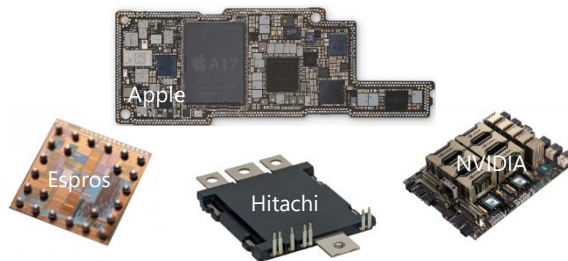


Chip FabLab – A Project for Switzerland

Event “lunch@metagon” on 23 October 2025 at the Prime Tower in Zürich

Dr. Lars Sommerhäuser (Empa)

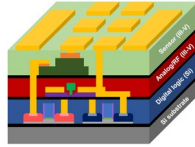
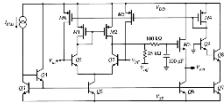
Without chips, our daily lives would come to a standstill



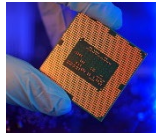
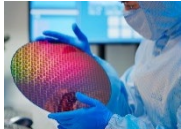
Chips and Microelectronics – Truly a Global Business

12 Steps – 10 Countries

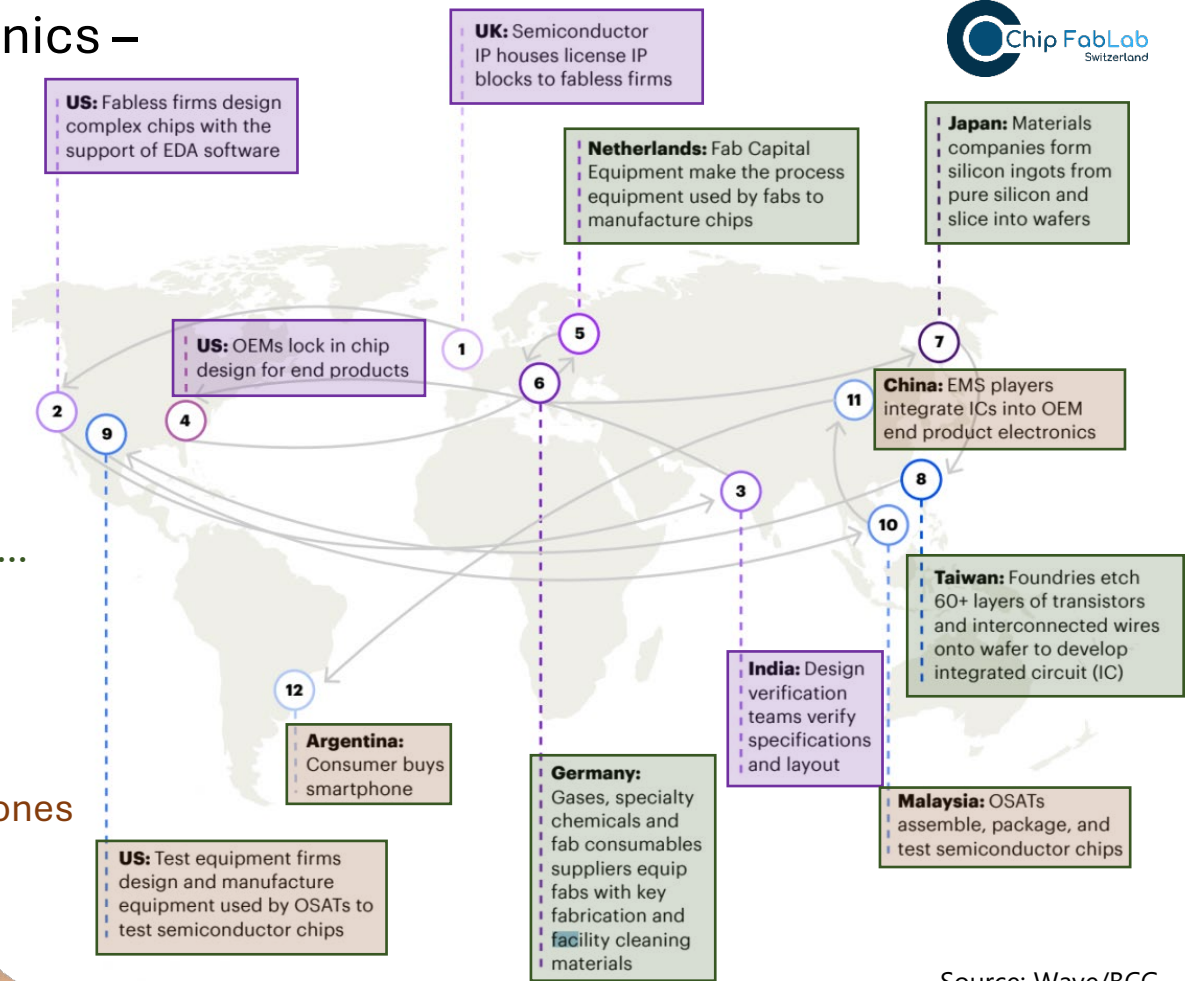
From IP blocks and chip design ...



