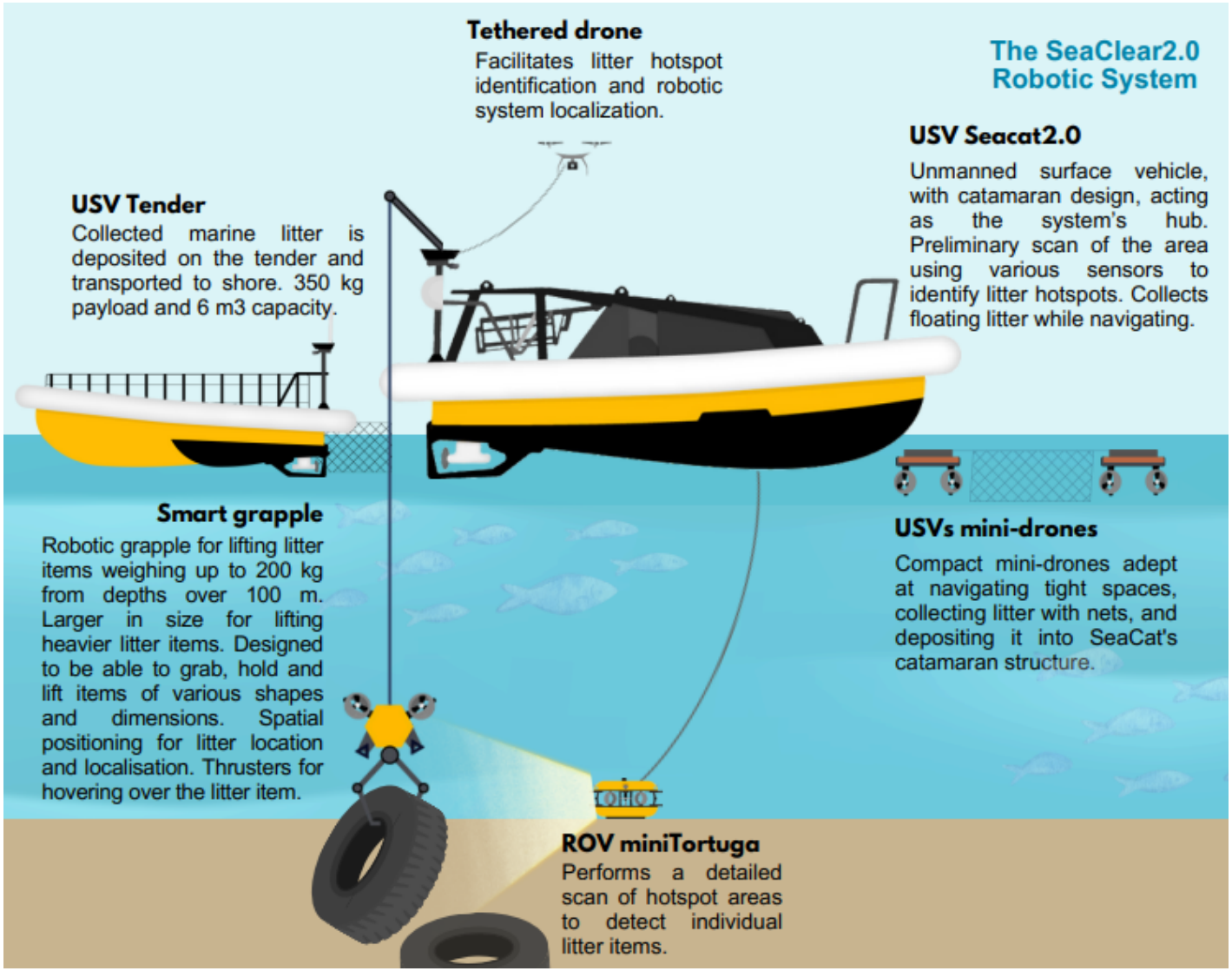
Titania nanotubes
AI: Optimization of synthesis through SEM image analysis

