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# Unprecedented Challenges and Opportunities Require Unprecedented Actions and Collaboration

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# SEMI Addressing Global Challenges



## Foundational

## Expanded Programs and Scope

## 2024 Priorities

**3,500 members worldwide (300+ in Europe)**

**Spanning the Electronics Design and Manufacturing Supply Chain**

**Driving Global Programs**

Thought Leadership

1,000+ Standards

Expositions/Conferences

EHS/ESG

Worldwide Offices

2,300+ Program Hours

170+ Tech Programs

20+ Tech Communities

Market Intelligence Reports

Strategic Tech Communities: ESDA, FOA, FlexTech, MSIG, SOIC

Tech partners: IMEC, Fraunhofer, CEA-Leti, IEEE, ITRI and AIST

Smart Initiatives

Think Tanks

**Talent Development, DEI & e-learning**

**Global Advocacy**

**Supply Chain Management**

**Sustainability**

CONNECT - COLLABORATE - INNOVATE - GROW - PROSPER

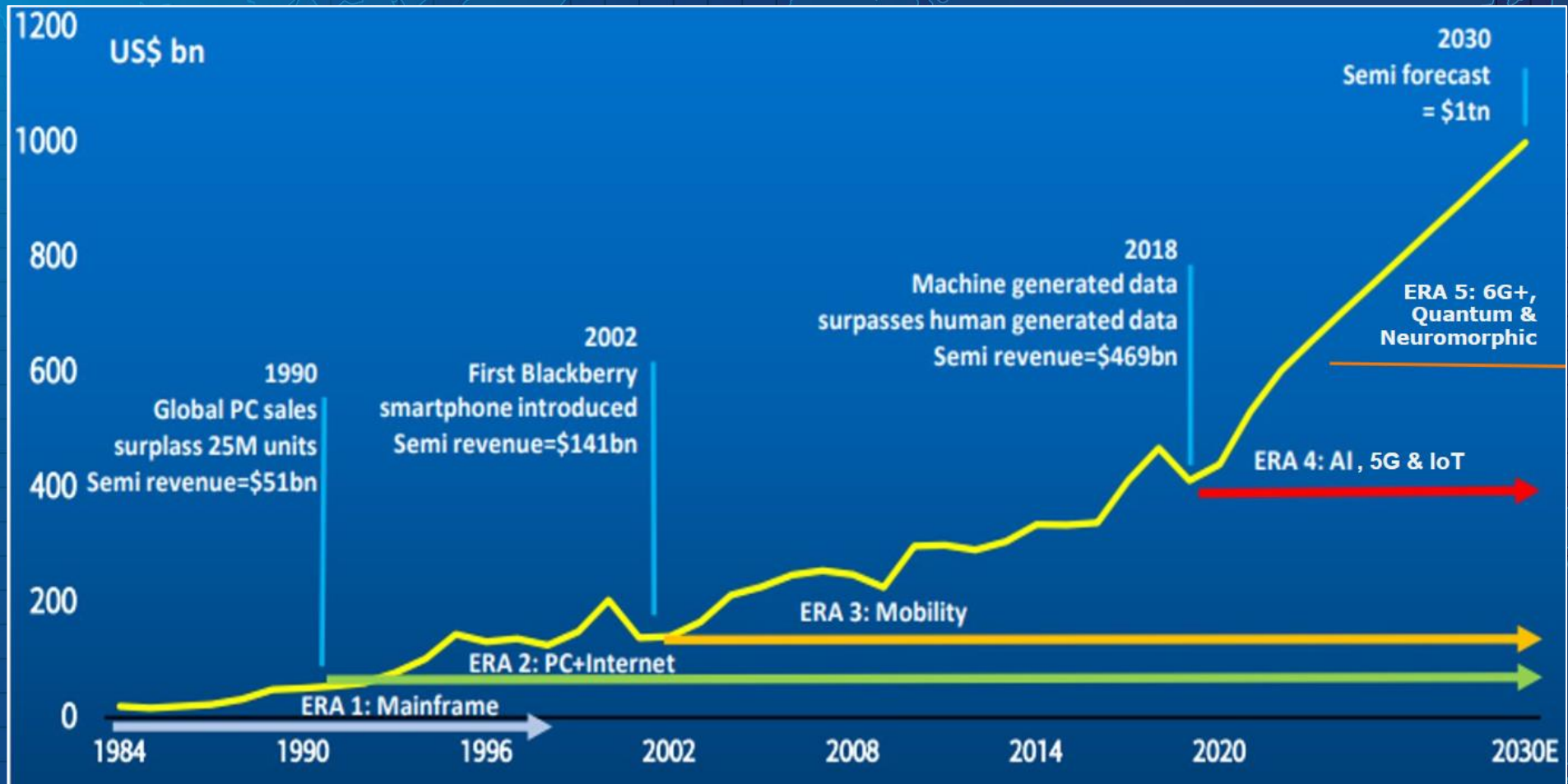


# SEMI: A Global Scope for a Global Industry



Regions	Locations
Americas	Milpitas, Washington DC
China	Shanghai
Europe	Berlin, Brussels
Japan	Tokyo
Korea	Seoul
India	Bangalore
Southeast Asia	Singapore
Taiwan	Hsinchu

# Industry Exponential Growth to \$1T



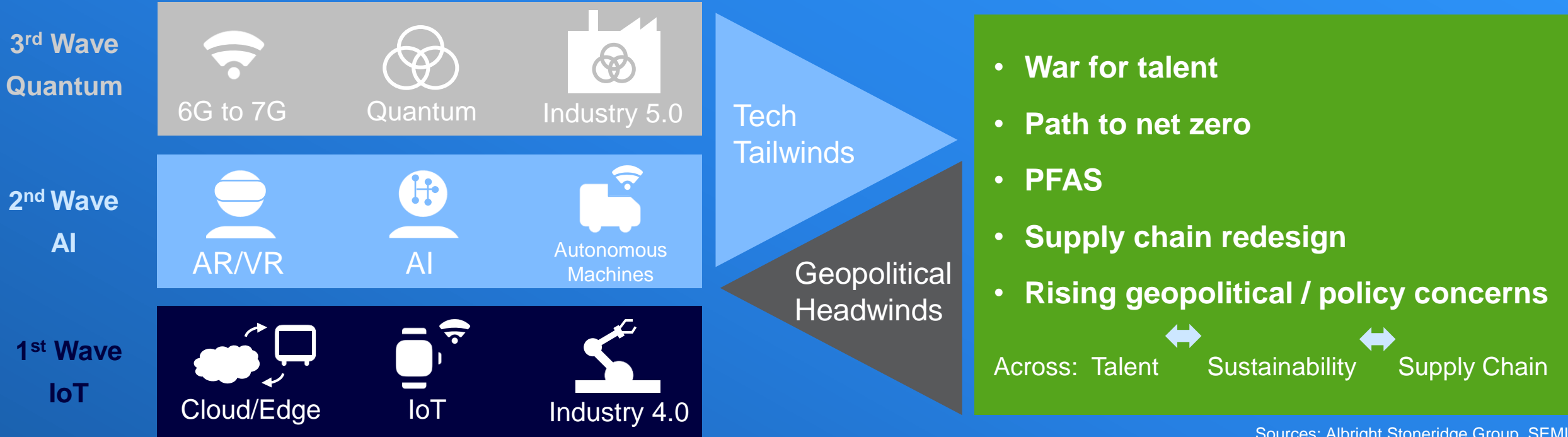
3<sup>rd</sup> Wave  
Quantum

2<sup>nd</sup> Wave  
AI

1<sup>st</sup> Wave  
IoT

