

A complete training program dedicated to nuclear instrumentation at Aix-Marseille University

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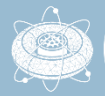
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ANIMMA 2021



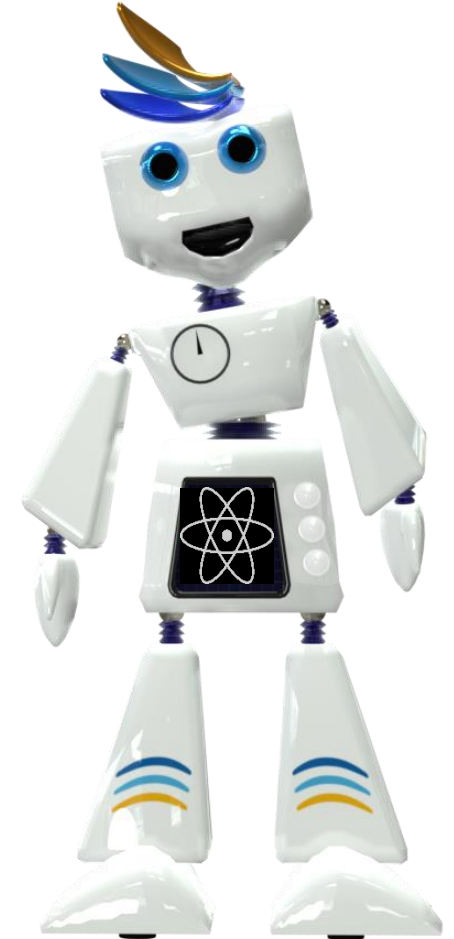
Summary

I) Aix-Marseille University

II) Instrumentation Unit of the Faculty of Sciences

III) Actions for the nuclear field

IV) Conclusions



I) Aix- Marseille University



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A bit of history !



- From the end of the XIXth century to 1968:
The faculties are merged into Aix-Marseille University,
chaired by the Rector of the Academy



- 1970-1973: Aix-Marseille Universities I, II and III are
created
- 2007-2009: The merger of the three universities is thought
through and Aix-Marseille University's founding principles are
adopted
- December 10th, 2010: The university's legal status are voted
- November 28th and 29th, 2011: The three councils are elected



- January 1st, 2012: Aix-Marseille University is
created

In the South of France, AMU
headquarters, Marseille



80 km from CEA, ITER org
and IRSN (JHR, CABRI,
WEST, ITER...)



I) Aix- Marseille University

Aix-Marseille University in a nutshell



- More than **80,000 students**, including 10,000 international students
- Over **3,000 doctoral students** 39,5% of whom are from abroad (from 105 countries)



- A staff of **8,000**, including 4,400 senior lecturers, professors, teachers
- 17 faculties**, schools or institutes



- 18 Aix-Marseille University institutes**
- 122 research structures** including 113 research units and 9 federative research structures
- 12 doctoral schools

- 1 long-term Initiative of Excellence (IDEX)** project (€26 Million per year)
- 1 City of Innovation and Knowledge (CISAM)
- 1 European Civic University (CIVIS) in cooperation with 9 universities



- 820,000 m² net floor area for 5 campuses



- A budget of €720 Millions

Aix-Marseille University in a nutshell

□ 6 education and research fields

- Arts, humanities, languages and social sciences
- Law and political science
- Economics and management
- Health
- **Science and technology**
- Multidisciplinary sector (technological institute and education departement)

□ 5 interdisciplinary research interests

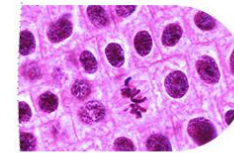
- **Energy**
- The environment
- Health and life sciences
- Advanced sciences and technologies
- The humanities



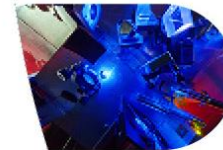
- **Nuclear fusion and fission**
- **Bioenergy**
- **Energy storage**
- **Energy efficiency**
- **Energy transition**



- **Climatology**
- **Man/Environment interactions**
- **Resources**
- **Oceanology**



- **Oncology**
- **Immunology**
- **Neurosciences**
- **Microbiology and infectious diseases**
- **Imaging**
- **Genetics**
- **Nutrition/Cardiovascular**