DRUG DELIVERY

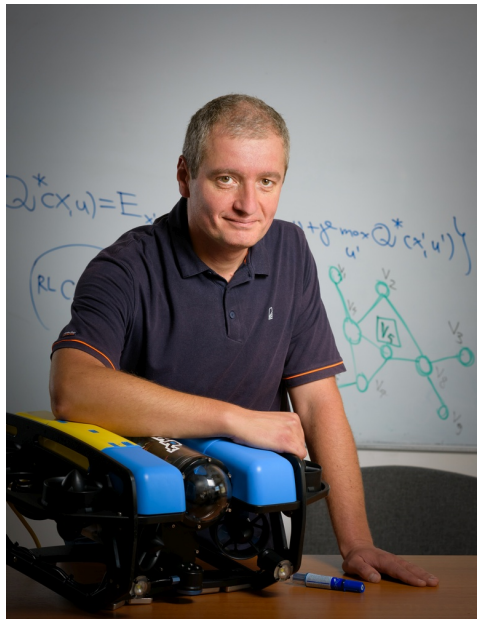


Microspheres BSA gel - hydrogels multilayer shell: simple (a,b), loaded with tetracycline (c,d)
AI: Assessment of drug loading efficiency through shape

From stars to oceans



Lucian Busoniu (2025)
member of the Romanian Academy



Robotic and participatory solutions for marine litter prevention & remediation


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Our division of nutcrackers





Building animation



Live view

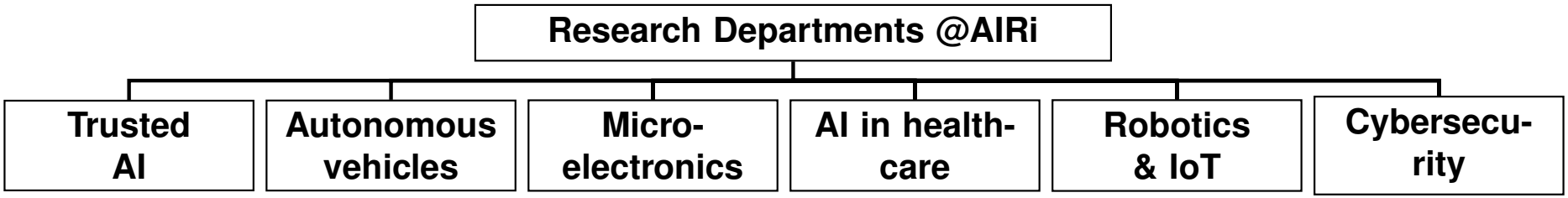




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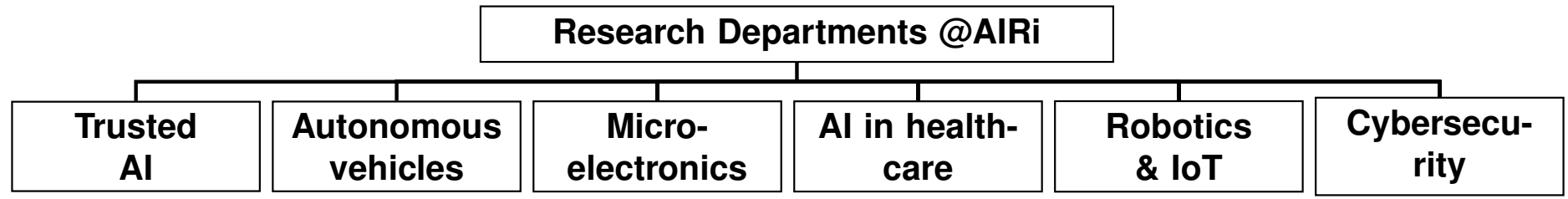


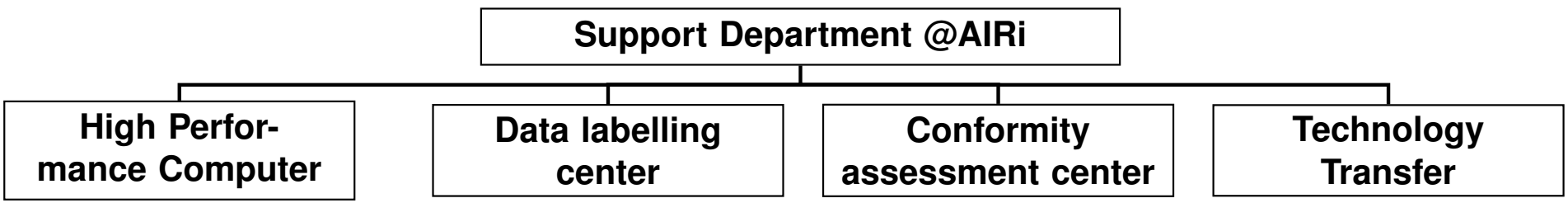
XAI: Diana Inkpen, Univ. of Ottawa - Explainable Neural Text Classifiers
XAI: Mihai Surdeanu, Univ. of Arizona - ÃmpÄcÃ¢nd si capra si varza: Aducerea explicabilitatii inapoi
Diet: Radu Grosu, TU Wien Informatics - Biologically Plausible LLMs
Soft Robots: Daniela Rus, MIT: Cercetare si inovatie bazate pe IA
Real challenges Anca Grosu, Univ. Medical Center Freiburg - High-Tech si AI pentru a vindeca cancerul