# Unprecedented Challenges and Opportunities Require Unprecedented Actions and Collaboration

No single executive, company or country can address these challenges: We must collaborate.



Sources: Albright Stoneridge Group, SEMI

## Unprecedented Actions by SEMI

- **Comprehensive Workforce Development Program**
- **Semiconductor Climate Consortium and Energy Collaborative**
- **SEMI International Policy Summit (SIPS)** – A unique global platform driving alignment across the “quadruple helix” of Industry, Government, Academia, and Civil Society – Focus on Talent & Climate/PFAS

# SEMICON<sup>®</sup> INDIA

SEP 11 -13 , 2024  
GREATER NOIDA, DELHI



Total Attendees 10,994

On-Site registered Visitors  
(SEMICON) 5,180

Pre-registered Visitors  
(SEMICON) 3,646

Inaugural Attendees 2,168

Exhibitors 250+

Booths 650+

- 7 technical sessions
- 2 keynote tracks
- SEMI U tutorials
- Workforce Development Pavilion

## Semiconductor Executive Summit (SES)

September 10, 2024 in Delhi attracting 100+ top global CEOs and CxOs, senior government officials and academia

# Overcoming a Vortex of Global Risks

War for Talent

Geopolitical  
Volatility



Path to Net Zero

Supply Chain  
Redesign

**Urgency for a  
Public – Private  
Partnership**



**SIPS** SEMI  
INTERNATIONAL  
POLICY SUMMIT

SIPS is a unique platform strengthening global alignment on geopolitical concerns across industry, government, academia, and civil society