- **Optics/Photonics**
- **Microelectronics**
- **Aeronautics/Spatial domain**
- **Mathematics**
- **Particle physics**
- **Astronomy/Cosmology**



- **Mediterranean studies**
- **Digital humanities**
- **Migrations**
- **Archeology**
- **Brain/Languages**
- **Globalization**
- **Economics/Public policies**
- **Law**

Characteristics

www.fillere-instrumentation.com



- ❑ Unit of the department of physics in the faculty of Sciences
- ❑ Filière Instrumentation created in 1985
- ❑ ISO 9001 certificated since 2003
- ❑ Different training programs: apprentices and block-release training programs or Initial training program or Prior experimental learning and continuing education
- ❑ Vocational Bachelor's Degree: Professions in Instrumentation, Measurement, Quality Control
- ❑ **Master's Degree: Instrumentation, Measurement, Metrology**
- ❑ 200 students
- ❑ 110 lecturers, professors, industrial trainers
- ❑ > 100 companies for student internships and apprenticeship
- ❑ Several research structures involved
- ❑ Industrial steering committee and agreements with various companies



Aix-Marseille Université

Faculty of Sciences

Physics department

Instrumentation Unit






III) Actions for the nuclear field

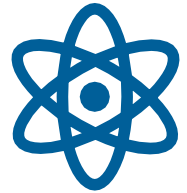
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Main objectives

- ❑ **Promote** nuclear field and its various applications
- ❑ **Attract** new talents and **develop** these attracted talents
- ❑ **Increase** engagement of attracted talents and alumni in nuclear careers
 - Positions in research activities (R&D, PhD)
 - Positions in industry

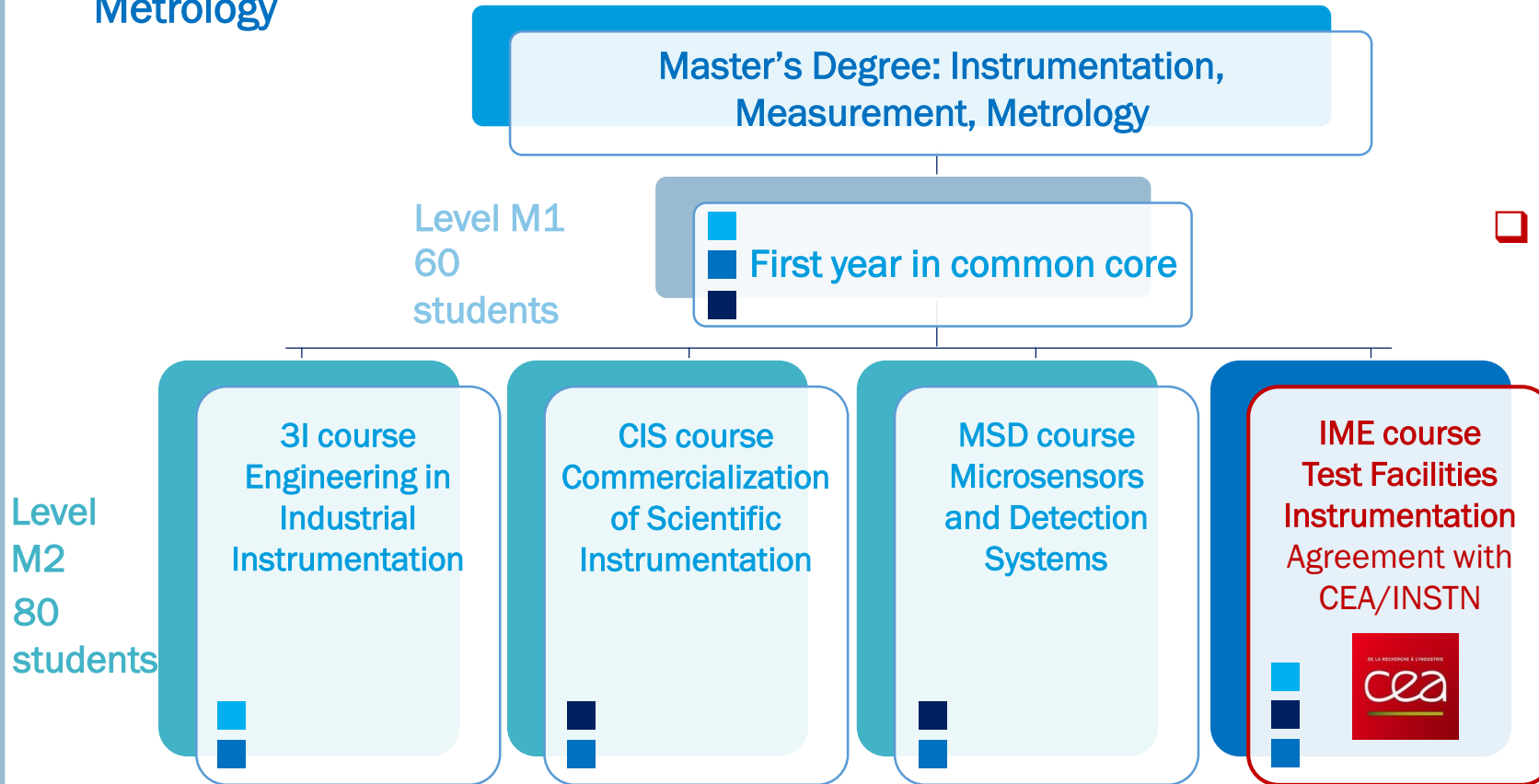
➔ Thanks to several actions based on:

- High level training programs involving many partners
- Important links between education and research
- A strong research activity developed since 2009 in collaboration with the CEA (in-pile calorimetry, nuclear measurements)
- Recognized research structures such as research units, joint Lab., Institutes (IM2NP, LIMMEX, ISFIN)    Institut Sciences de la Fusion et de l'Instrumentation en Environnements Nucléaires Aix-Marseille Université
- An international network of partners (some of whom are involved in ANIMMA)
- An important network of companies
- An alumni directory



What are the main current actions ?

- All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology



- **Action#1: IME course created in 2004 with CEA**

- 750 h
- AMU and CEA lecturers
- CEA visit
- 30 students (50% apprentices)
- High professional integration rate
- A job in the nuclear field for 1/4 of alumni

- Apprentices and block-release training programs
- Initial training program
- Prior experimental learning and continuing education

III) Actions for the nuclear field

III) Actions for the nuclear field

What are the main current actions ?

- ❑ All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology
- ❑ **Action#3: MOBIL-APP project**
 - For students in level M1
 - Founded by AMIDEX Foundation (Excellence Academy, 2018-2022)
 - Involving several partners
 - In France: CEA, EDF, CFA Epure Méditerranée,
 - International countries: MIT NRL, SCK-CEN, JSI, NCBJ, CNESTEN
 - Aim: **International mobility for apprentices** who meet difficulties to take advantage of usual international-mobility schemes for long periods due to alternation periods between university and workplace 15 days/15 days



III) Actions for the nuclear field

What are the main current actions ?



□ All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology

□ **Action#3: MOBIL-APP project**

- **Mobility field: Instrumentation for research reactors in nuclear fission**
- Number of students: from 10 to 20 selected and prepared students per edition
- Phase#1: selection and preparation
 - Academic results, Covering letter, Questionnaire, Interview
 - Courses
 - Seminars
 - Visits (LIMMEX laboratory, CEA (Cadarache center), EDF (Nuclear power plant))



2019, in France

III) Actions for the nuclear field

What are the main current actions ?



- ❑ All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology

❑ Action#3: MOBIL-APP project

- Intensive study stay from 1 to 2 weeks, thanks to different learning activities
 - Scientific and Interculturality seminars, Workshops
 - Practical works, Courses, Exercises
 - Reactor and nuclear facilities visit
 - Company visits and Cultural visits
- 4 events
 - In 2018: 1 group at MIT NRL
 - In 2019: 2 groups at NCBJ and MIT NRL respectively
 - In 2020: 2 groups at SCK-CEN and MIT NRL respectively → cancelled due to COVID pandemic



2019, in USA and Poland

- In 2021: 1 group → virtual mobility, involving MIT NRL, Univ. of Michigan, JSI, CAEN and CEA

III) Actions for the nuclear field

What are the main current actions ?

