C. Talent
The world-wide challenge

HOW WILL THE U.S. OVERCOME THE SEMICONDUCTOR SKILLED LABOR SHORTAGE?

Posted on April 27, 2022 by Jack Trompert

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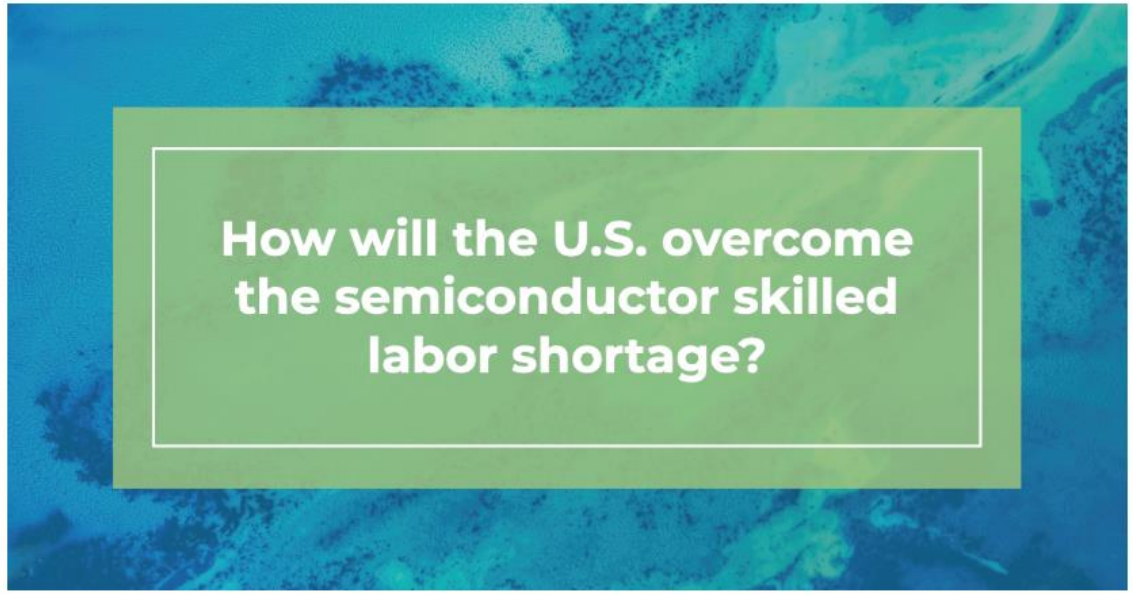


Job postings for electrical engineers in the U.S. semiconductor industry grew 78% from 2020 to 2021 — more than three times faster than growth for electrical engineers overall. What's more, the U.S. semiconductor industry will need between 70,000 and 90,000 new workers by 2025 to meet the most critical workforce needs, reported Eightfold.ai.

FEATURE

Tech talent shortage slows reshoring of chip manufacturing in US

Even as leading semiconductor manufacturers eye plans to build new fabrication facilities in the US, creating tens of thousands of new jobs, the lack of available tech talent threatens to stymie efforts.

