

eFES



**A green electronic component with
ultra-low power consumption**

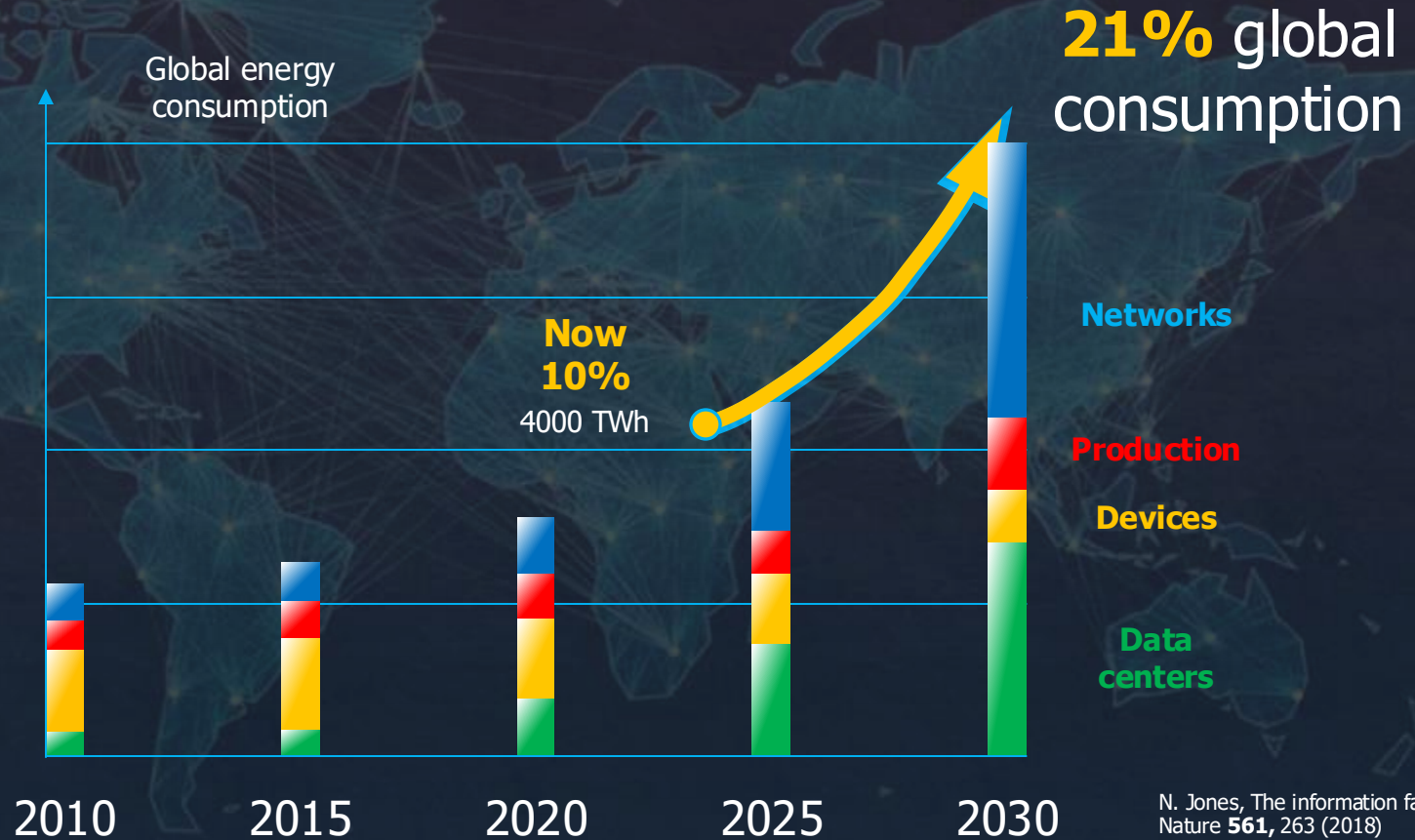


1.000.000
transistors



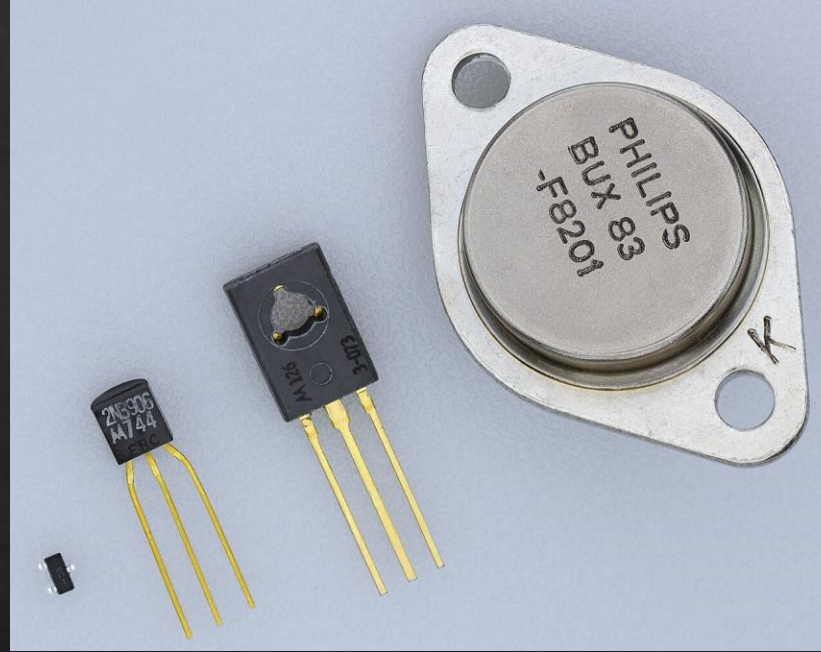
10.000.000.000
transistors

We consume a lot

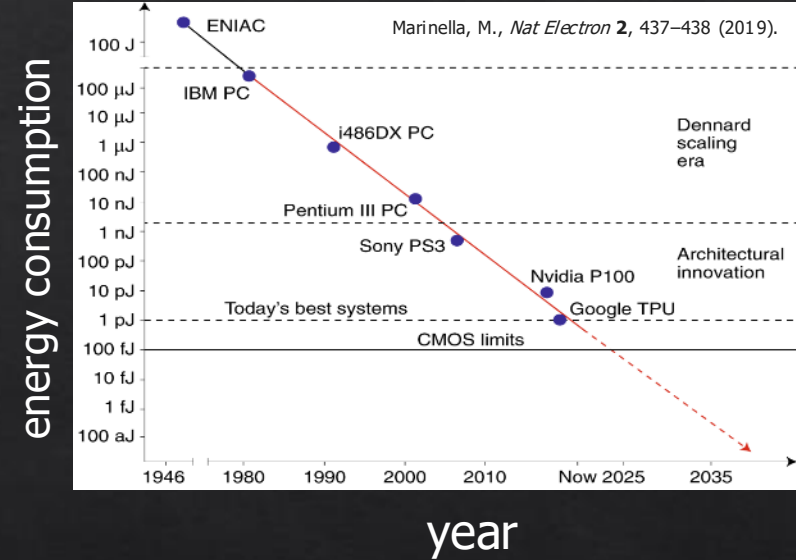


N. Jones, The information factories,
Nature **561**, 263 (2018)