- All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology

- **Action#4: Agreement with EDF company**



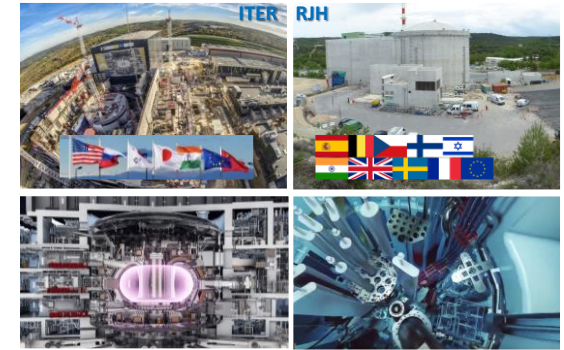
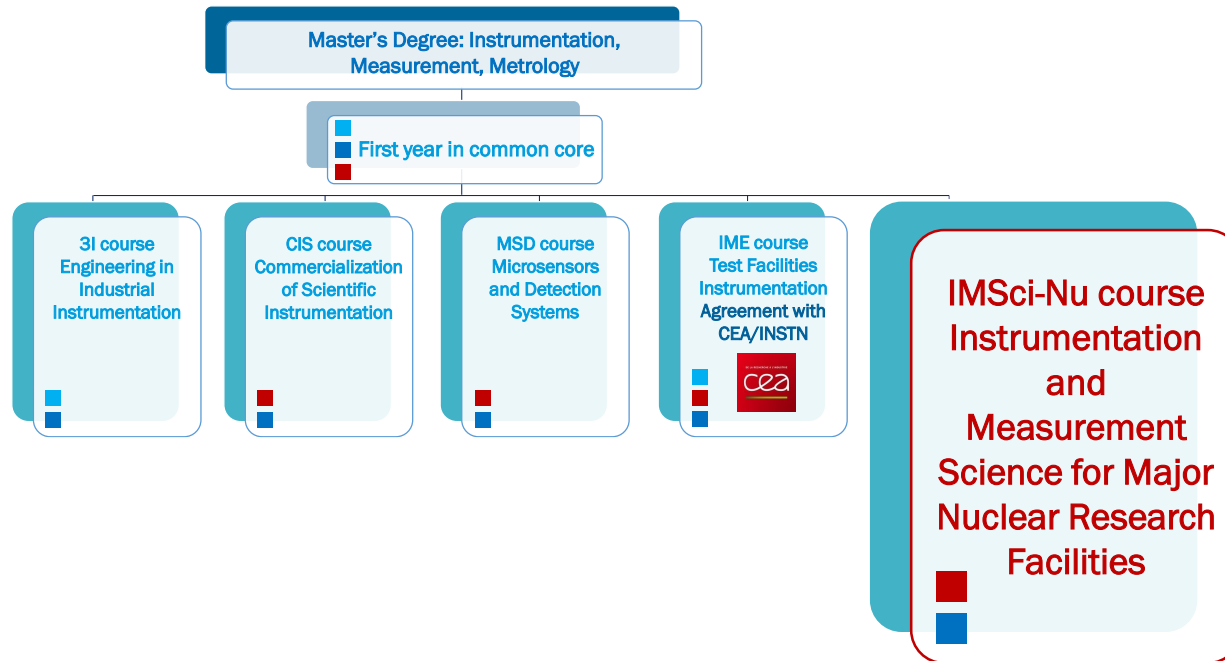
- Signature in 2019
- For students in level M1 and level M2
- Various activities
 - Company introduction
 - Seminars on specific topics
 - Visits of sites
 - Mentoring for apprentices and students during internships
 - Grants for internships (social or excellence criteria)
 - Sponsoring for different actions
 - Joint proposals at different calls



III) Actions for the nuclear field

What are the main actions under finalization ?

