



L'ECOSISTEMA NORD-OVEST DEI SEMICONDUTTORI

Torino, 11 Aprile 2025





L'ECOSISTEMA NORD-OVEST DEI SEMICONDUTTORI: Sistema delle infrastrutture di ricerca/tecnologiche

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*Vicerettore per lo Sviluppo del modello e delle infrastrutture di ricerca –
Politecnico di Torino*

INSTITUTIONAL OVERVIEW

2024



Politecnico
di Torino

Human Capital

373 Full professors

404 Associate professors

440 Researchers

Master's degree
programmes **37**

9 in Architecture
27 in Engineering
(**>10 related to ICT**)



Bachelor's
degree

3,531



Master's
degree

4,212

>1200
related to ICT



Politecnico
di Torino

Departments devoted to Microelectronics



DENERG _ Department of Energy "Galileo Ferraris"

DIMEAS _ Department of Mechanical and Aerospace Engineering

DISAT _ Department of Applied Science and Technology

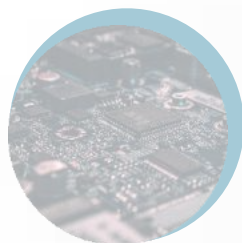
**Industrial Engineering
Area**

**Information Technologies
Area**



DAUIN _ Department of Control and Computer Engineering

DET _ Department of Electronics and Telecommunications



DIGEP _ Department of Management and Production Engineering

DISMA _ Department of Math, Sciences "Giuseppe Luigi Lagrange"

**Engineering and Management
and Mathematics for Engineering
Area**

**Civil and Environmental Engineering,
Architecture, Urban Planning and Design
Area**



DAD _ Department of Architecture and Design

DIATI _ Department of Structural, Geotechnical and Building Engineering

DISEG _ Department of Structural, Geotechnical and Building Engineering

DIST _ Interuniversity Department of Regional and Urban Studies and Planning



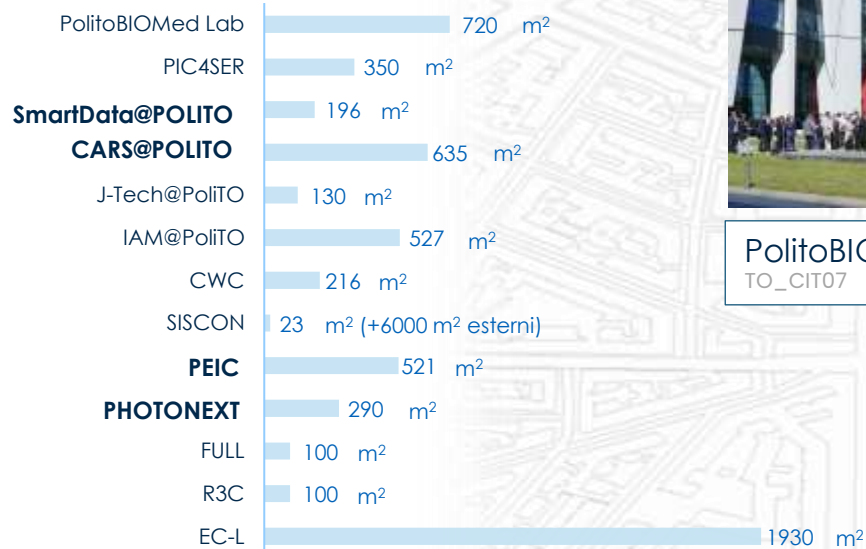
Ambito delle Infrastrutture di Ateneo

- **Aerospazio** (Centro Interdip. TOBE, ITEC IS4Aero, PIC4SER, PEIC, TEST-eDRIVE, iEntrance)
- **Food** (Mondovi, CWC, PIC4SER, iENTRANCE)
- **Transizione digitale** (PHOTONEXT, FIP, SmartData, Piquet, PIC4SER, HPC4AI, Ebrains, Chivasso)
- **Manifattura avanzata** (IAM, J-Tech, DJ-Lab, SAX, Alessandria)
- **Mobilità** (CARS, PEIC, Chivasso, TEST-eDRIVE, ITEC ISM4Italy, ITEC inFuturo, iEntrance)
- **Salute** (PolitoBIOMed, PAsTISs, EBRAINS, Piquet, AerosolTech, D34Health)
- **Tecnologie e risorse verdi per l'energia** (EC, CCL, iENTRANCE, Seastar)
- **Tecnologie, costruzioni e infrastrutture per le transizioni** (R3C, FULL, SISCON)



