



**SWTEST**

PROBE TODAY, FOR TOMORROW

2025 CONFERENCE

# Welcome to 34<sup>th</sup> SWTest 2025 Conference and EXPO in Carlsbad, CA

**Jerry Broz, PhD**  
**SWTest General Chair**

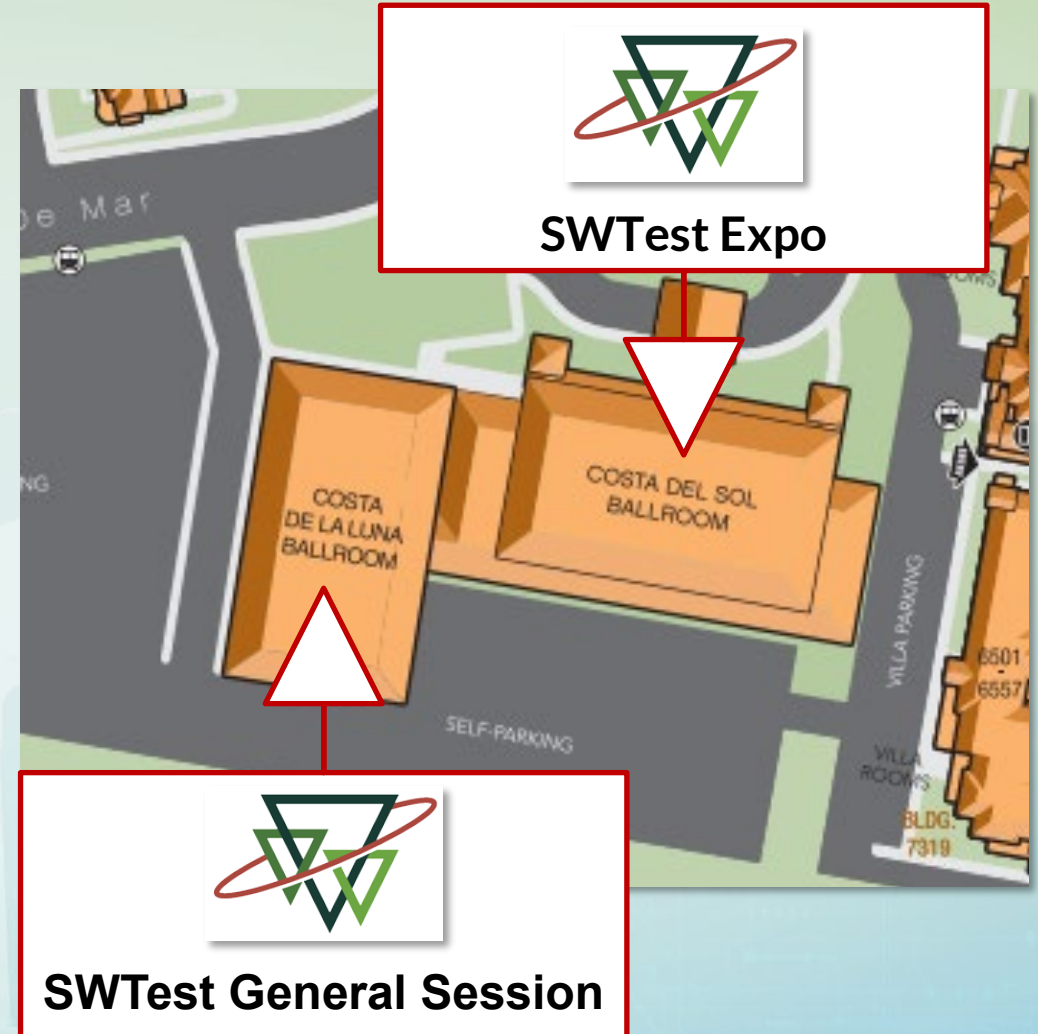
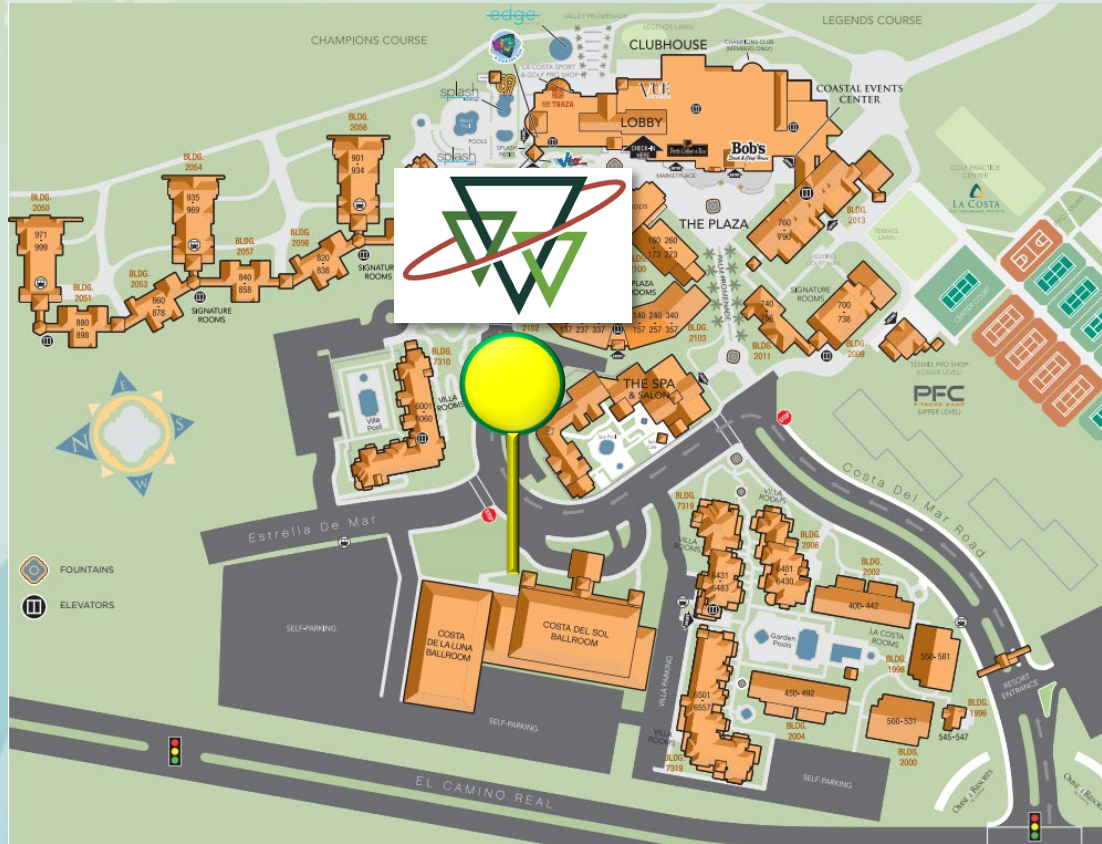
# Welcome to SWTest Conference and EXPO June 3 to 5, 2025

