

# MuonX

## *Imaging with Muons*

Muon X is an innovative start-up founded in 2022 from the collaboration between the **Federico II University** of Naples, **Tecno In S.p.a** and **Stress Scarl** consortium.

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### OUR TECHNOLOGY

We use the muons from the cosmic rays to discover and make an image of the underground.


By detecting cosmic muons, we are able to determine the subsurface density distribution and thus detect and quantify the anomalies.

### OUR OFFERS

- Feasibility studies
- Field measurements
- Design and implementation of detectors
- Supply of detectors
- Training

### APPLICATION FIELD

- Archaeology
- Cavity detection
- Geological prospection
- Study of industrial structures
- Nuclear safety and safeguarding



## MuonX: Our scientific background (INFN-UNINA)

More than 15 years of experience in detectors, data analysis and modelling, applied to muography

- Volcano study ( Puy-de Dome, Vesuvius)
- Cavity detection: Mt Echia in Naples, Salt mines in Sicily
- Industrial applications (Blust furnace)
- Feasibility study for tunnel detection

MuonX:  
Our background:  
**TECNO-IN**  
( now partecipazioni-  
tecno)

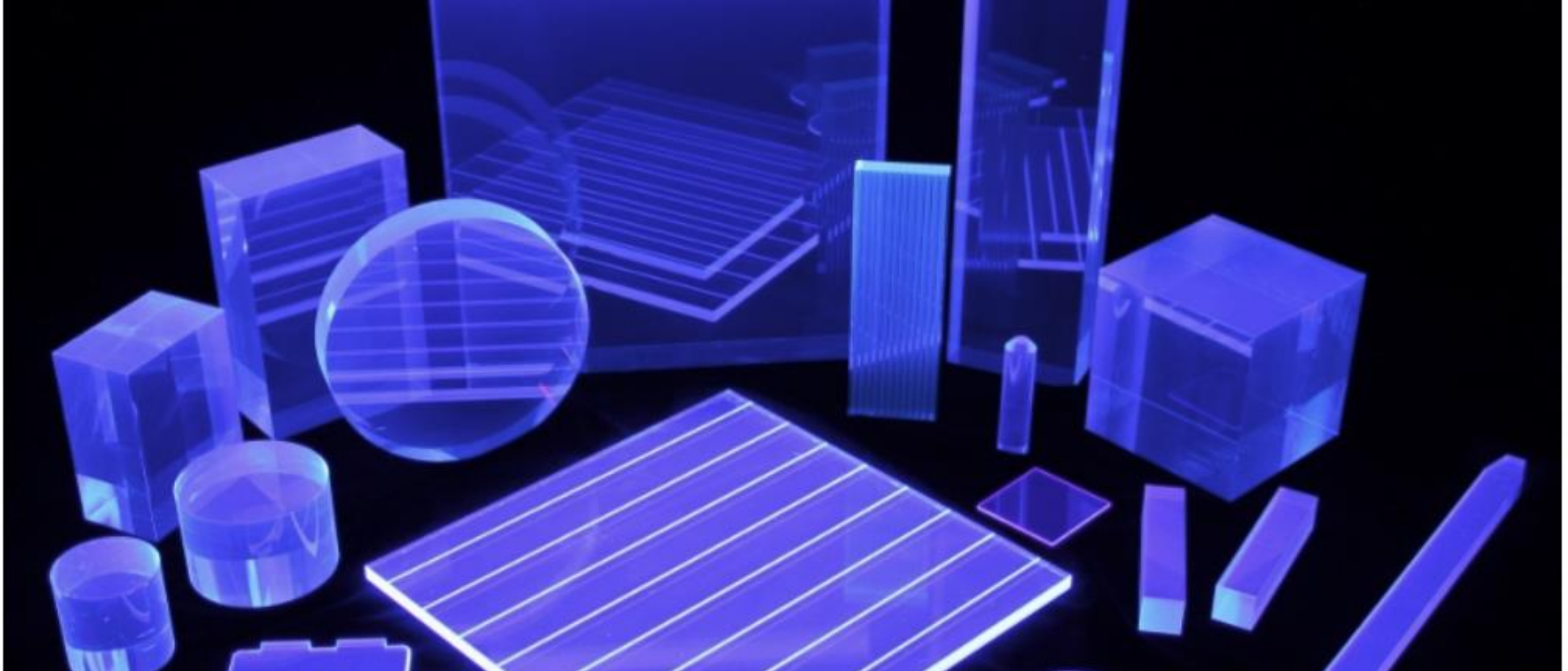
### Decades of Field Experience in Geotechnics