By Lucas Mearian

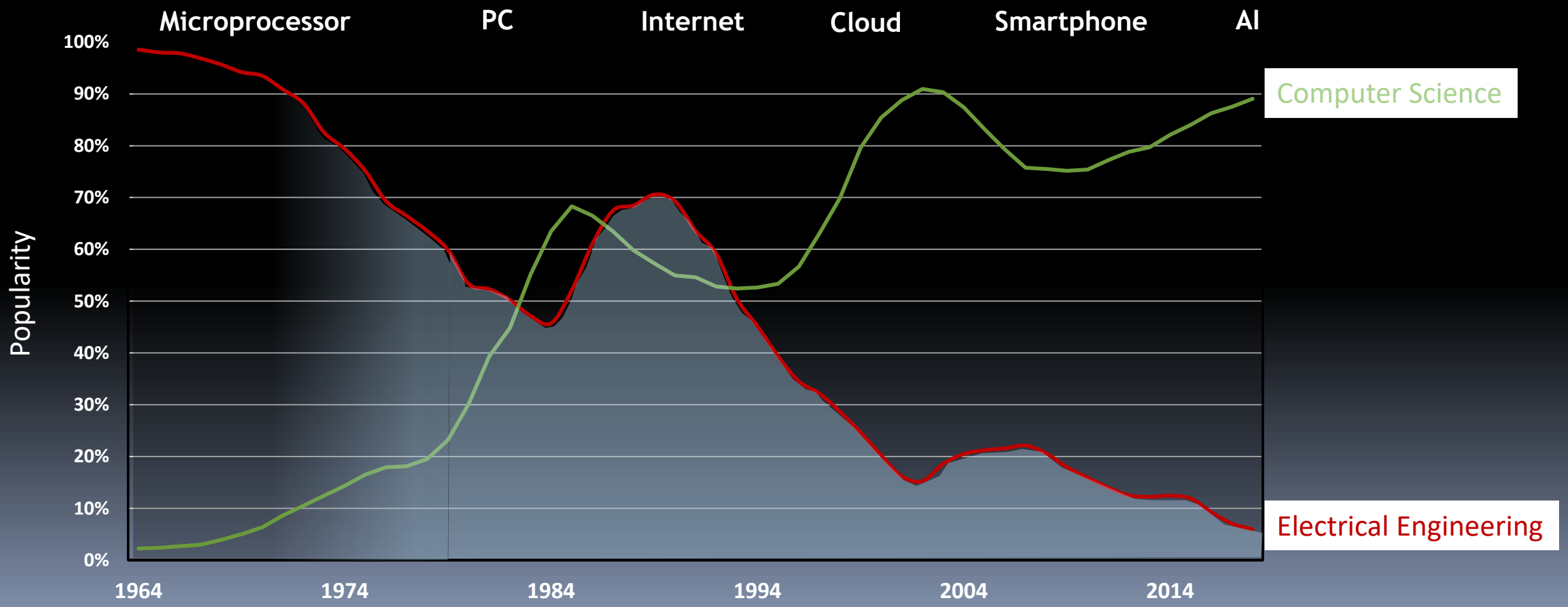
Senior Reporter, Computerworld | JUL 5, 2022 3:00 AM PDT

South China Morning Post

China chip makers scramble for semiconductor talent, showering fresh graduates with offers as peers in other fields face dim prospects

C. Talent
Graduation rate in US

Raja Koduri
Executive Vice President, Accelerated Computing Systems and Graphics (AXG) BU
Intel Corporation



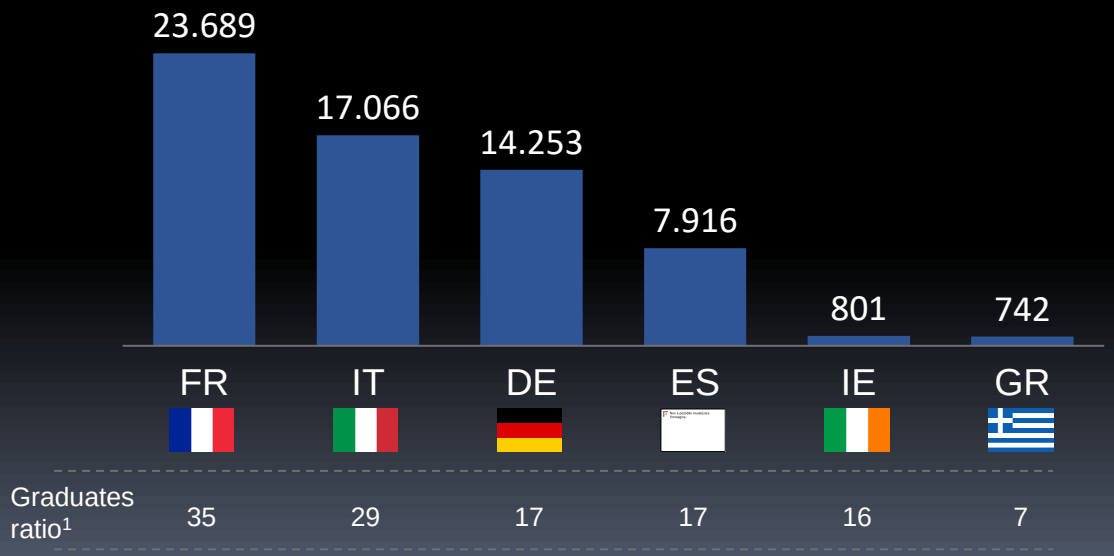
Source: US Dept of Education, IPEDS (https://nces.ed.gov/ipeds)