Omni - La Costa, Carlsbad, CA





# SWTest 2025 Property Map



# SWTest 2025 eProceedings Download

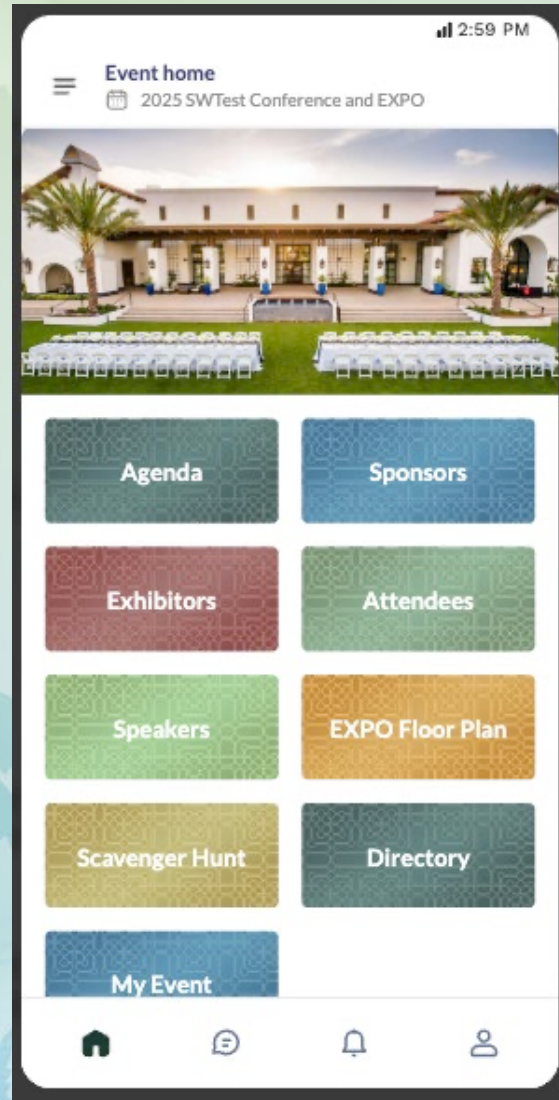


Password for Monday = newport  
Password for Tuesday =  
Password for Wednesday =

- Each day of the conference will be available in an e-Version for download in a password protected file.
  - Network (SSID) = SWTest Conference
  - Session and Expo WiFi Password = swtest2025
  - Download at = <https://www.swtest.org/>
- Free WiFi access will be available during the entire conference to allow attendee access to the downloads.
- Daily passwords to the download files will be announced throughout each day, respectively.
- Non-password locked files will be made available in the SWTest Archives after the conference adjourns.



# SWTest Conference Mobile App



Download mobile app from respective online stores and enter your registered email.

- Up-to-the-minute Event Info
- Connect with the Sponsors and Exhibitors
- Program Schedule in the Auditorium
- View Exhibitor and Sponsor Videos
- Read the Literature from the Exhibitors
- Connect with Attendees that have “opted-in”
- Check out the Job Board Postings

**Cast your votes for the  
People’s Choice Award !**

# SWTest San Diego and SWTest Asia



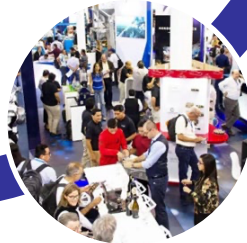
**40 Years of Combined  
Probe Technology**



**12,000+ Attendees have  
participated from 60+ Countries**



**1,000+ Technical Podium  
and Poster Presentations**



**Repeat Multinational Sponsors  
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# SWTest San Diego Team

- **SWTest Executive Team**

- Jerry Broz, PhD, General Chair and Sr. Member IEEE
- Patrick Mui, San Diego Program Co-Chair
- Rey Rincon, Operations Chair
- Maddie Harwood, Finance Chair & Conference Mgmt.

**SWTest is organized, coordinated, and executed through the efforts of your colleagues.**

- **Technical Program & Steering Committee**

- John Caldwell, MEC (US)
- Geert Gouwy, imec (Belgium)
- Alistair Laing, Micron Technology (US)
- Clark Lui, TMJC (Taiwan)
- Muru Meyyappan, Enfabrica (US)
- Mark Ojeda, Infineon (US)
- Kenny Tang, TSMC (Taiwan)
- Raffaele Vallauri, Technoprobe (Italy)
- Joey Wu, consultant (Taiwan)

- **Steering Committee**

- Davide Appello, Technoprobe (Italy)
- Karen Armendariz, Celadon (US)
- Michael Huebner, PhD, Formfactor GmbH (Germany)
- Nobuhiro Kawamata Formfactor KK (Japan)
- BC Kim, Samsung (Korea)
- JY Kim, TSE (Korea)
- Karan Maniar, AEM (US)
- Joey Wu, consultant (Taiwan)
- Andrew Yick, PhD, Marvell (US)