**A Solid Legacy:** Built on the long-standing experience of **Tecno-In**, **Tecno-Partecipate** a leading name in geotechnical engineering and structural monitoring.

**Decades on the Field:** More than 30 years of practical experience in soil mechanics, site characterization, and geotechnical design.

**Infrastructure & Safety:** Proven track record in monitoring large-scale engineering projects, landslides, tunnels, and structural stability in complex environments.

**From Data to Solutions:** We don't just measure; we provide real-world, reliable solutions where geology and engineering meet.



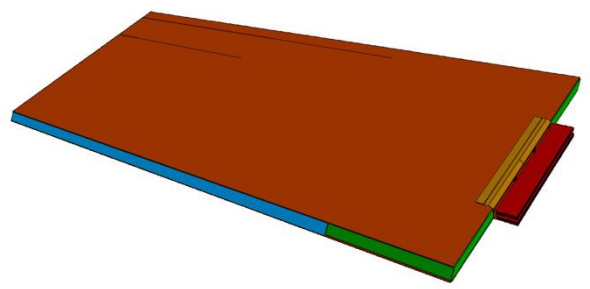
# Detector technology

GIULIO SARACINO MUONX

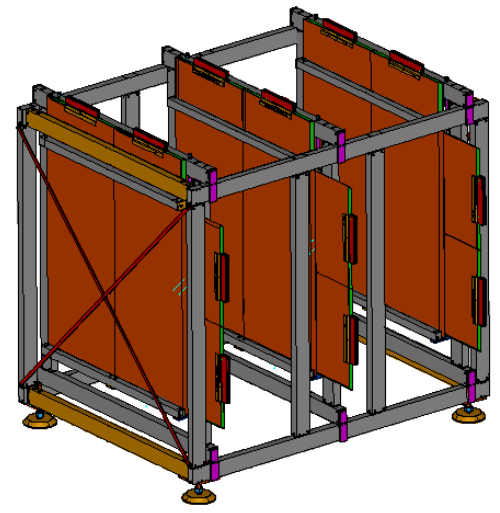
# Plastic scintillator + SiPM + Dedicated FEE