Interdepartmental Centers

Centers focused on microelectronics



PolitoBIOMed Lab
TO_CIT07 720 m²

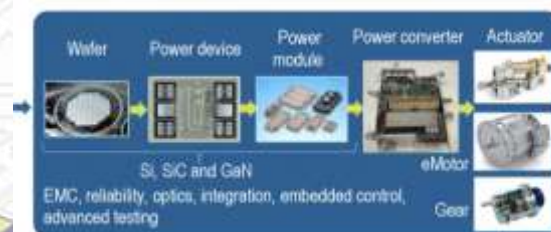
Energy Center-L
TO_CIT21 1930 m²

FULL
TO_OGR01

R3C
TO_OGR01



PHOTONEXT
TO_CIT09 290 m²



PEIC
TO_CEN04 521 m²

SISCON
TO_CEN04 23 m²
Sede di Mirafiori (area esterna) 6 000 m²

CWC
TO_CEN04 216 m²

IAM@PolITO
TO_CEN01 183 m²
Sede di Alessandria 344 m²

J-Tech@PolITO
TO_CEN01 130 m²



CARS@PolITO
TO_CIT24 175 m²
TO_CEN01 460 m²

SmartData@PolITO
TO_CIT24 196 m²

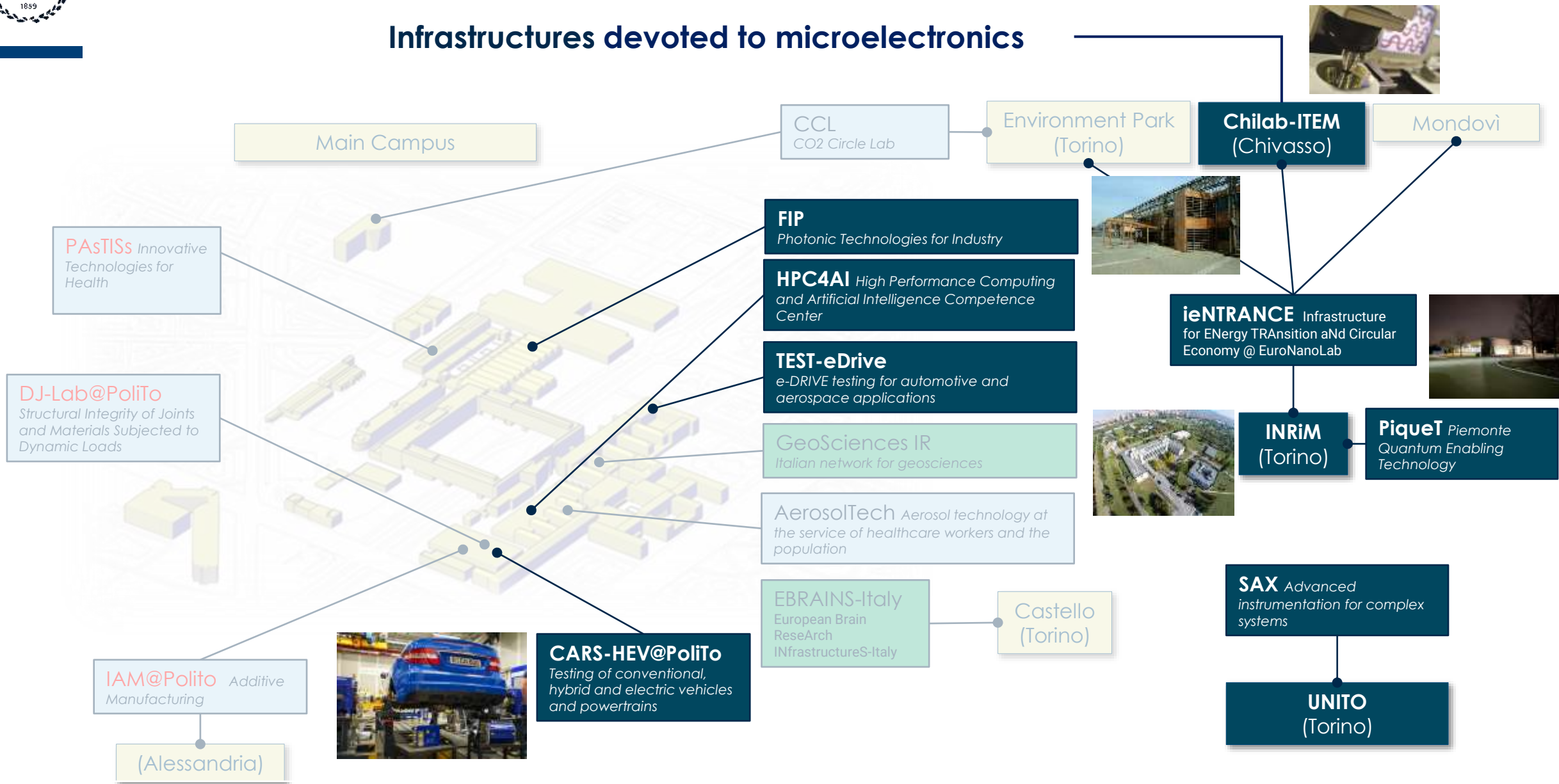
PIC4SER
TO_CIT24 350 m²



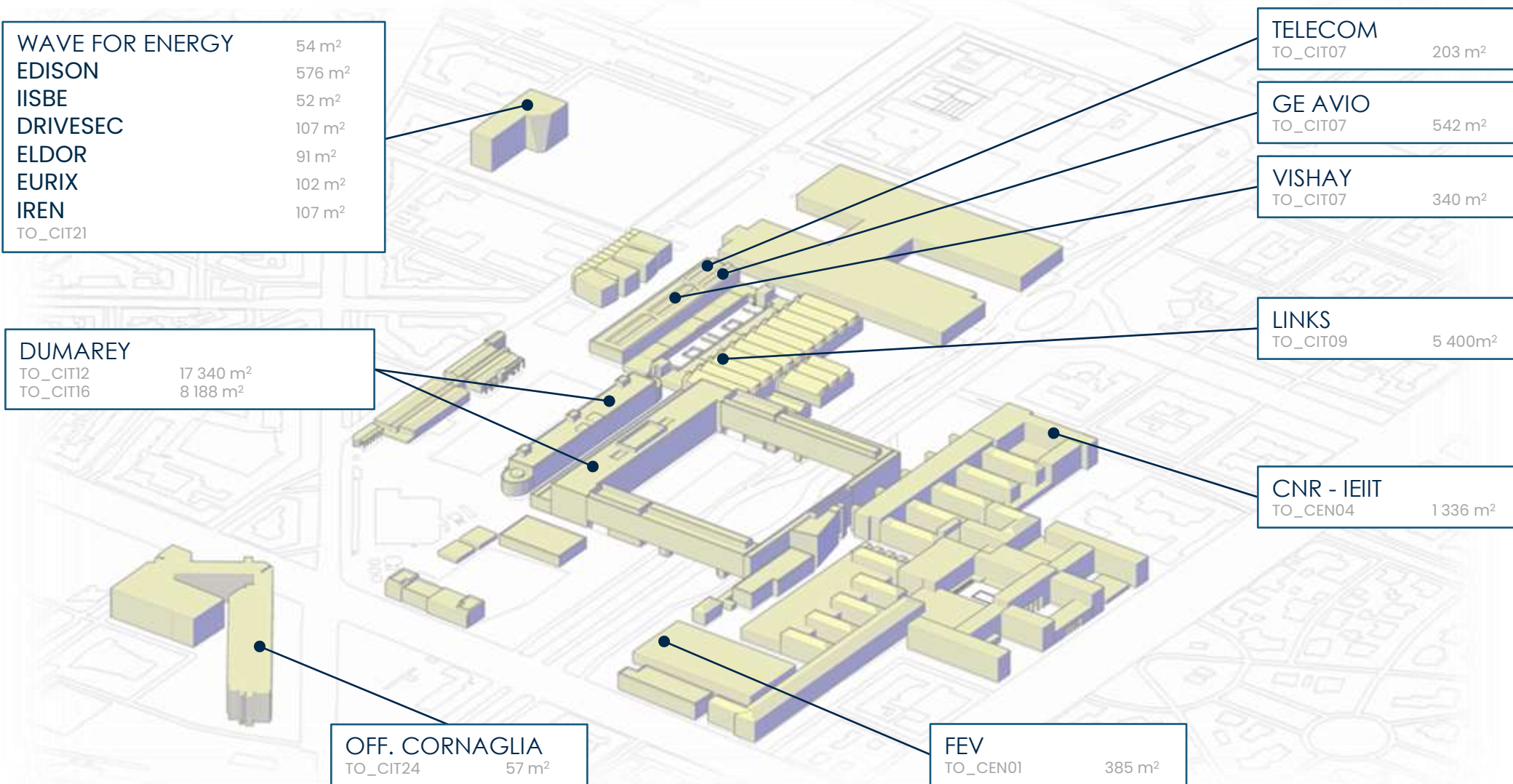


Regional and PNNR Infrastructures @PoliTo

Infrastructures devoted to microelectronics



Enti Esterni - Ricerca

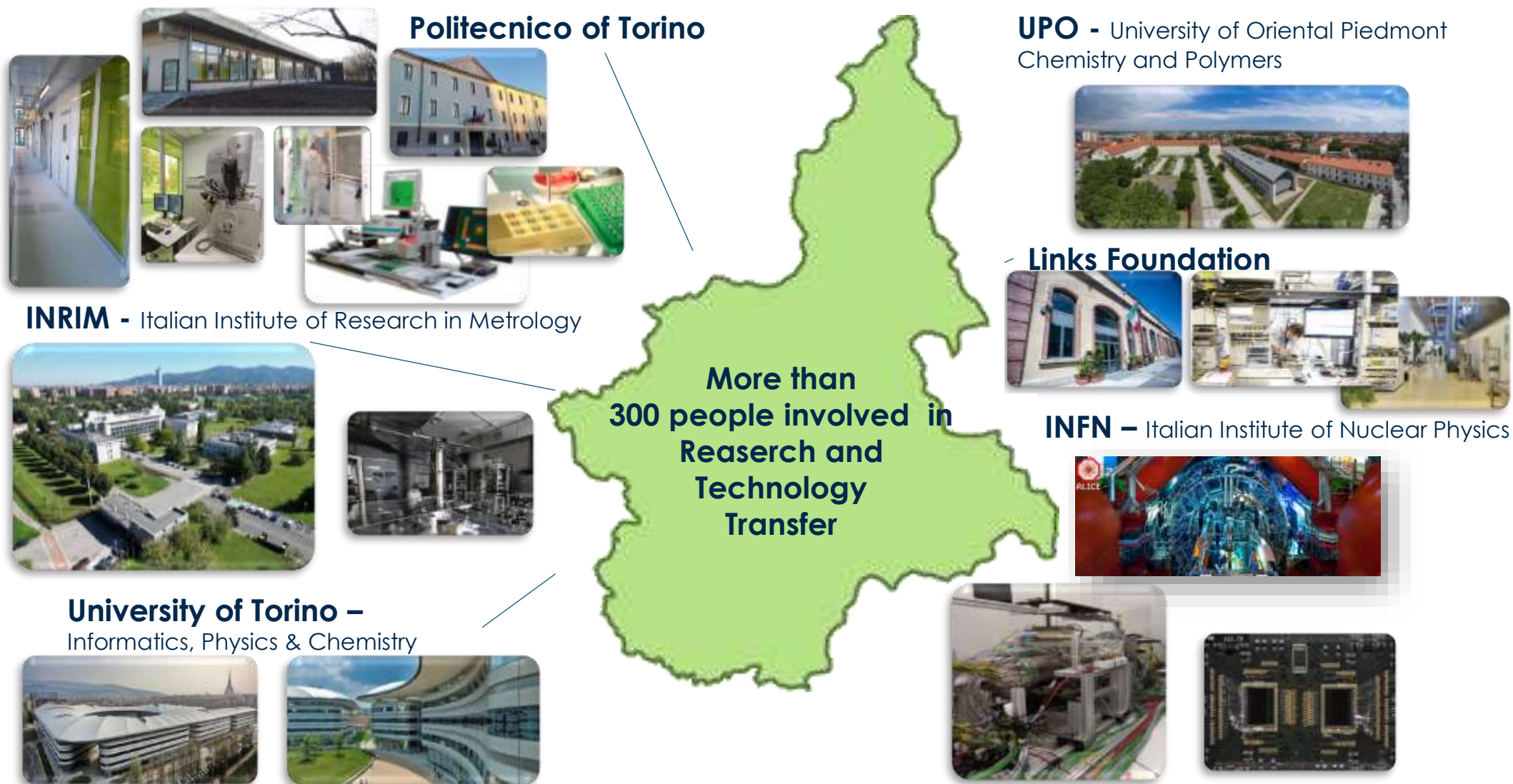


*Fonte dati tabella (12/04/2024) PROGES



Politecnico
di Torino