Policy Focuses: **Talent, Climate and PFAS Regulations**

**Next SIPS in Tokyo, Japan on December 10<sup>th</sup>, 2024  
(SEMICON Japan)**

# SEMI Europe: Talent and Skills

## EC Funded Projects



- Innovative VET Courses
- Image Campaign for VET and Microelectronics
- Network VET Stakeholders and Advise Policy



- Skills Intelligence in the Microelectronics Sector
- Innovative Online Learning Platform
- Long-term Plan, European Chips Skills Alliance



- Collaborative European Chips Skills Alliance
- Build **Online Learning Platform**
- Chips Skills Academy with **Summer Schools**



- Diversity Survey, Case Studies, Reports
- Online Learning Platform and Operational Tools
- Mentorship and Ambassador Programs



- Designing a **double-degree MsC** in Embedded Systems
- Higher education institutions from 5 countries in collaboration with SEMI
- Starting in June 2024

## SEMI Europe Initiatives

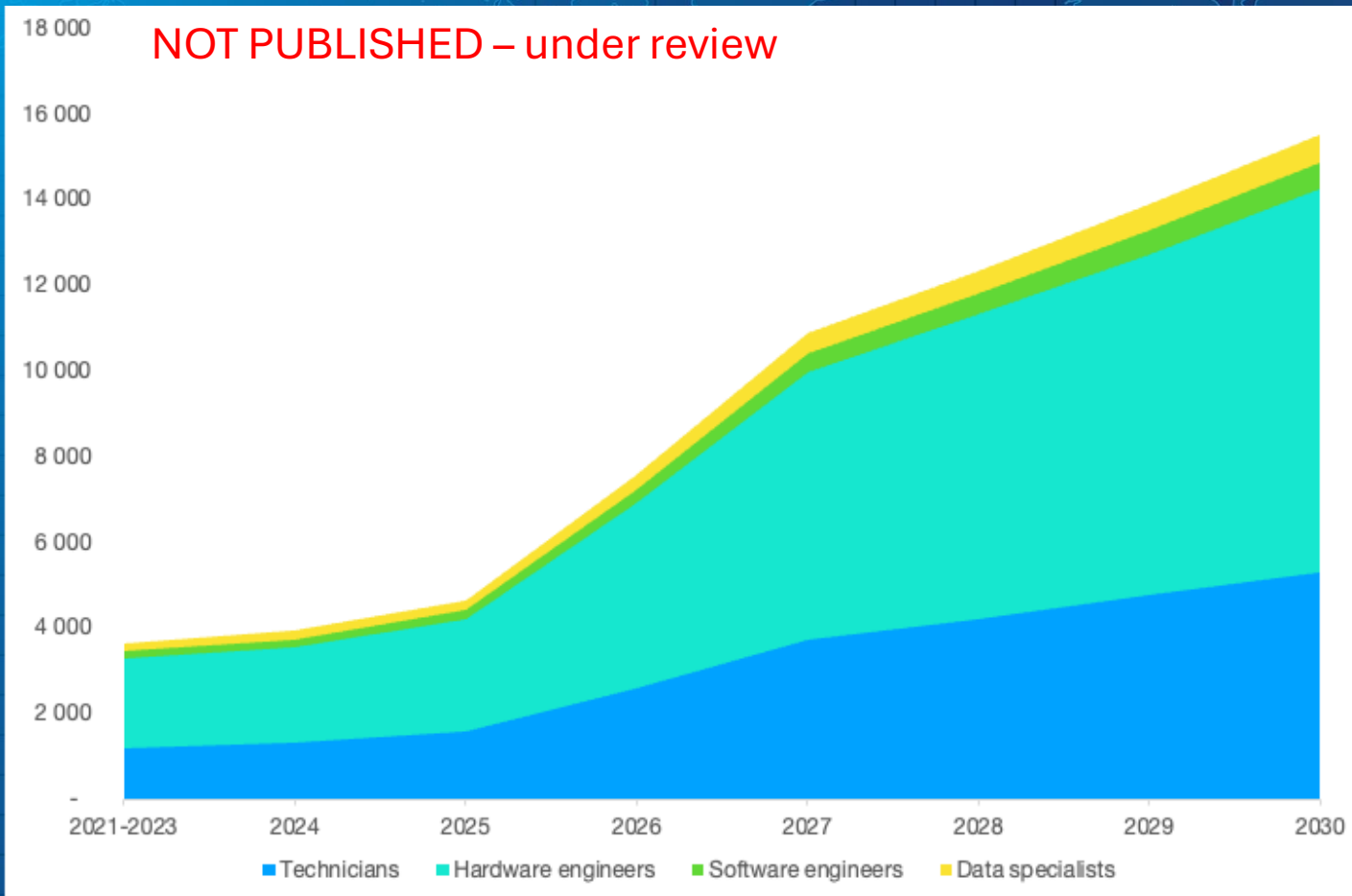
- SEMI ChipQuest Challenge
- **SEMI Talent Forum**
- P4S Gender Diversity Survey & Report
- Award, SEMI Beacon
- Award, SEMI Spark
- Podcast & Webinar Series
- Blog Article Series, Role Models & Rising Stars
- Blog Article Series, Inclusion & Workplace
- Event Video Testimonials