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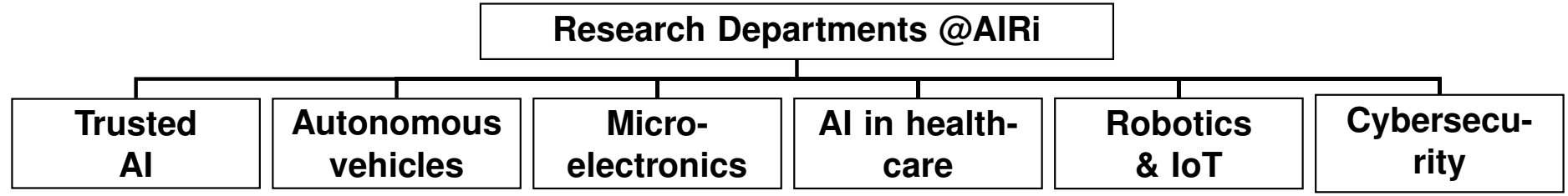


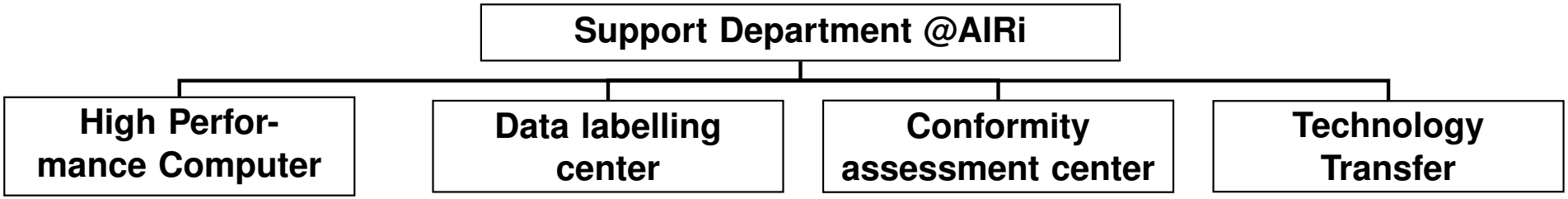
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144 GPUs B200

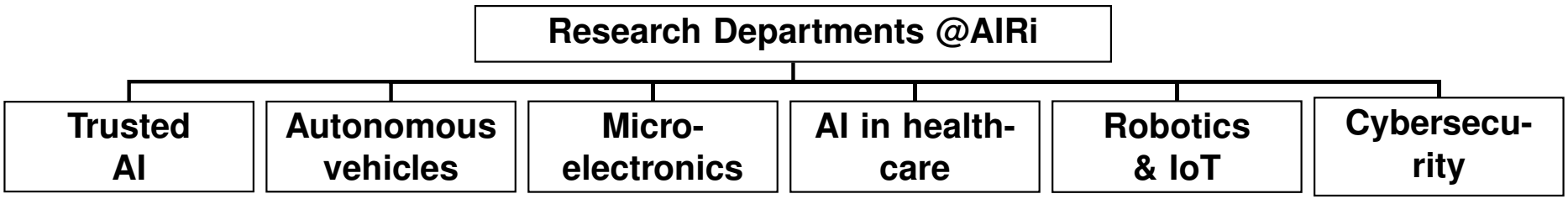
Direct Liquid Cooling

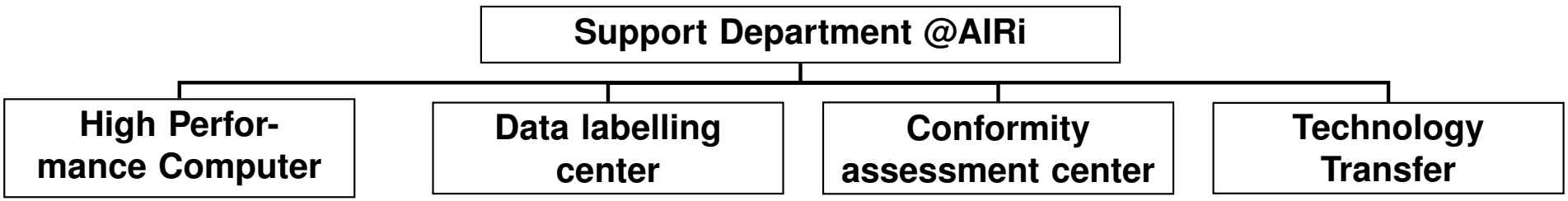
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Mindset: Bogdan Nicolae, Argonne Nat. Lab. - Principles for Designing Scalable and Robust AI Workflows