Regional Research Centers devoted to Microelectronics



Regional Infrastructures

Reference Infrastructure for Micro, Nano and Quantum Technologies

Project
Value

6 M€



Programma Operativo Regionale
"Investimenti per la crescita e
l'occupazione"
F.E.S.R. 2014/2020

AZIONE I.1a.5.1 "Sostegno alle infrastrutture della
ricerca considerate critiche/cruciali per i sistemi
regionali.

Bando: INFRA-P Sostegno a progetti per la realizzazione, il rafforzamento e
l'ampliamento di IR pubbliche

15 M€

Partners
Investment



Politecnico
di Torino



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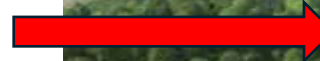
Next steps



Upgrade Mask Aligner
Upgrade EBL
Upgrade BenchTop SEM

Tubular Furnace
New SEM-FIB
Scanning
Lithography

Thermal



Città delle Scienze e dell'Ambiente di Grugliasco, Torino



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Infrastructure networks: It-Fab

Network of Leading Institutions and Laboratories



Aim and Scope

Establish harmonized rules

- Cleanroom management & commitments to users
- Access policy
- IP rules
- External costs & reporting

Joint best-practices

- Complementarities
- Reciprocal backup
- Standardization issues

Harmonization and sharing

- Design and simulation software
- Service contracts
- Consumables
- Management of professional services

Information System

- Existing know-how database
- Projects database
- Equipment and facilities database

Cutting-edge micro & nanofabrication facilities for the manufacture of microelectronic devices and microsystems both for industrial and research purposes.

A network infrastructure, distributed across Italy, providing an optimal interface towards the national industrial tissue, mainly composed of SME.