## SEMI HQ Initiatives in Europe

- 20 Under 30 Award
- **Careers Platform**
- SEMI High Tech U
- **SEMI University**
- Chip In Documentary Film



# Annual projected EU semiconductor workforce gap (2024-2030)



- 2021-2023: already facing a talent gap (3,700 jobs)
- 2024-2030 : annual talent gap projected to rise due to a surge in job openings (+5%/year) outpacing the growth in graduates (+1%/year)

# PFAS use by the Semiconductor Industry

Photolithography

Plasma-Etching

Removal of Photoresist

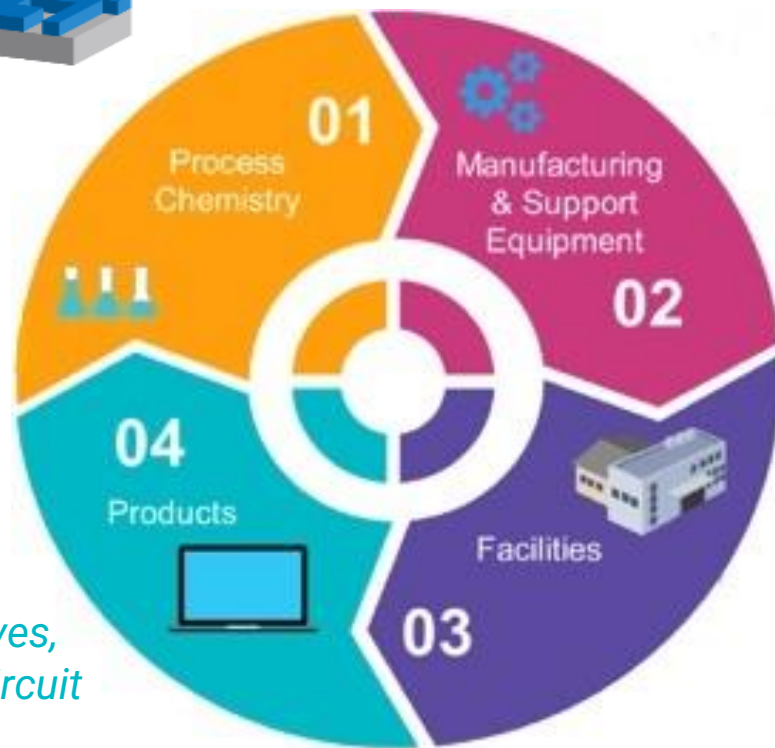
Resist  
Dielectric Material  
Silicon



**PFAS for Process Chemicals** (*Photoresists, Plasma Etching Gases and Chamber Cleaning*)



**PFAS in Articles** (*Semiconductor Products, Adhesives, Cables, Printed Circuit Boards*)



**PFAS for Manufacturing and Related Equipment** (*Heat Transfer Fluids and Fluoropolymers*)



**PFAS for Fabrication Facilities** (*Cooling and Heating Systems, Polymers in Infrastructure – Filters, Tubing, Linings and O-rings*)