# Planar detectors ( from The MU-RAY & MURAVES experience)

12 x

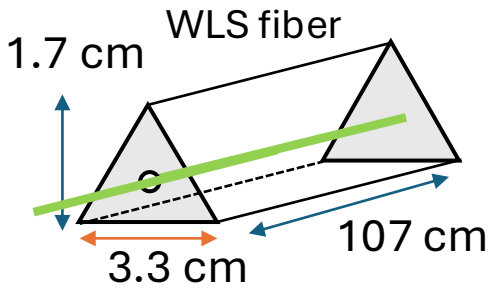


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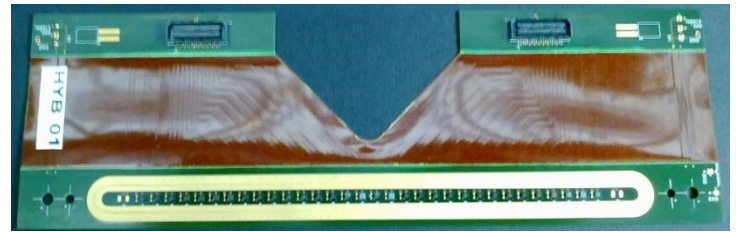
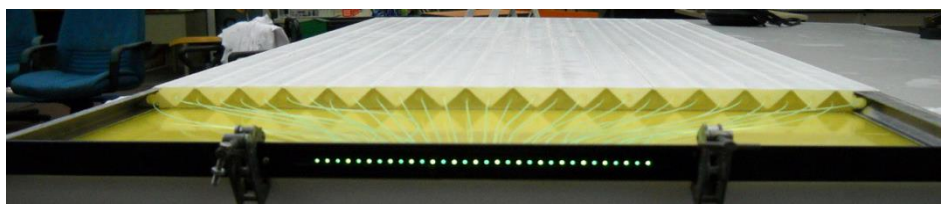


3 X-Y Hodoscopes  
1m<sup>2</sup>

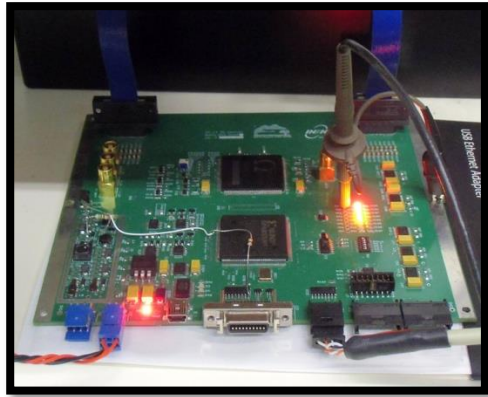
Module 1m x 0,5 m (20 kg)



32 Plastic scintillators with triangular section and WLS fiber

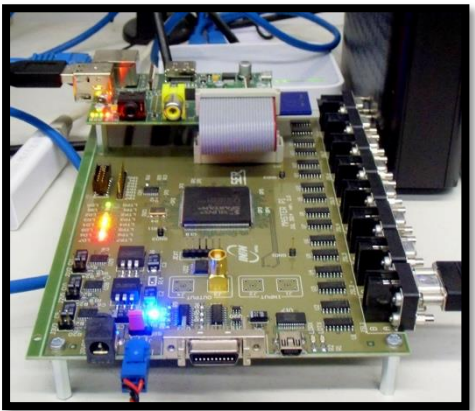


PCB with 32 SiPM temperature controlled



Front end electronics  
ASIC EASIROC (OMEGA)  
FPGA  
HV on board  
32 Ch  
2W power/board