Infrastructure networks: EUROnanoLAB



14

Countries in the Consortium

15

Nodes

44

Cleanrooms

<http://euronanolab.net/>

EuroNanoLab is an initiative to establish a large scale distributed nanofabrication research infrastructure

- **Enhance excellence** by building superior processing competence
- **Accelerate research** by process exchange and single-access point to nanofabrication RI and expertise
- **Share competences** by defining European standards in cleanroom procedures
- **Strengthening cooperation** by building an alliance between scientist and nanofabrication experts



ESFRI

EU Projects: RIANA



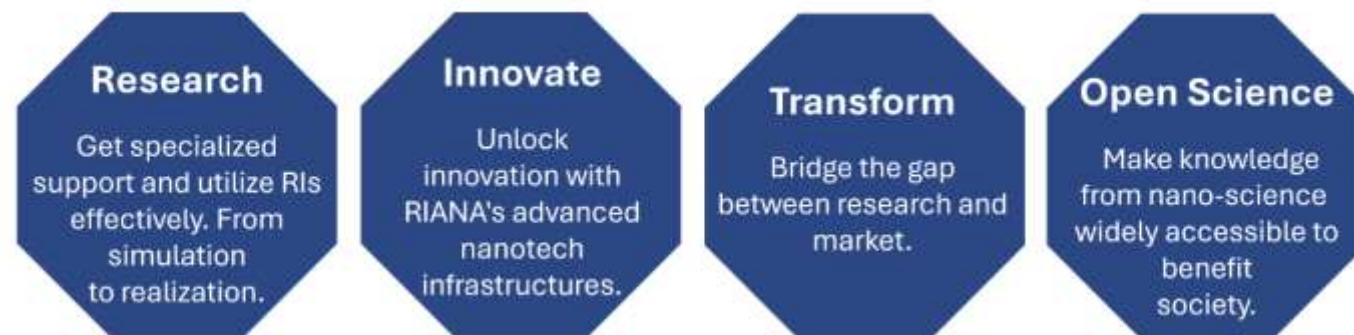
RIANA is a Horizon Europe-funded project that **assists research** in nanoscience and nanotechnology.