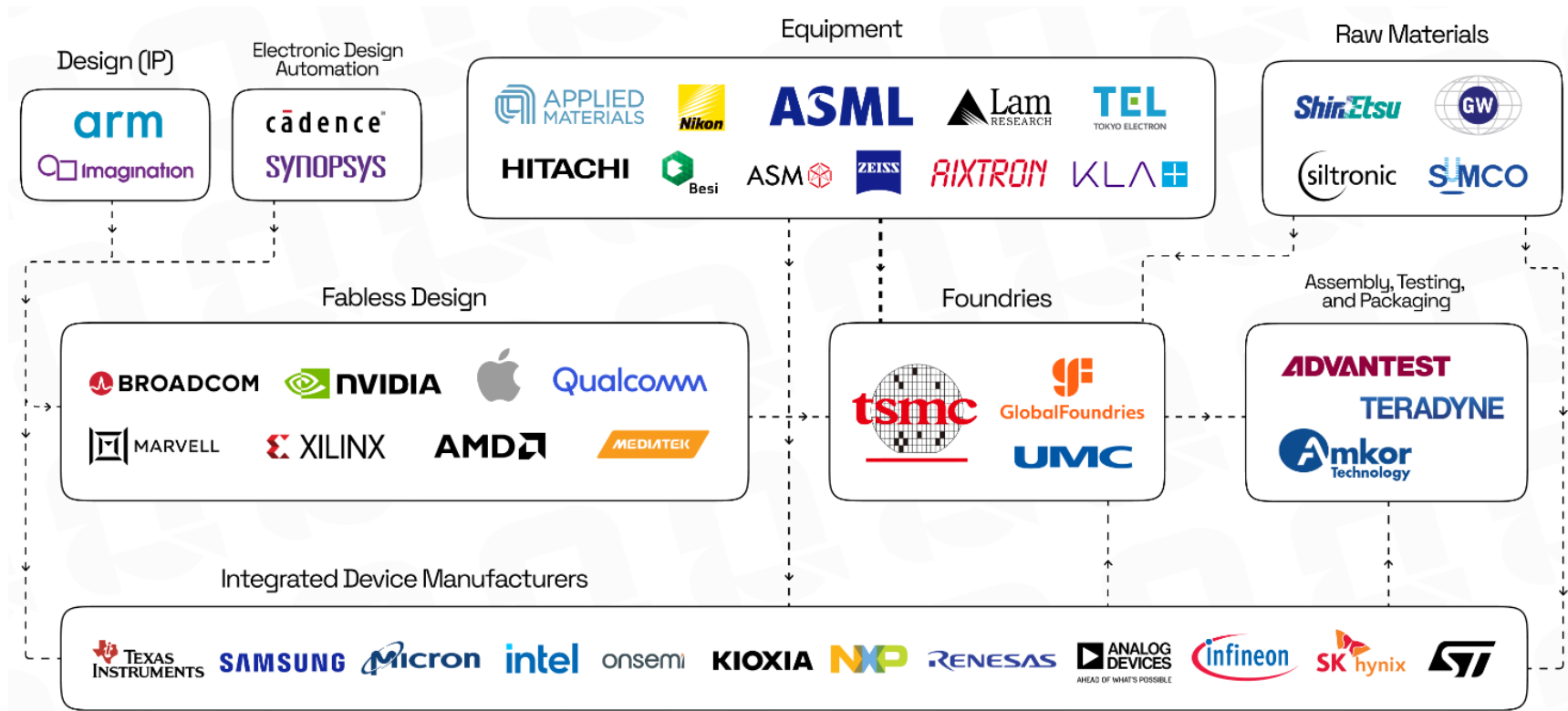
to fabrication of wafer and chips ...



to the assembly of chip sets / phones



Key Players in the Global Semiconductor Value Chain



Source: Quartr Insights

Make Switzerland one of the best places to develop and fabricate innovative semiconductor chips and modules for special applications in microelectronics, photonics and quantum technologies.