**There are no scientifically known alternatives to PFAS for most applications in the semiconductor industry.**

# PFAS RESEARCH ROADMAP

## • PFAS RESEARCH ROADMAP

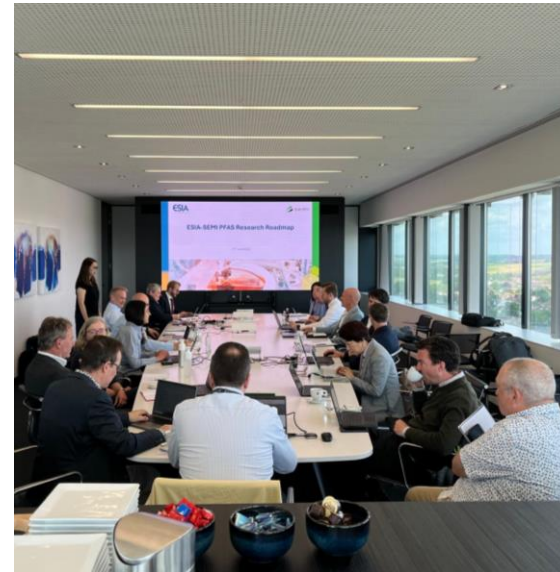
- Detection
- Abatement, capture and destruction
- Circularity and recycling
- PFAS-free alternatives (Articles, equipment and process chemicals)

## • 2 WORKSHOPS WITH THE EUROPEAN COMMISSION

- October 2023 and June 2024
- DG GROW, DG ENVI and DG CONNECT

## • GENESIS PROJECT PROPOSAL

- Research and Innovation Action (RIA) for sustainable manufacturing processes and PFAS-free alternatives
- Industry, academia, research organizations, think tanks and civil society



semi ESIA

**Key Findings from the SEMI – ESIA Survey**

**Technology Readiness Index**  
TRL 1-3: Fundamental research  
TRL 4-6: development phase  
TRL 7-9: Deployment phase

**Focus Area 1: Detection**

Issue and Guiding Questions	Research Priority	Research Duration (Months)	Research Budget	TRL
Establishing monitoring tools – real-time and inexpensive sensors – for all chemicals and emissions to air, water and waste. Need to establish accurate analytical tools and methods to effectively detect PFAS in production processes.	PFAS Monitoring for the Semiconductor Industry	10 years	10,000,000 EUR	TRL 1-3

**Focus Area 2: Abatement, Capture and Destruction**

Issue and Guiding Questions	Research Priority	Research Duration	Research Budget	TRL
Can filter membranes be used to capture PFAS contaminants before they exit a fab? Can the PFAS then be collected for destruction or in-situ destruction possible?	Advanced PFAS Abatement	2 years	500,000 EUR	TRL 1-3
The flow rate of the waste stream containing PFAS is relatively small and can be separated from the other wastewater stream. Heat PFAS treatments generate a large volume of clean water and small volumes of concentrated waste (solid, liquid or both). Our TRL 7 technology will be adjusted to fit the needs of the SEMI industry.	PFAS Destruction Technologies	2 years	1,000,000 EUR	TRL 2-7
Pilot use of POU capture and destruction of PFAS containing wastewater.	POU PFAS Capture and Destruction	2 or 3 years	250,000 EUR	TRL 1-3

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# EU R&D projects at SEMICON Europa TechARENA

- **SEMICON Europa** in Munich acts as a strong dissemination tool for EU funded projects
- Most influential event for electronics manufacturing in Europe with over **40,000** participants in 2023.
- Promotional material related to EU-projects are featured at the **TechARENA**
  - talks and panel discussions related to the latest innovations and pressing industry issues

**SEMICON<sup>®</sup>  
EUROPA**

**SEMICON Europa  
2024**

November 12-15, 2024

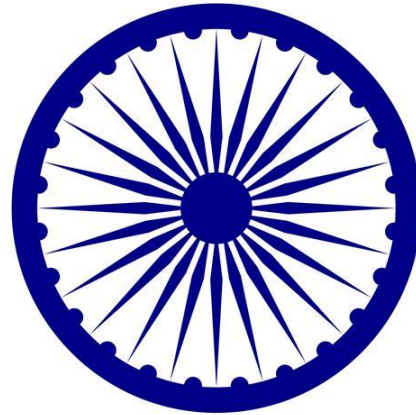
Messe München, München, Germany



## Priorities for global Actions and Collaboration - to be underpinned by research -

- Path to net zero
- PFAS
- Supply chain redesign
- Rising geopolitical / policy concerns
- War for talent

# Opportunities



# for Collaboration

## Specific Collaboration opportunities with on-going SEMI Europe initiatives

- Global dissemination of EU Research projects (e.g. SEMICON Europa – SEMICON India)
- Collaboration on PFAS Research roadmap
- Collaboration on Talent initiatives such as summer schools etc.



THANK YOU



EU – INDIA – Joint Researchers Workshop on Semiconductors

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[www.icos-semiconductors.eu](http://www.icos-semiconductors.eu)

STRONGER  
TOGETHER

November 12 - 15, 2024

**INNOVATION AND  
COLLABORATION:  
POWERING SUSTAINABLE  
EXPONENTIAL GROWTH**