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144 GPUs B200 Research acceleration

Direct Liquid Cooling Capacity building

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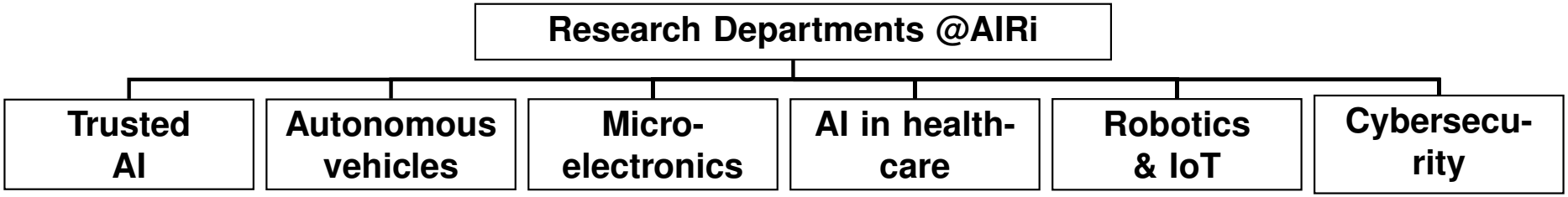
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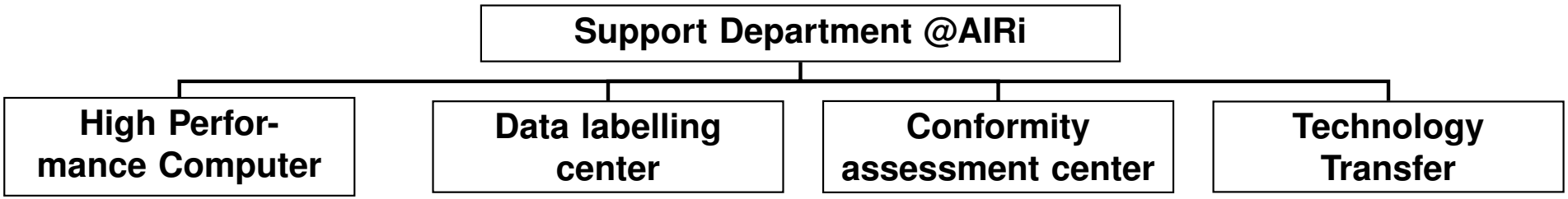
Labeling: Cornelia Caragea, Univ. of Illinois at Chicago - LLM-Guided Semi-Supervised Learning

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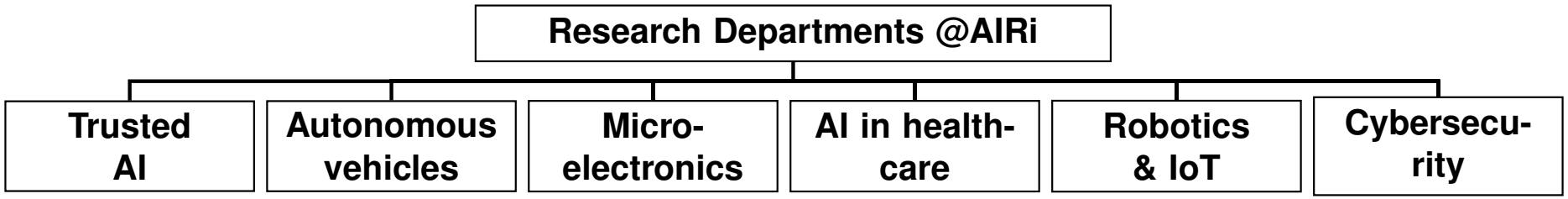