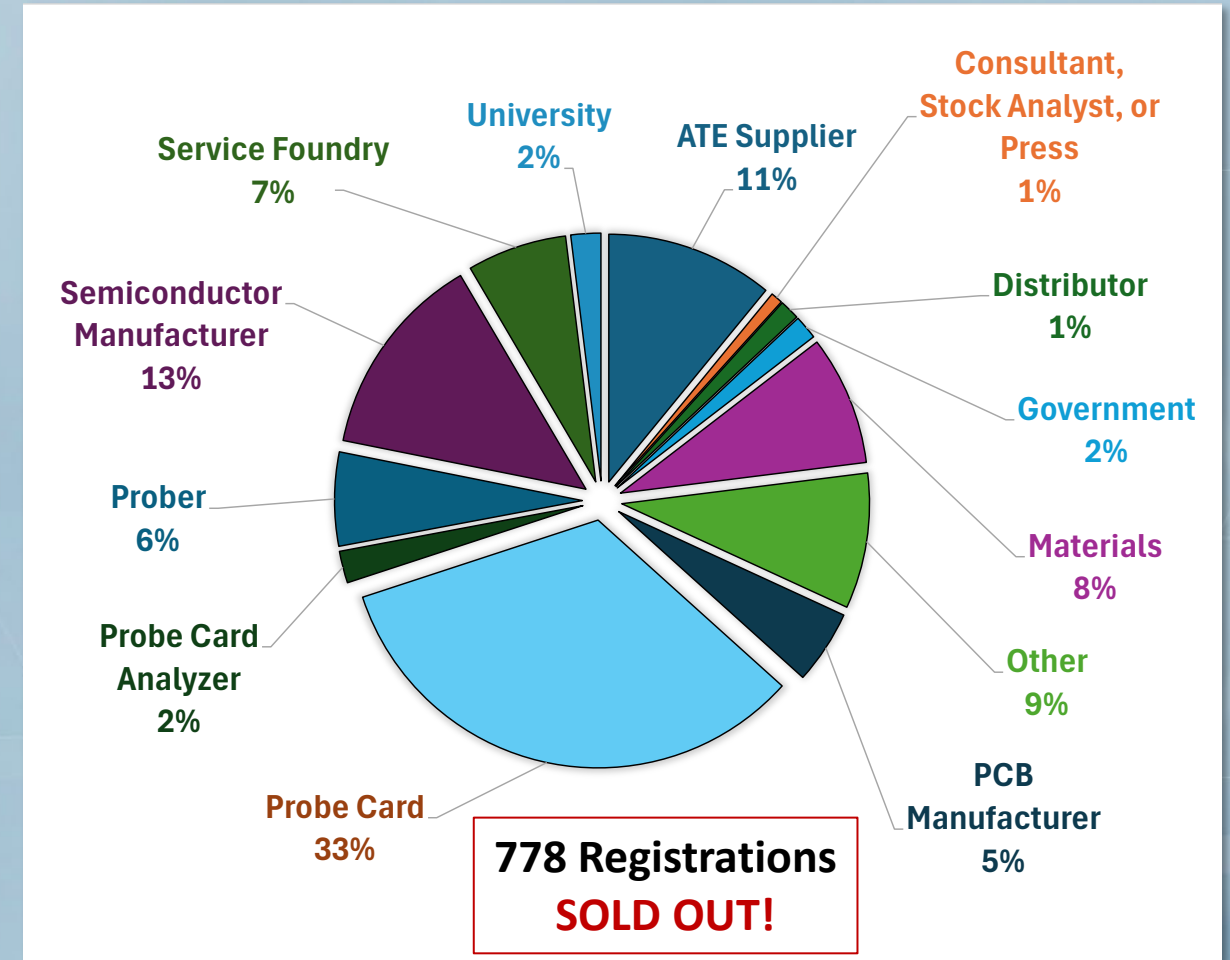