G. Saracino



DAQ board  
FPGA +  
Raspberri-Pi  
Up to 32 boards

MuonX

30W/detector

# Planar detector in horizontal configuration

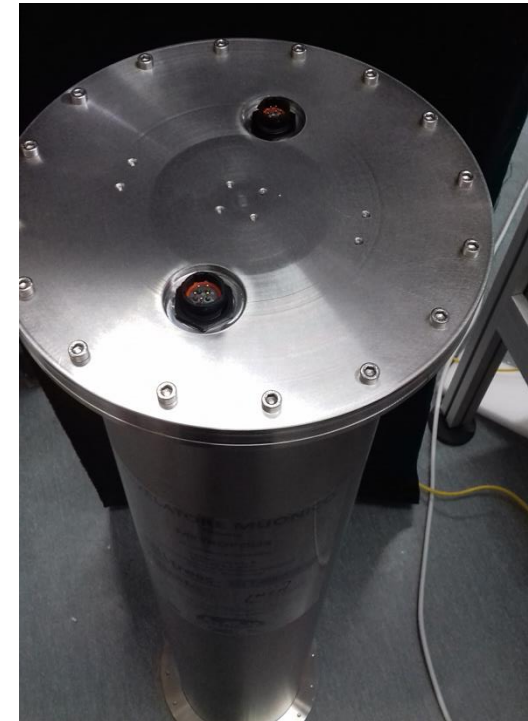
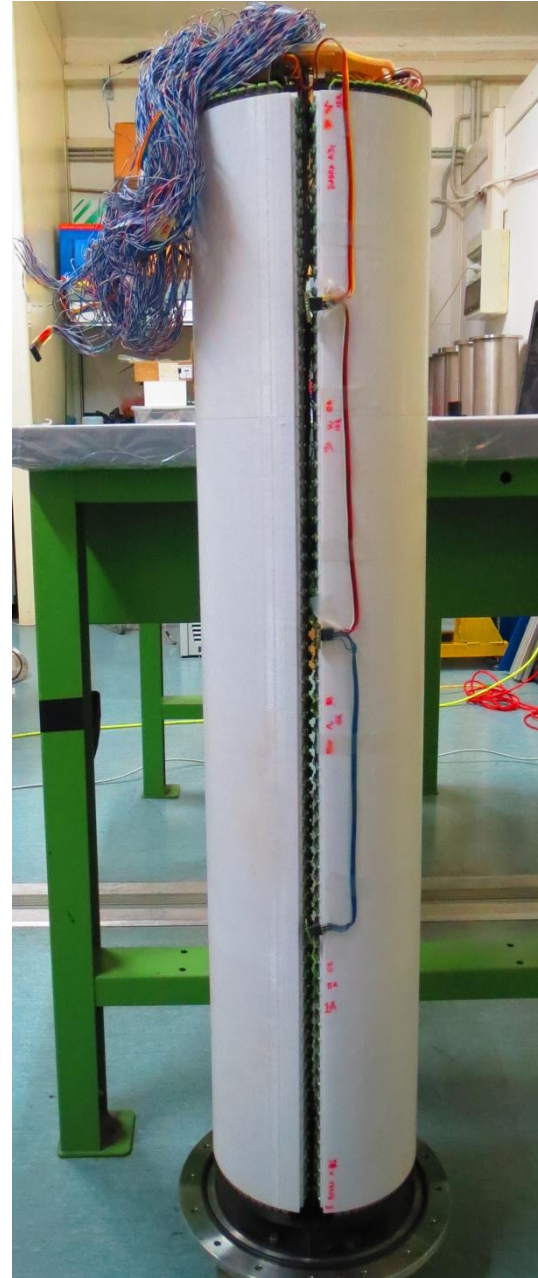
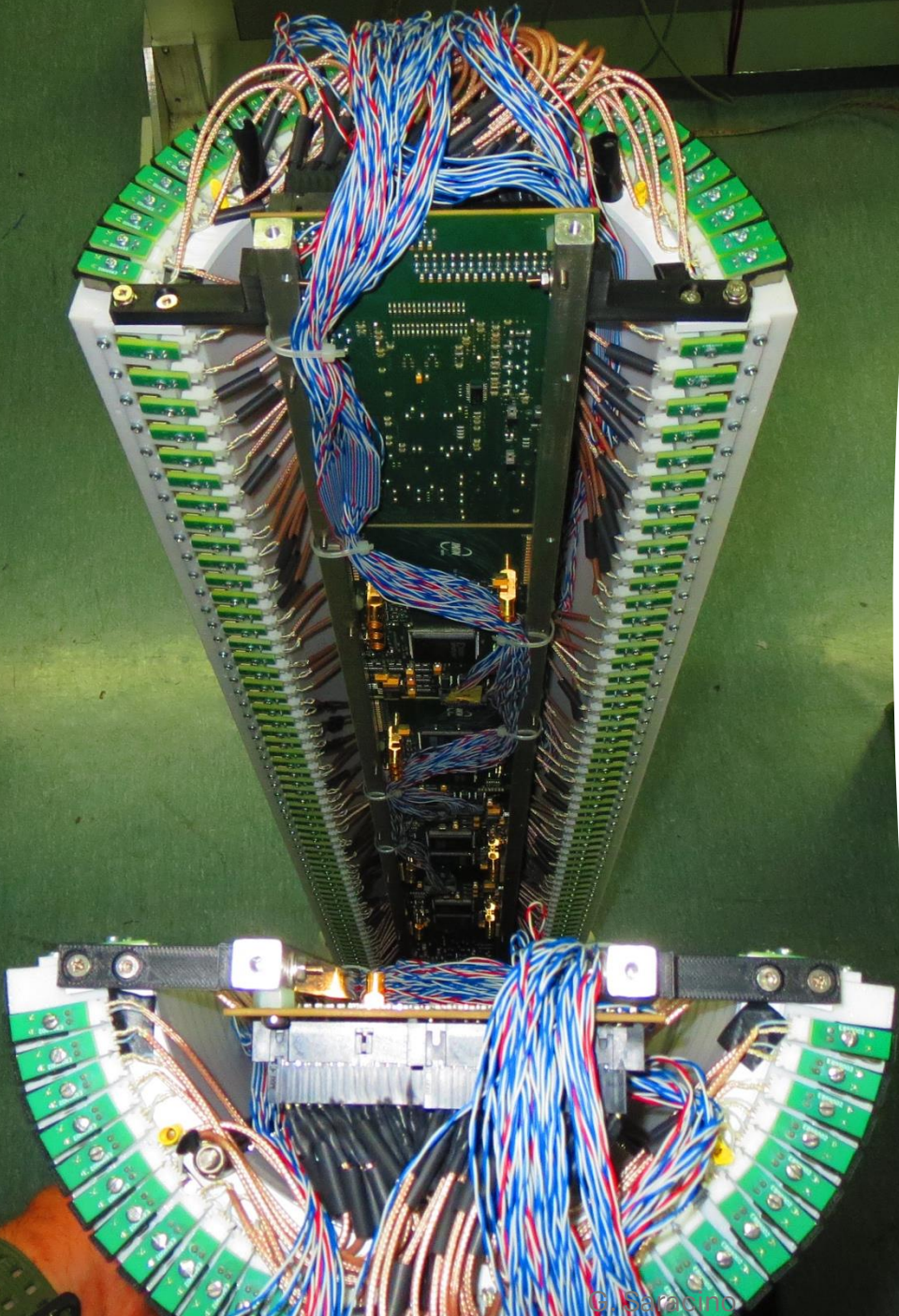
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# Borehole Cylindrical Detector (patented)