Chip FabLab – Project Overview

A Research, Development and Industrialization Platform for Switzerland



Key facts and figures

- National center to develop and fabricate semiconductor and photonics chips
- Non-profit limited company with partners from the public sector and industry
- Building with 4,000 m² of cleanroom and 7,000 m² of lab and office space at the Innovation Park Zürich (IPZ) in Dübendorf
- Operation of around 100 systems (CHF 129 million) for all steps from wafer to chip
- Services ranging from room rental and tool use to contract manufacturing (foundry services)





Communications

- Electrical and optical devices for signal processing and sensing, e.g. RF filters, THz modulators or detectors, or modules for RaDAR and LiDAR systems



Computing and Electronics

- Highly integrated chips for special applications, e.g. atomic clock chips for precision timing or ultra low power chips for watches and wearables



Power Electronics

- High power semiconductor devices in energy or mobility applications, e.g. SiC based inverters



Quantum Technologies

- Building blocks for quantum computing, communication and sensing, e.g. superconducting qubits



Sensors

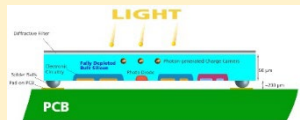
- Electronic or photonic devices for detecting chemical, biological or electromagnetic fields, e.g. contamination or humidity sensors

We are not aiming for the fabrication of mass manufactured logic or memory chips for personal computers or smartphones

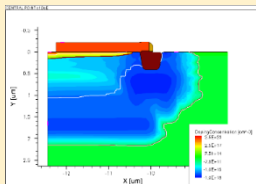
Technology Building Blocks, Components and Partners

Sensors – Monolithic CCD/CMOS Chips for LIDAR Modules

Technology Building Blocks



Fast backside illuminated imagers with 100% fill factor

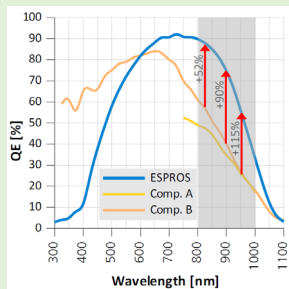


Monolithic CMOS/CCD mixed signal processing

Research Organizations

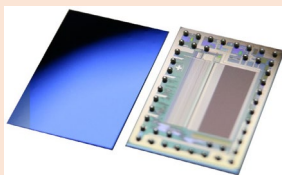
ETH zürich
EPFL

Technical Advantages



- Very high sensitivity
Quantum efficiency > 70%
Conversion gain 80 $\mu\text{V}/\text{e}^-$
- Ultra-high speed
Pixel speed < 6 ns FWHM
Time resolution = 10 ps
- High performance
CTE = 0.9995 @ 250 MHz
Up to 180 taps in pixel
8 M electrons stored / pixel

Components



TOF chips, line imager



TOF/LiDAR modules

Swiss Manufacturer



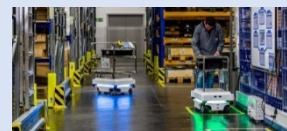
Applications



Autonomous vehicles



Mobile robots / drones



Automation / logistics



Medical imaging

Military/Security Relevance

High precision LIDAR chips and modules:

- Autonomous navigation of UAV/UGV (drones and robots)
- Surveillance and intrusion detection
- Detection of mines or explosive devices
- Mapping and terrain analysis
- Identify, range, and track targets, e.g. for drones/missiles

Seven Reasons for Switzerland to Build the Chip FabLab



Democratization through Access

Give smaller research groups, startups, and SMEs access to high-tech infrastructure and manufacturing know-how, thereby promoting the “democratization” of the semiconductor industry.

1



Innovation through Flexibility

Enabling the production of prototypes and small quantities of novel chip designs that require adjustments to manufacturing processes and deviate from standard mass production.

2



Enabling Industrialization / Preventing Relocation

Enabling startups and companies to industrialize their newly developed chips and modules in Switzerland, thereby preventing companies from relocating abroad.

3



Bringing Jobs and Value Creation Back to Switzerland

Giving Swiss companies the opportunity to have their chips manufactured entirely in Switzerland and to bring production—and thus jobs and value creation—back to Switzerland from abroad.

4



Reducing Risks in Security-Related Technologies

Enabling the development and manufacture of chips for security-related and military applications in Switzerland, thereby reducing risks associated with the use of foreign technologies and products.