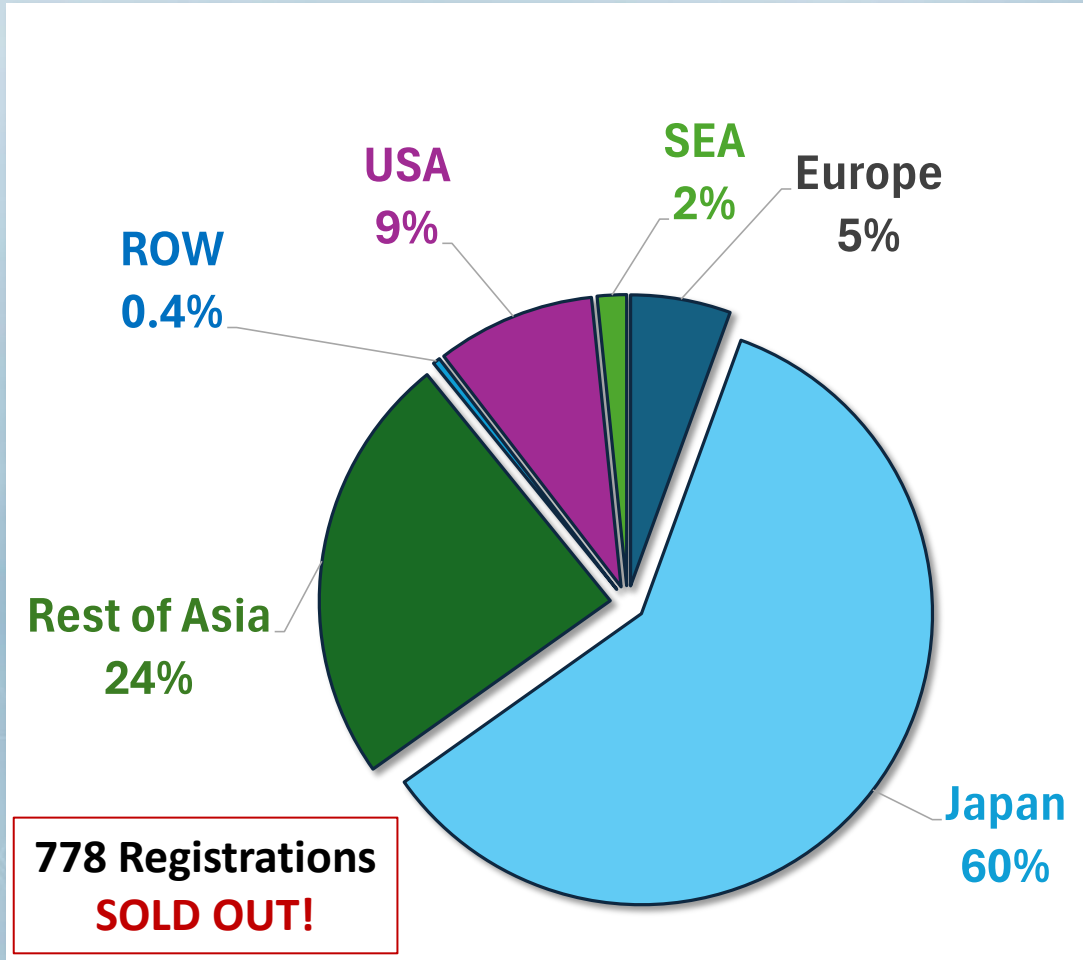
# SWTest Asia 2024