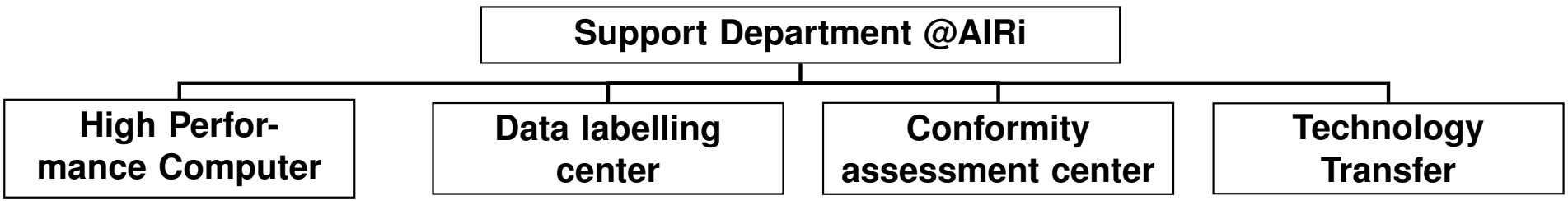
144 GPUs B200
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Research acceleration
Capacity building

Risk analysis
Performance evaluation

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Marriage counseling: Vasile Rus, The Uni. of Memphis - AI in Education





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Marriage counseling: Vasile Rus, The Uni. of Memphis - AI in Education
Impact: Ioan Toma, ONLIM GmbH IA Conv: Inovatie, Provocari si Perspective
Fairy tales: Vivi Nastase, University of Geneva - Povesti cinematografice mici pentru idei stiintifice mari
How to learn: Claudia Ignat, Inria, France - Efficient distributed learning

Running projects: Romanian Hub for AI - HRIA

(2025-2029) 7 UNI (UPB, UTCN, UVT, UTGA, UPT, UB, UBB) and 8 SME,

T_1: Trustworthy AI

- Agentic AI for Complex Goals (Adrian.Groza@cs.utcluj.ro, Link)
- Neorosymbolic foundation models (Anca.Marginean@cs.utcluj.ro, Link)
- Multilingualism, multi-task learning (Rodica.Potolea@cs.utcluj.ro, Link)
- Speech recognition and synthesis (Mircea.Giurgiu@com.utcluj.ro, Link)

T_2: Intelligent and Autonomous Systems

- Understanding of the environment (Sergiu.Nedevschi@cs.utcluj.ro, Link)
- Real-time perception with low power (Florin.Oniga@cs.utcluj.ro, Link)
- AI for nonlinear control and robotics (Lucian.Busoniu@aut.utcluj.ro, Link)

T_4: Hardware Technologies for AI

- Self-interference rejection in radio comm. (Sorin.Hintea@bel.utcluj.ro, Link)
- Biometric electrophysiological signals on FPGA (Sorin.Hintea@bel.utcluj.ro)
- AI optimized design of integrated circuits, Marius.Neag@bel.utcluj.ro, Link)

T_5: AI in Healthcare

- Eye-on-AI: explaining diagnostic models (Adrian.Groza@cs.utcluj.ro, Link)
- Analysis of brain activity using AI techniques (Rodica.Potolea@cs.utcluj.ro, Link)
- AI in medical imaging (Tiberiu.Marita@cs.utcluj.ro, Link)
- Surgery Robots for Pancreas and Esophagus (Doina.Pisla@mep.utcluj.ro)
- Robotics in Oral Surgery and Dental Medicine (Doina.Pisla@mep.utcluj.ro, Link)
- Robots for Rehabilitation of Neuromotor Deficits (Doina.Pisla@mep.utcluj.ro)

T_6: AI in Cybersecurity and Space

- Intelligent Space Surveillance (Radu.Danescu@cs.utcluj.ro, Link)
- Analysis Spatial Data (Dorian.Gorgan@cs.utcluj.ro, Link)

T_7: AI for smart cities

- Optimizing Household Energy Consumption (Rodica.Potolea@cs.utcluj.ro, Link)
- Energy Optimization of Smart City (Tudor.Cioara@cs.utcluj.ro, Link)

5G Scalable Hubs for Accessible & Resilient Edu

- Feb 2026 - Jan 2029 - Ireland, Romania, Czech Republic, Italy
- interconnecting 4 advanced 5G Standalone Mobile Private Networks