The CMOS transistor until today



The CMOS transistor until today



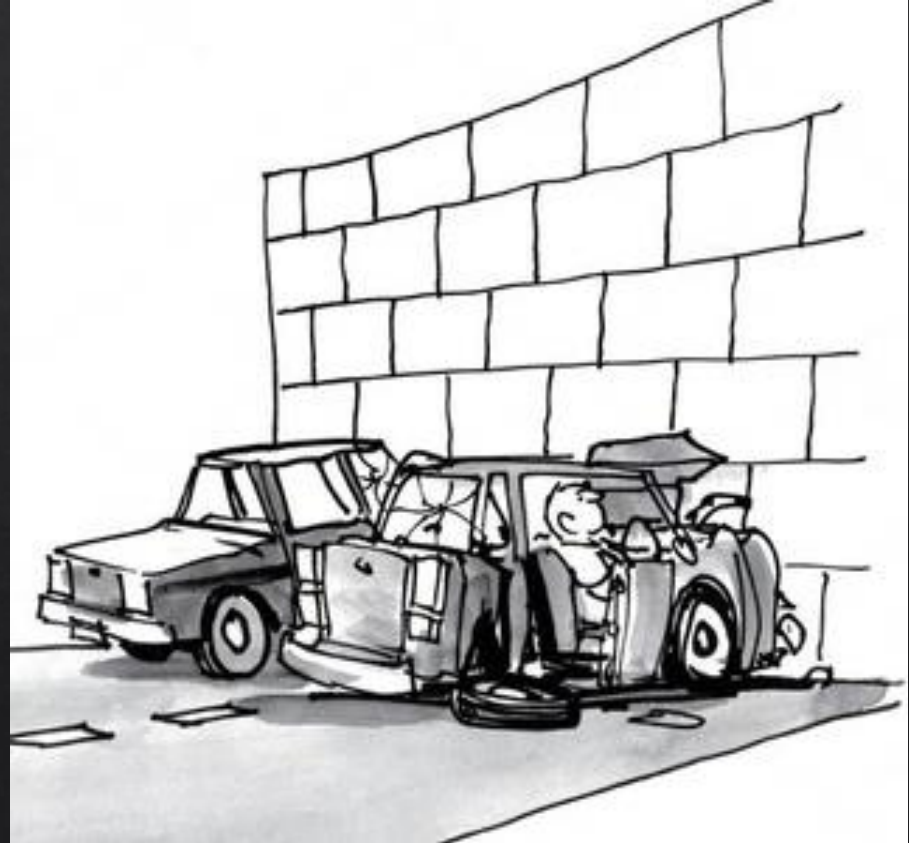
**Smaller
dimensions**



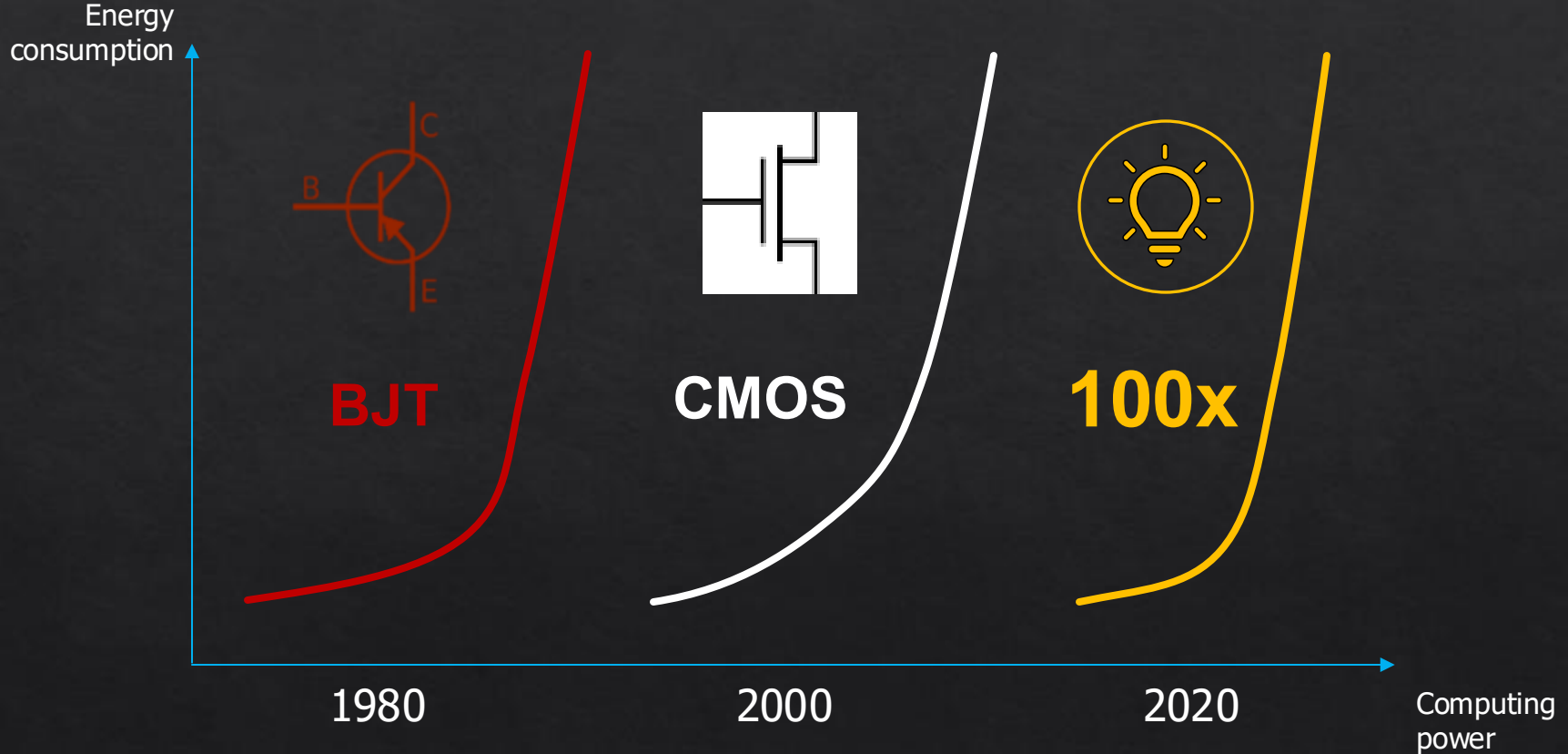
**Higher energy
performances**

The CMOS transistor tomorrow

But... in the future
it will **NOT** be
possible to
miniaturize beyond
the transistor!