## SOLD OUT - 778 Attendees





# SWTest Asia 2024 – 778 Attendees!



# SWTest Asia 2025 | Fukuoka, Japan

- **Schedule : November 20 - 22, 2025**
- **Location : Hilton Fukuoka Sea Hawk**

- **Conference Day 1 (Nov. 20, 2025)**

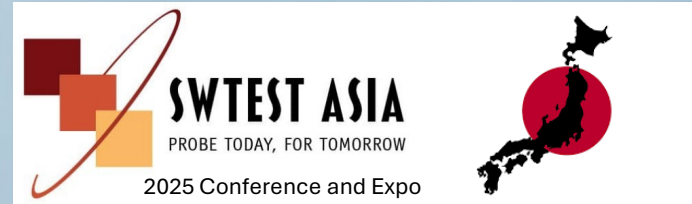
- Opening and Visionary Keynote
- Podium Sessions & Poster Sessions
- Key Supplier Expo
- Platinum Sponsor Tech-Showcase
- Networking Event in Expo Hall

- **Conference Day 2 (Nov. 21, 2025)**

- Opening and Industry Vision Speaker
- Podium Sessions & Poster Sessions
- Key Supplier Expo
- Platinum Sponsor Tech-Showcase
- Networking Event

- **Charity Golf Tournament and Networking Day 3 (Nov. 22, 2025)**

- Benefit Golf Tournament to support student participation.



**Abstract Submission is Open**

**Deadline: July 25, 2025**





# Phishing for SWTest Mailing List and Third-Party Hotel Reservations

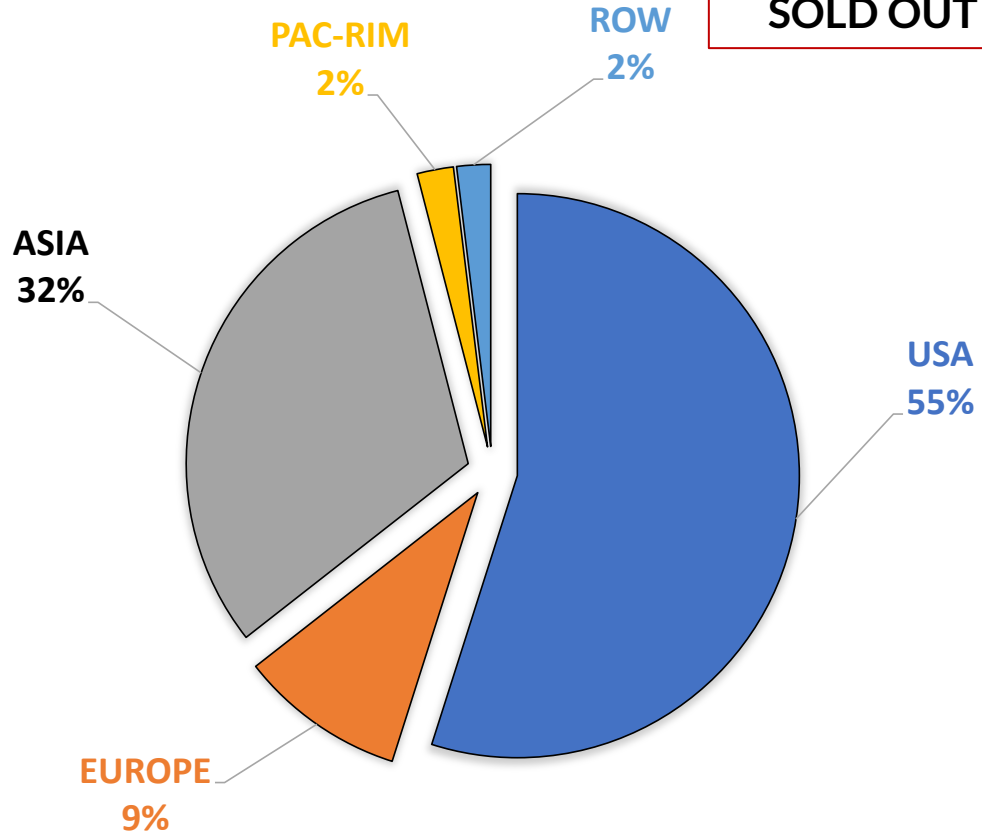


- **ALL attendee information provided to SWTest and SWTest Asia is safe, kept confidential, and never sold.**
- **Attendees must “opt-in” for sharing their contact information through the conference Mobile App**
- **Attendee details are not made available to anyone without permission.**
- **SWTest works directly with the hotel and DOES NOT use third-party hotel brokers.**