C.Talent

A highly-qualified yet cost-effective talent pool available in Italy

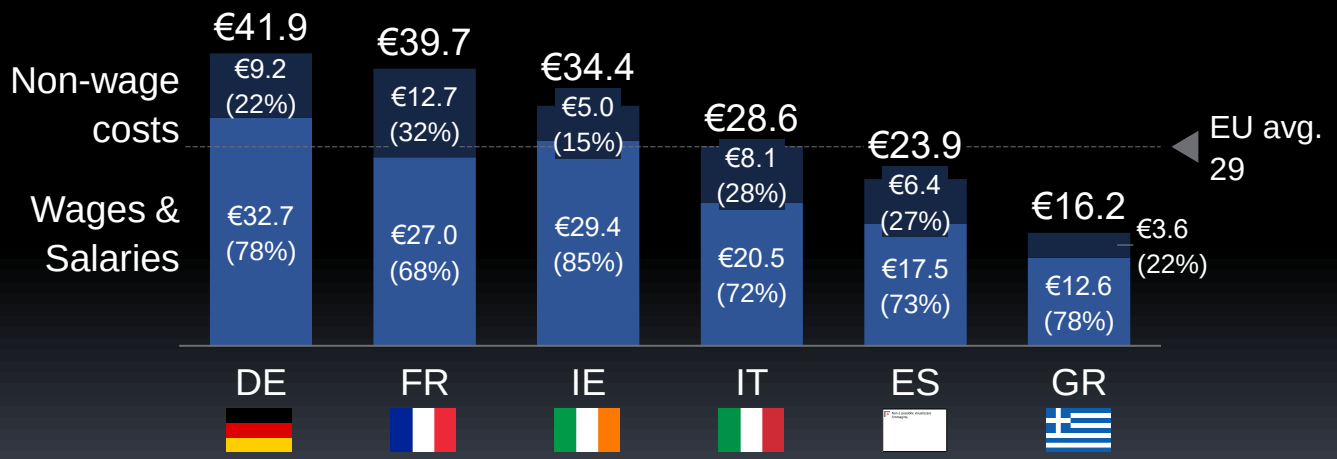
A first-class talent pool…

Number of graduates in engineering at EU Master's or equivalent level (2019)



…at a competitive labor cost

Labor cost per hour (€) for employees in manufacturing in the EU NACE Code C Manufacturing (2020)



Figures do not include fiscal incentives on non-wage costs

1. Calculated as number of new graduates every 100k inhabitants
Source: Eurostat, Indire, Banca dati Nazionale IT

B. Vibrant Semiconductor Ecosystem:
Excellent science and research capabilities

Italy has high rankings for research citation in the EU for microelectronics topics

- Italy is among the leading EU countries by number of scientific citations on subjects related to Microelectronics:

1º
- Electrical and Electronic Engineering subject (& 6th worldwide)
- Computer Sciences Applications
- Control and System Engineering