RIANA offers **access** to the world's leading **research infrastructures** (RI) to the nanoscience and nanotechnology research community.

RIANA joins 7 European networks of top-level RIs to cover the most advanced techniques relevant to nanofabrication, processing/synthesis, characterization, and analysis as well as simulation capacity.

Highly customized and efficient access to **69 infrastructures** is coordinated via a **single-entry point** and enabled through comprehensive scientific and innovation service by senior scientists, facility experts, and highly trained junior scientists.

RIANA <https://riana-project.eu/>
**Research Infrastructure
Access in Nanoscience &
Nanotechnology**



Politecnico of Torino – National Infrastructure & EU partnership

iENTRANCE

*Infrastructure for ENergy
TRAnsition aNd Circular
Economy @ EuroNanoLab*

Vision is to become the first distributed, integrated, and fully interoperable **Technological Research Infrastructure of European excellence in Italy** devoted to Clean Energy Transition Research.

Mission is to address the pressing global challenges represented by Clean Energy Transition, Sustainability, and Circular Economy, by developing a **future generation of nanomaterials, processes, and systems specifically designed to mitigate the environmental impact of production, storage, distribution, and use of energy.**



National Centers in North-west Italy

AI⁴I

THE ITALIAN
INSTITUTE OF
ARTIFICIAL
INTELLIGENCE
FOR INDUSTRY



Chips-It
FONDAZIONE

iit ISTITUTO
ITALIANO DI
TECNOLOGIA



Computing@PoliTO: Future

- 2025-2028 – **New data centre**
- **Computing4GenAI**
- In collaboration with AI4Industry
- Goal: **grow the IT infrastructure** to offer a flexible and **future-proof** solution for research
- 1000sq new building to host a new Data Centre
- New **AI-centric** computing solution
 - More and more GPUs
 - High-speed network
 - HW-accelerated infrastructure
- **Open** to collaborations with industries and research centres



Area Torinese acquisisce un computer quantistico



Figure 2: Physical parts and layout of IQM Spark™ quantum computer. System covers are not shown. Image is representative only and subject to change.

IQM Spark™ Quantum Computer

Table 1: IQM Spark™ configuration summary.

Data qubits	Coupler qubits	Processor topology	Dilution refrigerator	Control electronics
5	4	Star	Customized Bluefors LD250s	IQM Quantum Control System (QCS)



Politecnico
di Torino



UNIVERSITA
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DI TORINO

Servizio | Al via da quest'anno

Al Politecnico di Torino la prima laurea italiana in Ingegneria quantistica

di Redazione Scuola

28 settembre 2023



ABBONAMENTO

Digital Fisco +
Book24ORE Fisco e
Imprese Manuali
1 mese di prova a 9,90 €
poi a 39,90 €/mese

L'Europa lancia l'allarme sul gap di competenze digitali - al 2030 mancheranno all'appello 8 milioni di specialisti Ict e in Italia 1 cittadino su 2 è privo di competenze digitali - ed il nostro Paese non rimane con le braccia incrociate. Già dalla prossima settimana il Politecnico di Torino attiverà il primo corso italiano magistrale in Quantum Engineering, unico sul nostro territorio e quinto nella visione europea dopo Olanda, Svizzera, Gran Bretagna e Francia. «Abbiamo iniziato a capire che gli studenti andavano all'estero per formarsi nelle tecnologie quantistiche, volevamo anticipare il mercato e abbiamo verificato che i tempi erano maturi per costruire una laurea così in Italia», raccontano all'agenzia Adnkronos Matteo Cocuzza, ordinario al Dipartimento di Scienza Applicata e Tecnologia (Disat) del Politecnico di Torino.

