UNIVERSIDAD POLITÉCNICA DE MADRID

Big Science Business Forum 2022

Academic programs for a career in big science…

do we have all that we need?

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UPM BIG SCIENCE

ineustar
Asociación Española de la Industria de la Ciencia

Technical University of Madrid (UPM)

Main Technical University in Spain

1st Spanish speaking TU in QS ranking (2022)
nº 94 employability in QS ranking (2020)
+2,890 Faculty academics
+40,000 students
4 campus in Madrid

Specialized in engineering and architecture

18 faculties
21 R&D centers
200 research groups
nº 58 Ranking QS (2022)

R&D indicators

nº 1 in university patent applications
nº 1 university in attracting R&D European funds (+100M€ H2020)
nº 1 in attracting R&D contracts with industry
nº 1 in new technology ventures creation

UPM in Big Science

CERN	ITER/F4E	EMBL
Telemanipulation devices and haptic interfaces. Piezo actuators for high-precision positioning. Experiment TARC.	HW/SW for CODAC. Neutronics and Activation. Diagnostics, Acquisition and evaluation of nuclear data.	Molecular interactions plant-pathogen. Biomedical imaging processing.
ESA	**ESRF**	**ESS**
Preparation, execution and analysis after flight in space experiments. E-USOC activities. Solar cells architectures for space applications.	Data pre-processing and enrichment. Algorithms for fusion of images. Advanced structured materials and nanomaterials.	Target. Beam dump. Diagnostics and manufacturing systems.
EUROPEAN XFEL	**FAIR**	**ILL**
Power supplies. Physics integrated models. Proposal and design of experiments.	Nanoparticles generation. New European experimental data base.	Residual stress field induction methods. Analysis and characterization of micro-structured transformations.

UPM BIG SCIENCE

Industry & BSO

- ✓ **More than 30 years** working in Big Science.
- ✓ > 120 **tenders** + 500 **R&D projects**
- ✓ **25 research infrastructures** actively involved in Big Science, + many others with high potential

Present academic programs

- Most of the programs “we” offer nowadays to those wishing to pursue a technical career in BS can be classified in two groups

Generic

Electronic Engineering
Computer science
Mechanical Eng.
Physics
…

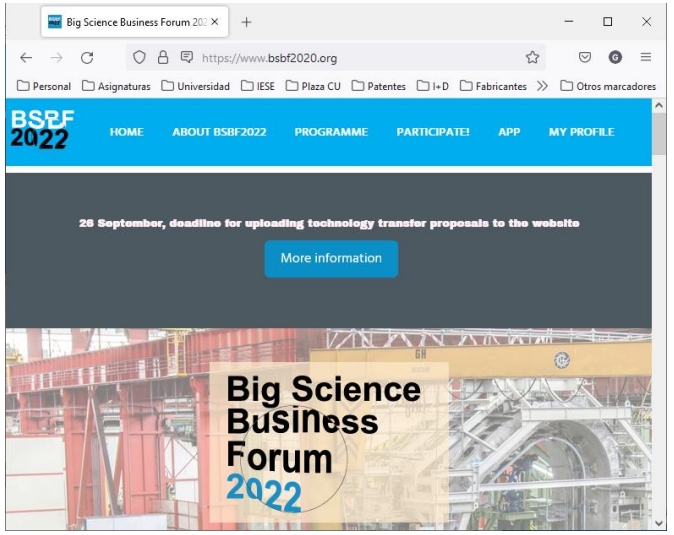
Specific

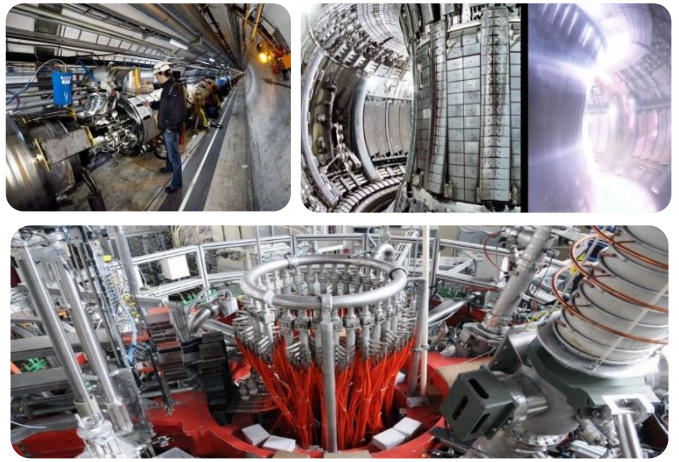
MS in Nuclear Fusion
MS in Aerospace Engineering
MS in
…

- These can be complemented by summer schools and short-term programs, such as those offered by many BSO, and specific training in companies

Future programs…

- Big Science experiments cover **different areas of knowledge**, and some experiments can be **very different among** each other
- However, they share:
  - Many **technological challenges** (AI, CODAC, robotics, materials…)
  - Many **common issues**, such as IP, technology transfer, innovation, etc
  - A need to **understand the experiment's** goals and physics
- We strongly believe there is a space to fill on our side (academic)





Master in Big Science

Big Science Business Forum 2022

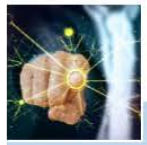
From…

- Engineering
- Physics
- Mathematics
- Computer science
- …

SCIENCE

- Electromagnetism
- Plasma physics
- Nuclear physics
- Particle physics
- Astrophysics

Workshops



TECHNOLOGY

- Instrumentation & control
- Materials & characterization
- Detectors and sensors
- Robotics and remote handling
- Artificial intelligence
- Big Data

Hands-on Labs

MANAGEMENT

- Project management
- Procurement
- IP and technology transfer
- Project finance
- Innovation & Entrepreneurship
- People & leadership

Seminars + Case Study

A REAL WORLD EXPERIENCE

Internship & Final theses

To…

- Companies
- BSO
- Research centers

1 Year

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We appreciate very much your feedback

Please take a minute to fill this survey

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