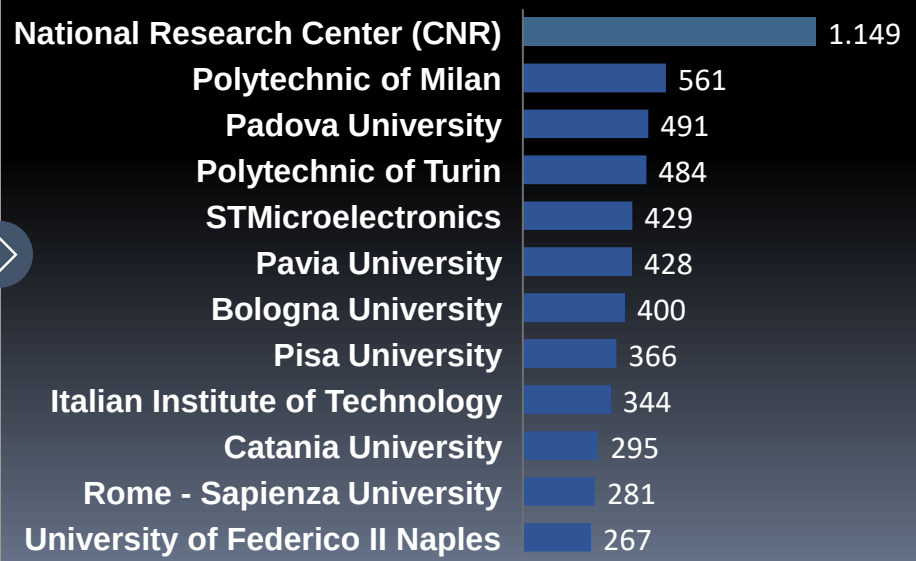
2º
- Computer sciences
- Sensory Systems

3º
- Electronic, Optical and Magnetic Materials
- Computational Mechanics

4º
- Nanoscience and Nanotechnology

Within Italy, CNR, Polytechnic of Milan, Padova University are well cited for microelectronics research

- Citation count by microelectronic keywords "transistor", "mos", "cmos" (last 10 years):



Virtuous interplay between industry and academia sustains competitive advantages, such as in the SiC market