- All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology
- Action#5: **Creation of a new international course** in the master's degree in Instrumentation, Measurement, Metrology



- Within the frameworks of the new ISFIN institute and its graduate school



- For fission and fusion facilities
- Start in September 202

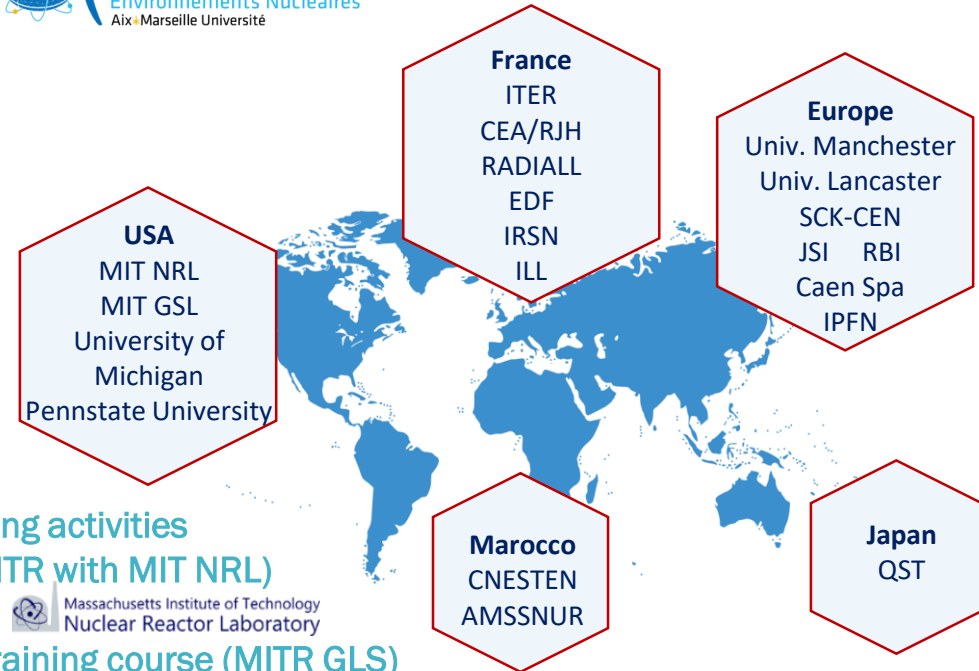
III) Actions for the nuclear field

What are the main actions under finalization ?

- All the actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology

- **Action#5: Creation of a new international course** in the master's degree in Instrumentation, Measurement, Metrology

- Letters of interest of 20 partners
- Course in English: 350 h
- A comprehensive academic program linked to research with
 - Scientific seminars from international partners
 - Courses from lecturers, researchers, partners
 - Research project unit with experimental or modelling activities
 - Practical activities on nuclear facilities (such as MITR with MIT NRL)
 - Visit of major facilities (in-person and in-distance)
 - Interculturality and international communication training course (MITR GLS)
 - Participation to summer schools, conferences, short-courses
 - Internship topic associated to international facilities (up to 6 months)
 - Cum Laude Award
- Scholarships for international students + Grants for internships