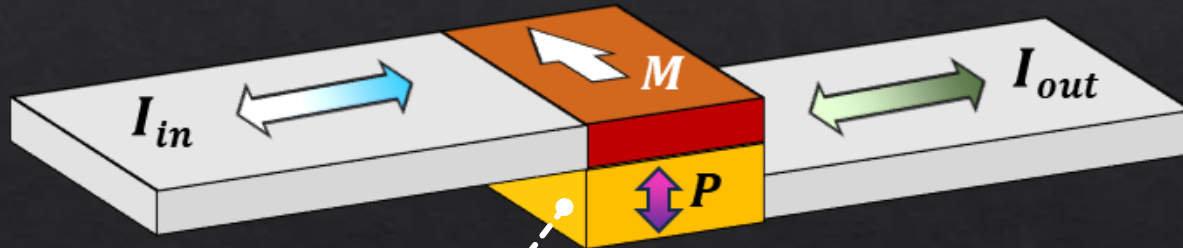
Paradigm shift?



The transistor of the future

FESO

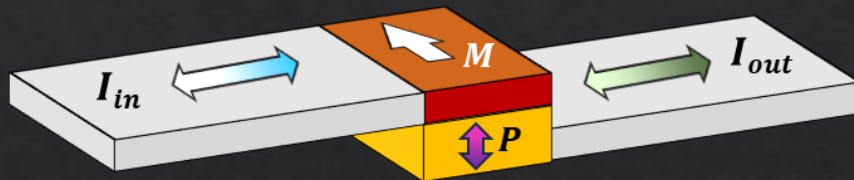
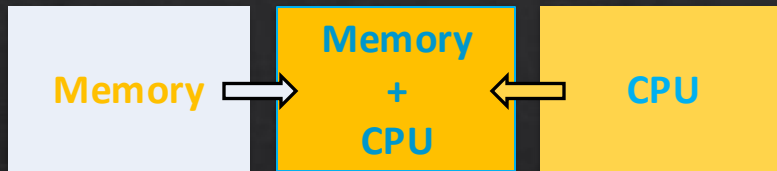
Ferroelectric spin-orbit logic



Germanium
Telluride

FESO

Ferroelectric spin-orbit logic



Patent
pending



MINIATURIZATION
+
**HIGH COMPUTING
POWER**



ENERGY EFFICIENCY

**30x BETTER
than CMOS**

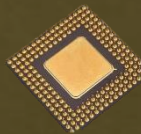


REDUCTION:
- **COSTS**
- **MATERIALS**

TAM

Transistor and memories

€600B/year (CAGR '24-'29: 10%)



SAM

Edge computing

€100B/year (CAGR '24-'29: 13%)

SOM

Neuromorphic computing in
wearable devices

€60B/year (CAGR '24-'29: 15%)