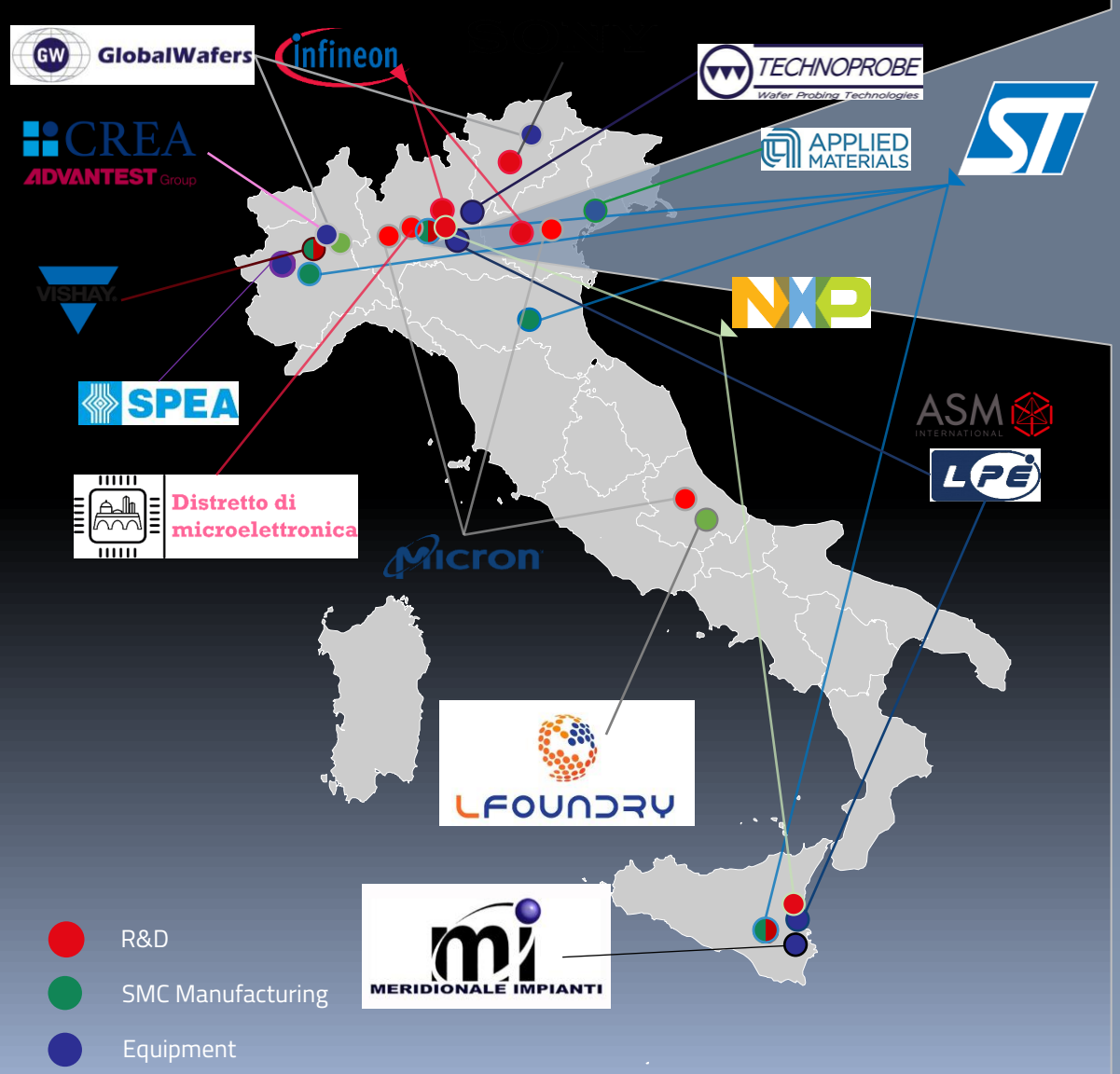
Source: Scopus, SCImago, (n.d.). SJR 2020

Chips-IT: A New Research Foundation to Expand and Strengthen the Italian Semiconductor Ecosystem

- **Chips-IT:** a public-private research foundation created by the Italian Government in 2023 with €200mn in initial funding.
- Focus on fostering Italy's **chip design** capabilities in collaboration with University and Industry.
- Platform where **Industry can access talent** to advance their research agenda.
- Industry can participate via **partnerships**, or as **Supporters / Members**. Membership gives the right to co-steer the Foundation's research and skills development agenda.

Chips-IT Location

Pavia: Italy's emerging Fabless Valley



Pavia (Lombardy) Italy's **Fabless Valley** thanks to decade-long collaborations between University and Industry.

Companies **already** present in Pavia with **design centers.**

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Example of focused Innovation areas

- #1: High-Speed Communication
  - mmWave and Sub-THz Transceivers for 6G and beyond
  - MIMO and Array Digital Processors
  - Silicon Photonics and Photonic Microsystems
- #2: High-Performance Computing
  - Digital and Analog Components for Machine Learning and Artificial Intelligence
  - Digital Processors, Accelerators, Memories and In-Memory Computing
  - Cryo-Electronics for Quantum Computing
- #3: Advanced Energy Management
  - Harvesting and Storage for Green and Renewables
  - Wireless Power
  - Circuits and Technologies for GaN and SiC Devices
- #4: Smart Sensing and Actuation
  - Body and Brain Silicon Interfaces and Medical Diagnostic Technologies
  - Advanced Imaging, Displays and Human-Machine Interaction Technologies
  - Emerging Sensing Systems, IoT and Security