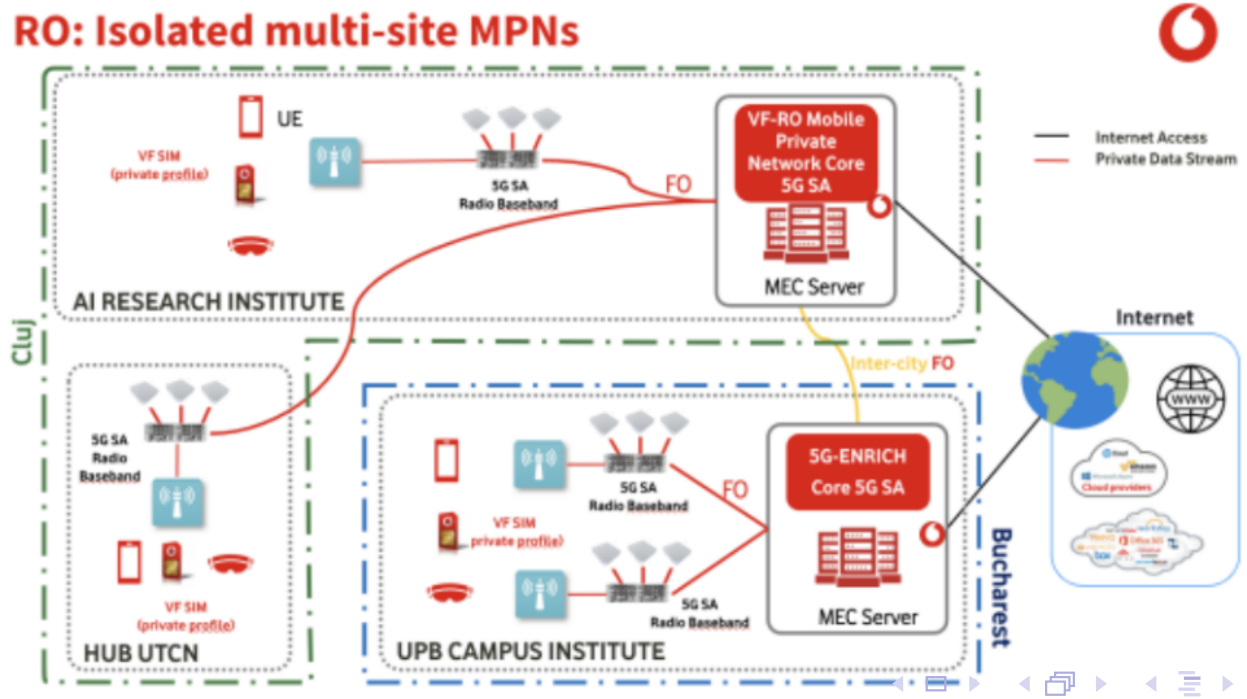
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UTCN AI Research Institute – Observator Campus