384 SiPMs and readout channels

- The cylinder is obtained by assembling the two semicylinders on a steel and closed with a waterproof stainless steel shell
- Ethernet and power plugs are attached on the top cap



# From Research to Impact: Current Status & Future Steps

- We have been in **close contact with several high-level organizations** and industry leaders who are interested in our approach.
- These conversations have been encouraging: they confirm that there is interest for high-precision tools like ours in the current landscape.
- At the moment, we are in the **final stages of a few promising discussions.**
- We are currently "in the loop" and waiting for the final feedback to move from the validation phase to full-scale collaboration.
- We are positive about the path ahead and ready to start these new projects soon.

# Conclusions

- We are a young university startup (December 2022) based on more than ten years of research experience in the muon radiography field
- We position ourselves in the market by offering an innovative technology that can be used when traditional methods fail or are not cost-effective or practical to implement.
- Within the spin-off, there are also consolidated experiences accumulated over many decades of activity in the geotechnical field, through the company TECNO-PARTECIPATE.

## The team



Prof. Luigi Cimmino  
Co-founder  
Department Board Member



Prof. Giulio Saracino  
Co-founder, CEO



Davide Sala  
Co-founder  
CEO of partecipazioni-tecno



Prof. Fabio Ambrosino  
Co-founder  
FormerCEO

# Thank you for you attention

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[www.muonx.com](http://www.muonx.com)

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