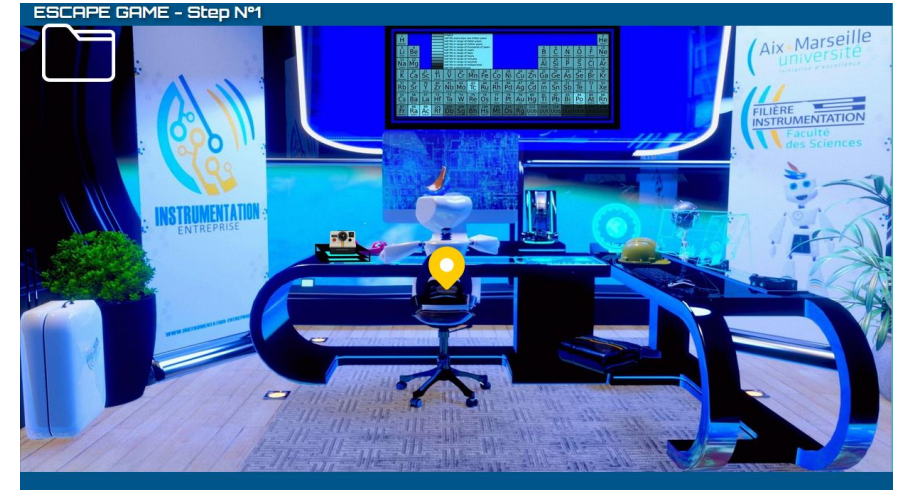
III) Actions for the nuclear field

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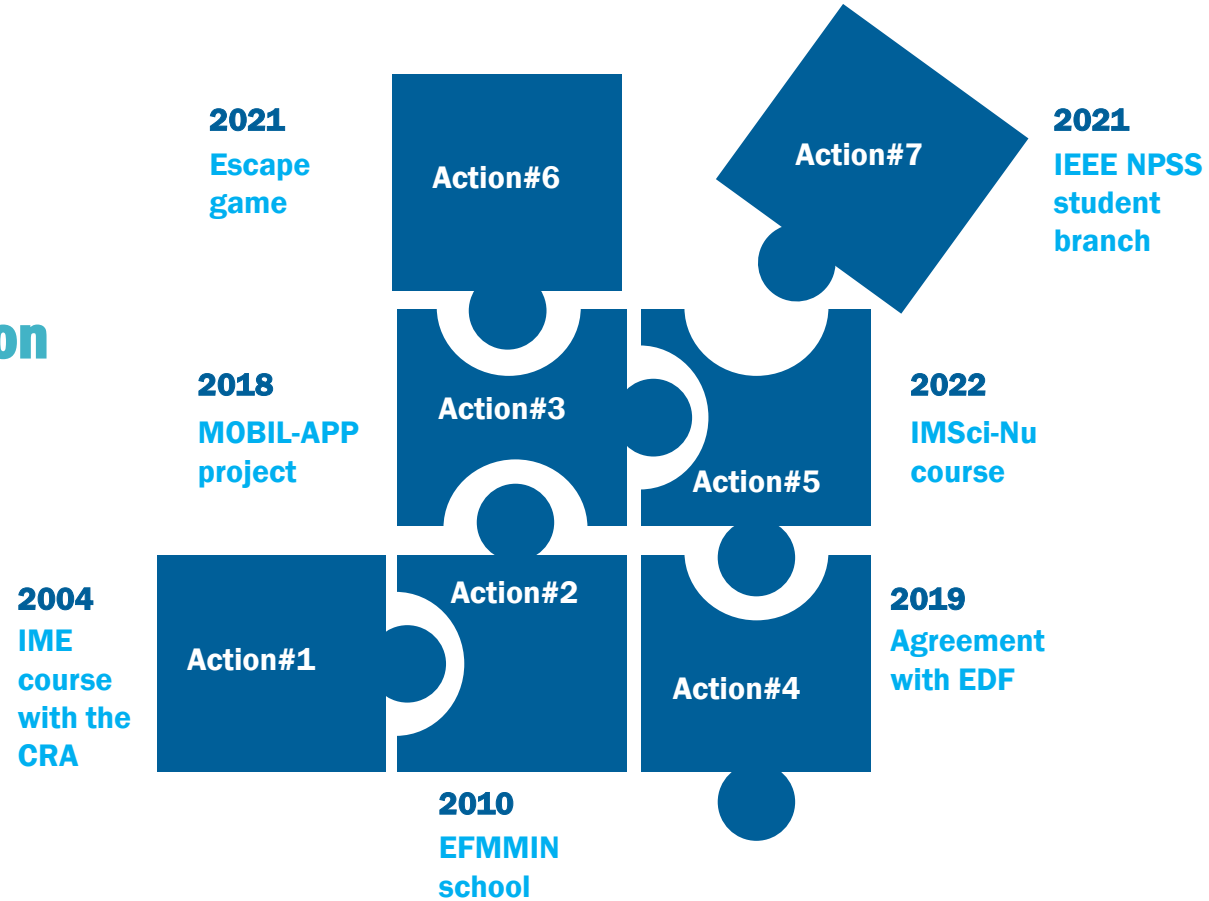
- ❑ **Action#6: Interactive escape game with our mascot**
 - For students in level M1
 - Nuclear instrumentation after a module dedicated to introduction to research
 - First test during virtual mobility in July

- ❑ **Action#7: Creation of an IEEE NPSS student branch**
 - For all the students in level M2 (IME course) + PhD students



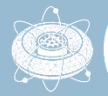
6 main actions for students enrolled in the master's degree in Instrumentation, Measurement, Metrology at Aix-Marseille University → in and for the nuclear field

A*Midex
Filière Instrumentation
ISFIN
IM2NP
LIMMEX
CEA



Network
Research
International Education
Industry Partners
Alumni

IV) Conclusion



Thank you for your attention



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