B2B licensing: €150M/year

AI HARDWARE
for:

Smartwatch

Smart glasses

Smart cameras

Wearable health
technologyStatista.com &
MordorIntelligence.comPossible
clients

nVIDIA

Roadmap



TRL 3

€30K

€50K

€300K

TRL 4

Patenting

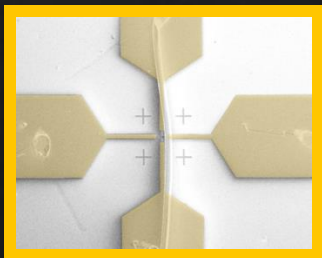
< 2022

2023

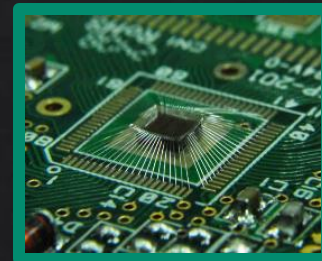
2024

2025

2026



Parallel project supported by
intel



Team

 **Federico Fagiani**
Post-doctoral researcher

CEO



 **Christian Rinaldi**
Associate professor

CTO



 **Giovanni Gandini**
Ph.D. student
Nano-fabrication



 **Giacomo Spaccia**
Research fellow


Electrical measurements

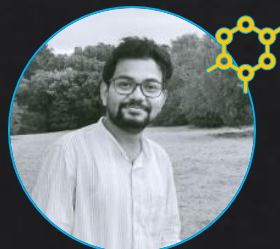


 **Daniela Tosca**
Management engineer

CMO



 **Anupam Jana**
Post-doctoral researcher
Material growth

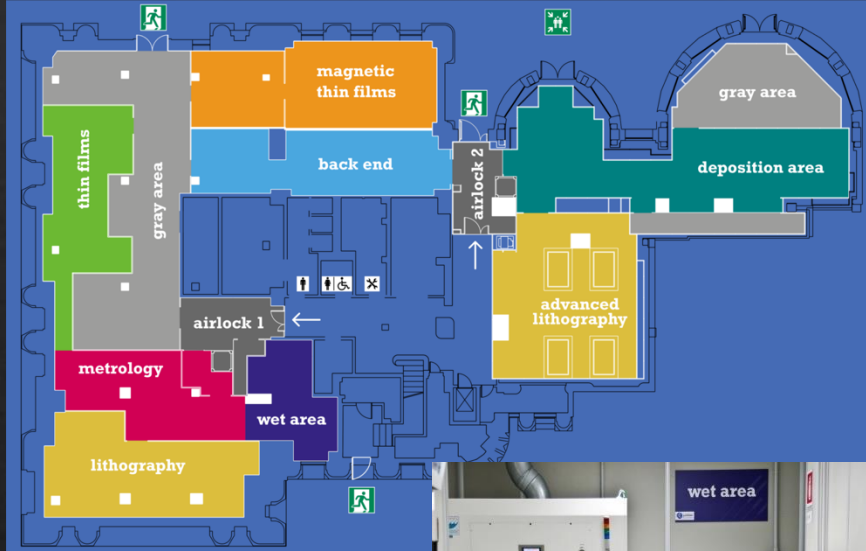


 **Matteo Cantoni**
Associate professor
SME – Material growth





polifab
POLITECNICO DI MILANO



*Epitaxial growth machine
for 2" wafers*

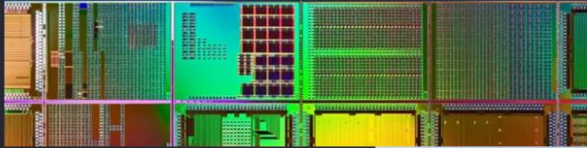


Advanced characterization

620 m² cleanroom

On the wave

Intel looks beyond CMOS to MESO



Source: VentureBeat



Source: Council of the EU

Huawei shrugs off US sanctions with fastest growth in four years

Revenue at Chinese telecom rose 10% as net profit more than doubles



Source: The Guardian Asia

TSMC wins \$6.6 bln US subsidy for Arizona chip production



Source: Reuters US



eFES



**A technological
revolution for a more
sustainable world**



eFES



LET'S CONNECT SOON!



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