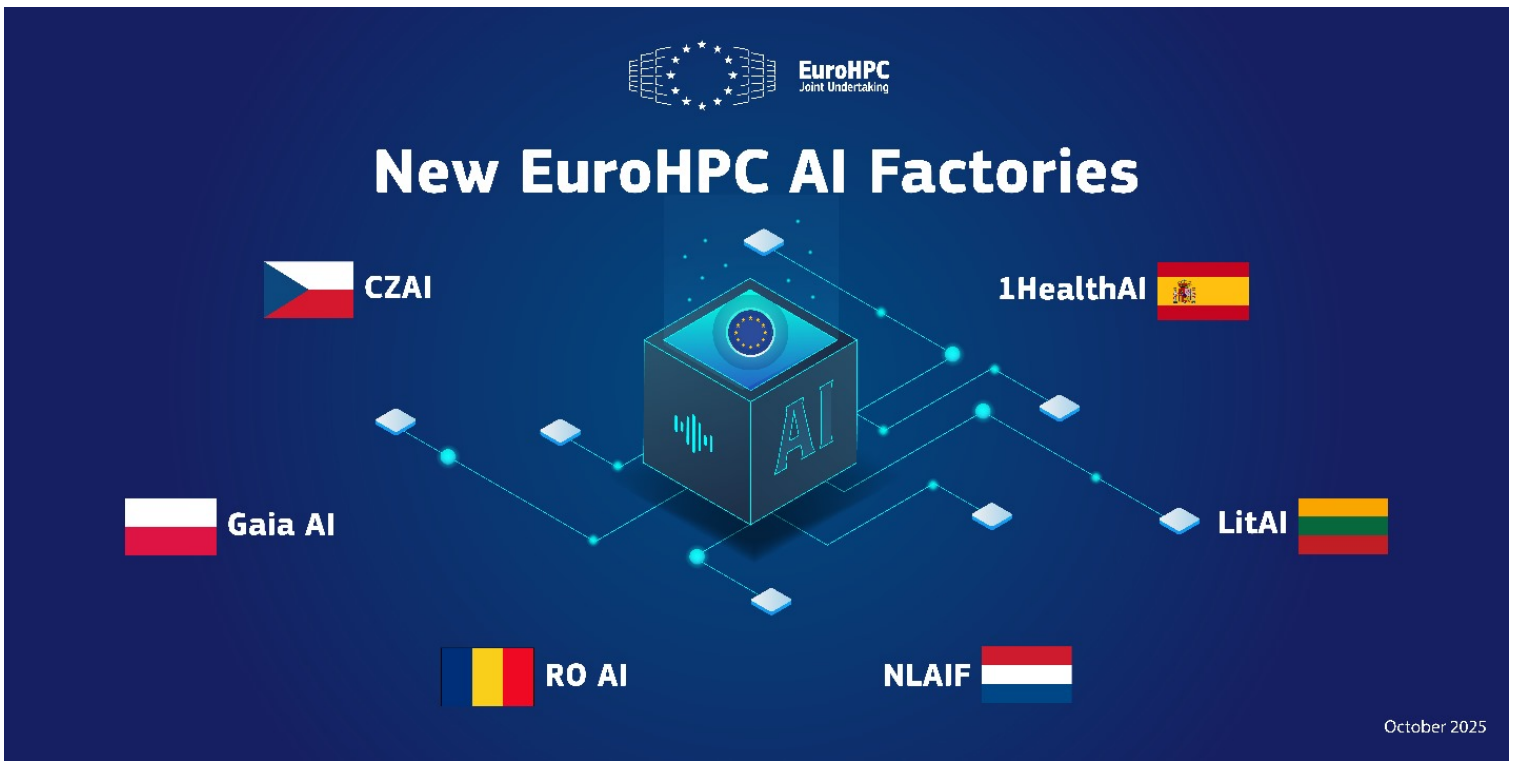


UTCN HUB – Central Campus

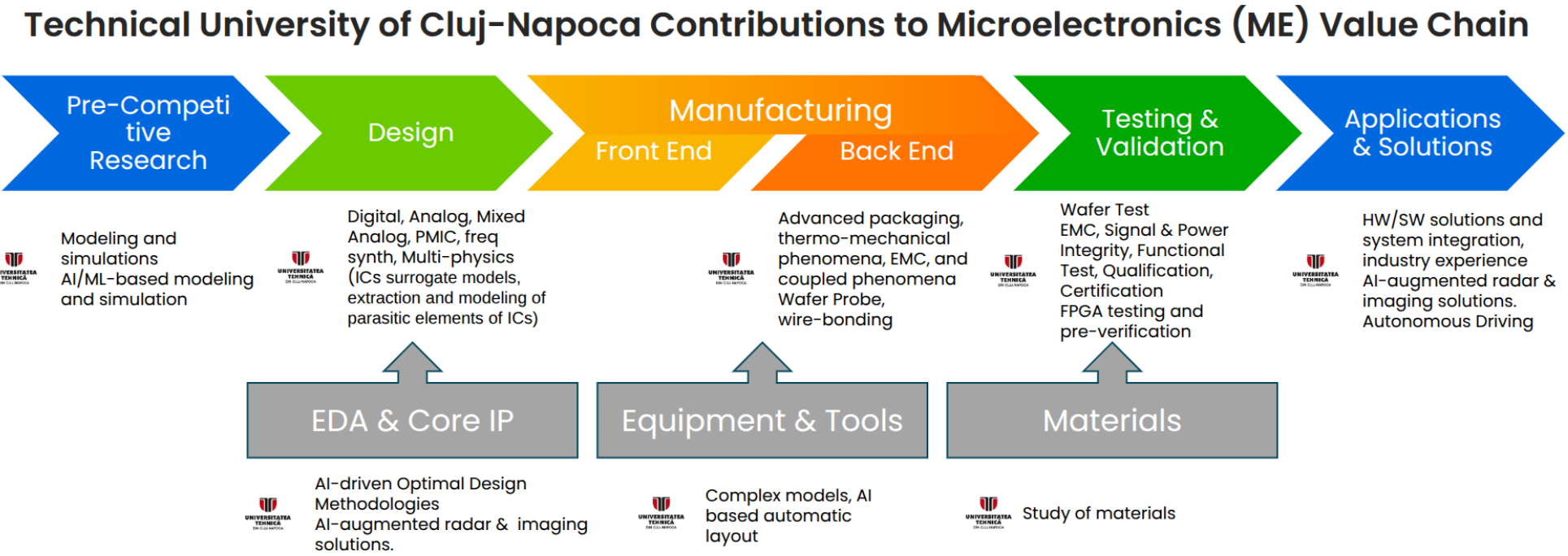


RO AI factory

- ICI, UPB, UTCN, INCDSB, ATIT, ICIA, CNIPMMR, RoDIH
- UTCN: 36 months, 1.25 mil EUR, 7.8 ENI.
- AIRi@UTCN - core co-working node in RO AI factory
- Activities: AI model enablement, training, data services AI-ready assets, HPC access, user support, ecosystem engagement, business developer & investor readiness, trustworthy & compliant AI.