5



Reducing Dependence / Strengthening Sovereignty

Reducing Switzerland's dependence on foreign suppliers by developing the capacity to develop, manufacture, and offer semiconductor technologies and products (in exchange).

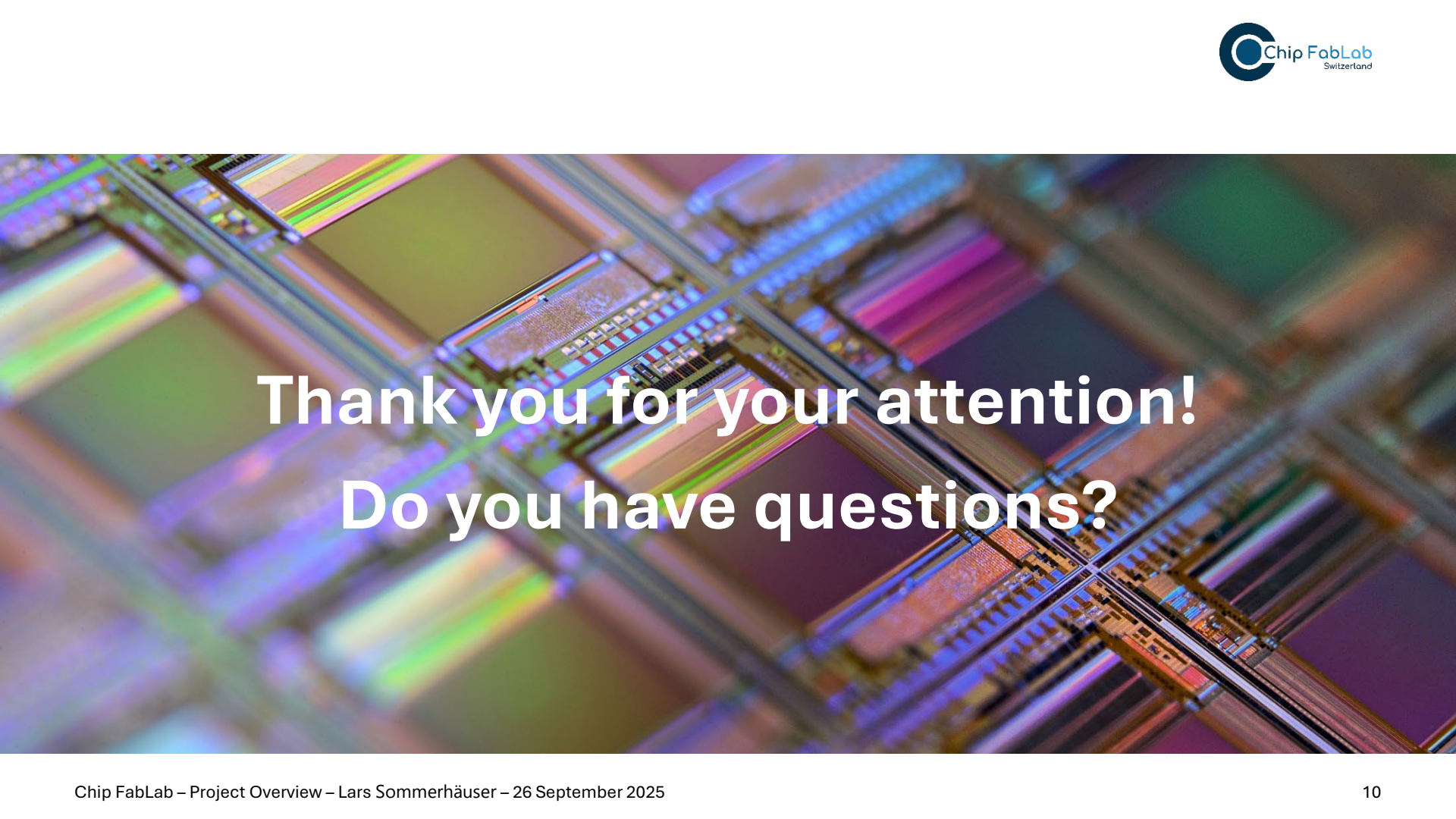
6



Improve Switzerland's Negotiating Position

Possess technologies and products that are important or irreplaceable for global supply chains in the semiconductor industry, thereby strengthening Switzerland's negotiating position with foreign partners.

7

A close-up, high-magnification photograph of a microchip, showing intricate circuitry and various colored regions (gold, blue, green, red) under bright light, creating a complex, geometric pattern.

Thank you for your attention!
Do you have questions?