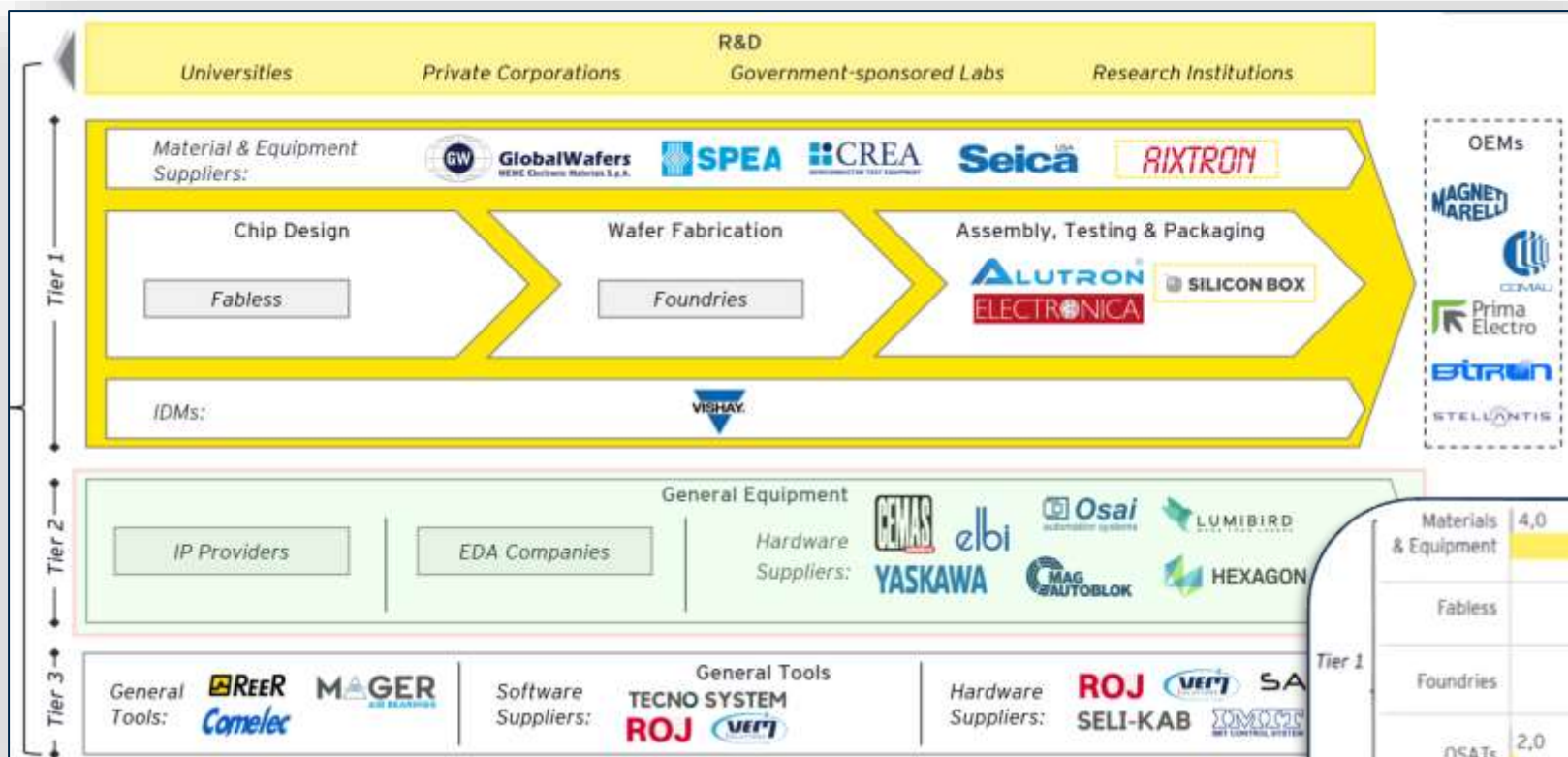
SCUOLA E FORMAZIONE | 28 settembre 2023, 15:25

Il **Politecnico** all'avanguardia nella formazione sulle tecnologie quantistiche: nuova Laurea Magistrale in Quantum Engineering

Moltissime le prospettive e gli sviluppi di una tecnologia che nei prossimi anni rivoluzionerà il settore delle comunicazioni



The semiconductors value chain



Piedmont confirms the national trend showing how most of the value created is concentrated in the segments of materials, general equipment, general tools and hardware