Running projects: IPCEI



PNRR

IPCEI on Microelectronics

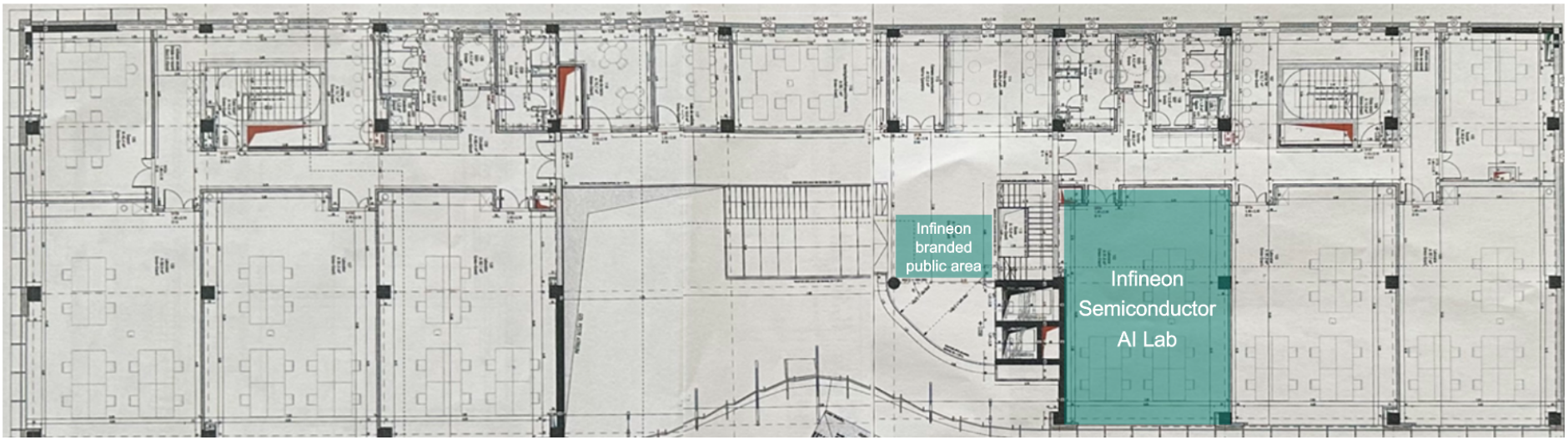
- **TUCN is partner in 3 major (25 mil €) IPCEI projects together with 3 industrial partners:**
  1. **SENse, THInk and COMmunicate**
  2. **Energy efficient embedded subsystem modeling and validation**
  3. **European Microelectronics value chain for highly automated driving**

NXP Continental BOSCH

Partnership with companies

Example (Infineon Semiconductor AI Lab)

- Joint projects AMS-design, ML, ETM
- 10 Postdoc/PhD/master grants



Example (Adobe Pilot AI research)

- PhD. grants (2025-2029)

Example (AI4INO proposal)

- AIRi@UTCN partner of 17 SME for developing AI solutions.

Some math quizzes

Example (Duration? Remaining time?)

- Inauguration of works on the construction site: May 2024
- Committed turnkey handover date: March 2026

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Example (How many researchers?)

- 30 laboratories, 1 data center, 15 support rooms, conference rooms, and collaborative spaces equipped with high-performance equipment.
- 12 researchers in each laboratory

Some math quizzes

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Example (Annual energy costs if unit of energy will be EUR 0.3 per kWh?)

- Project estimation: over EUR 20 mil. (financing from UTCN's own revenues).
- Data center: EUR 11.5 mil. (financing from HRIA, IPCEI, AI4INO)
- 144 NVIDIA Blackwell GPUs, installed IT capacity 260 kW, 85% average consumption rate, Power Usage Effectiveness of 1.20. Using a unit energy cost of EUR 0.20 per kWh, total energy expenditure on each year EUR 200.000.

$$p = m \cdot v$$


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We are open
to collaboration!
LIVE
SCAN
ME!

$$p = m \cdot v$$

$$F = m \cdot a$$