Politecnico of Torino,
Universities and Research
Institutions cooperate to
support the regional
microelectronics sector



Collaborations with the microelectronics industry

BIG Companies > 10



GlobalWafers



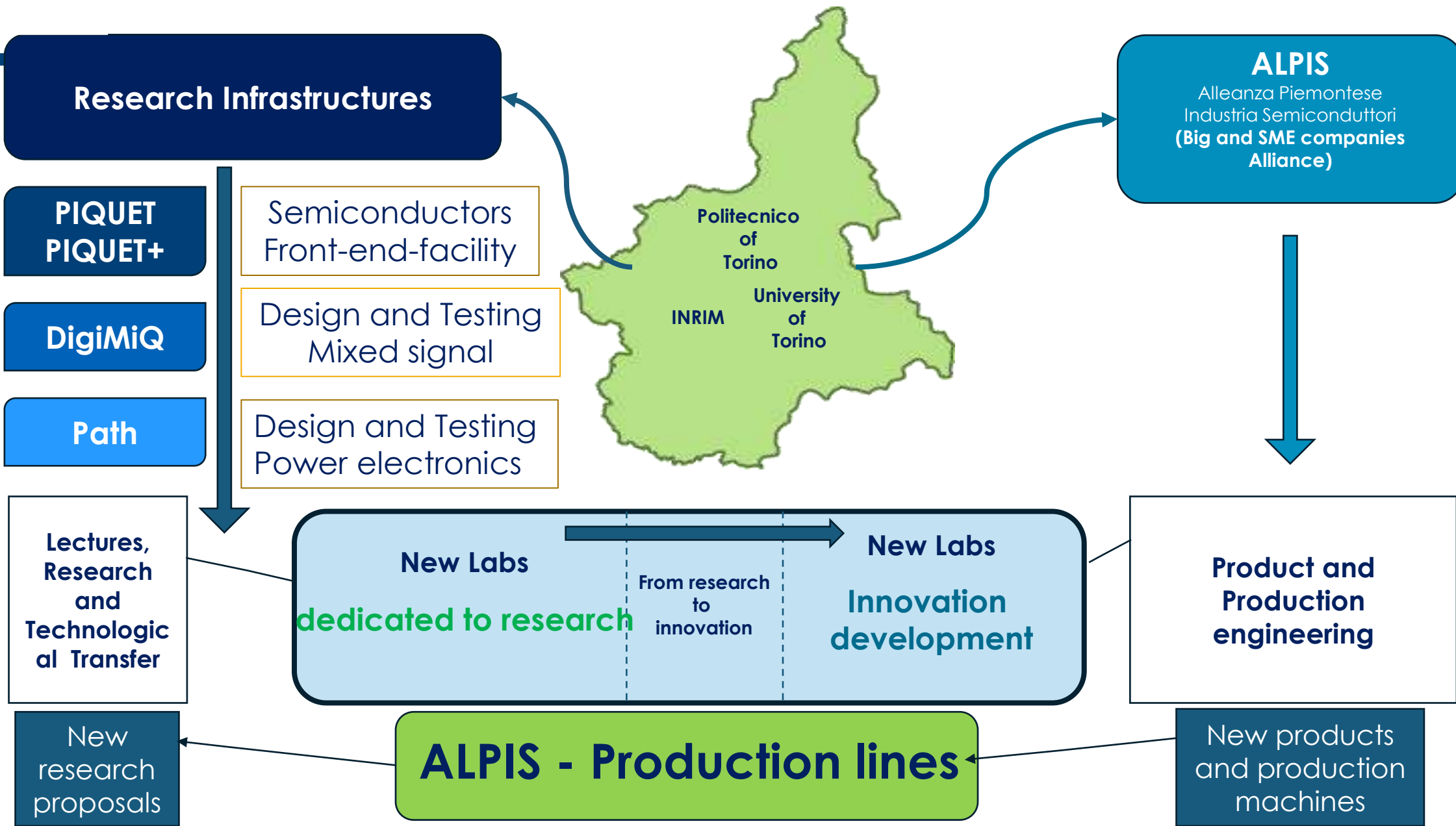
SME Companies > 100



Technosystem



A New Center in collaboration with companies





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