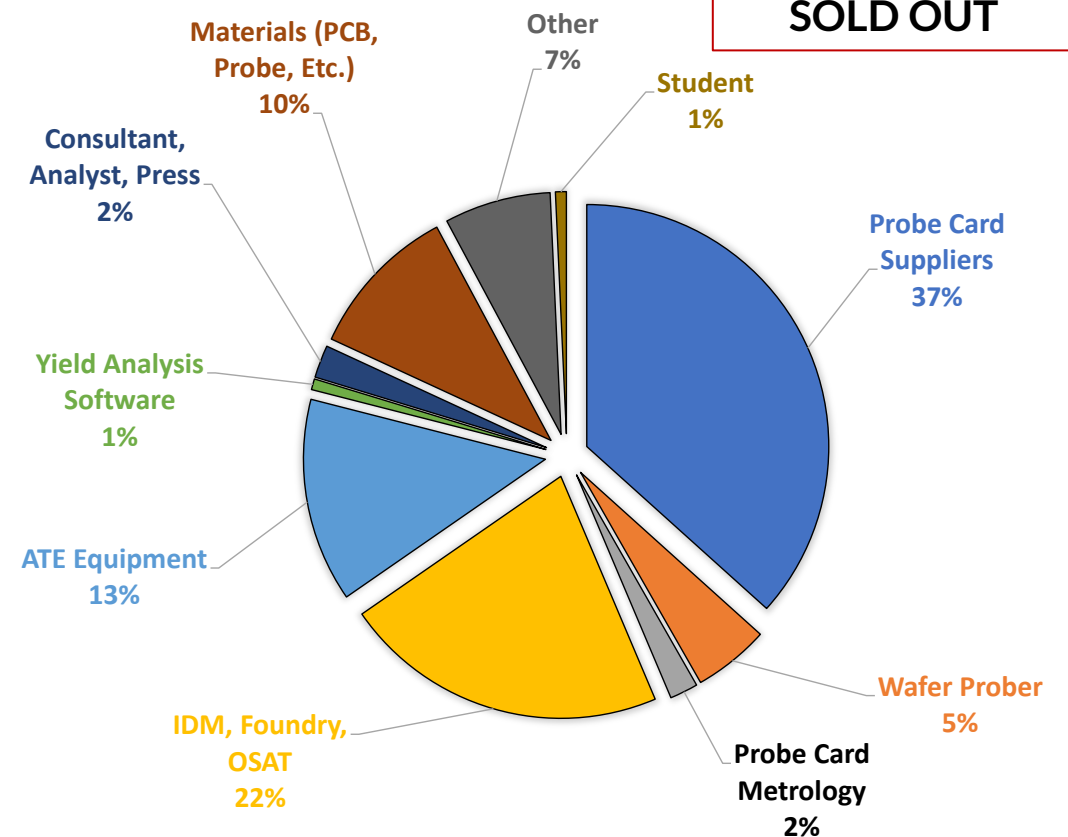
# Never have and never will !

# SWTest 2025 Participation

689 Registered  
SOLD OUT



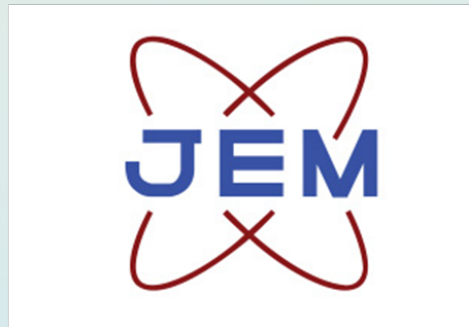
689 Registered  
SOLD OUT



**Over 65% of Presentations have International Authors !**



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# Thanks to Our Gold Sponsors



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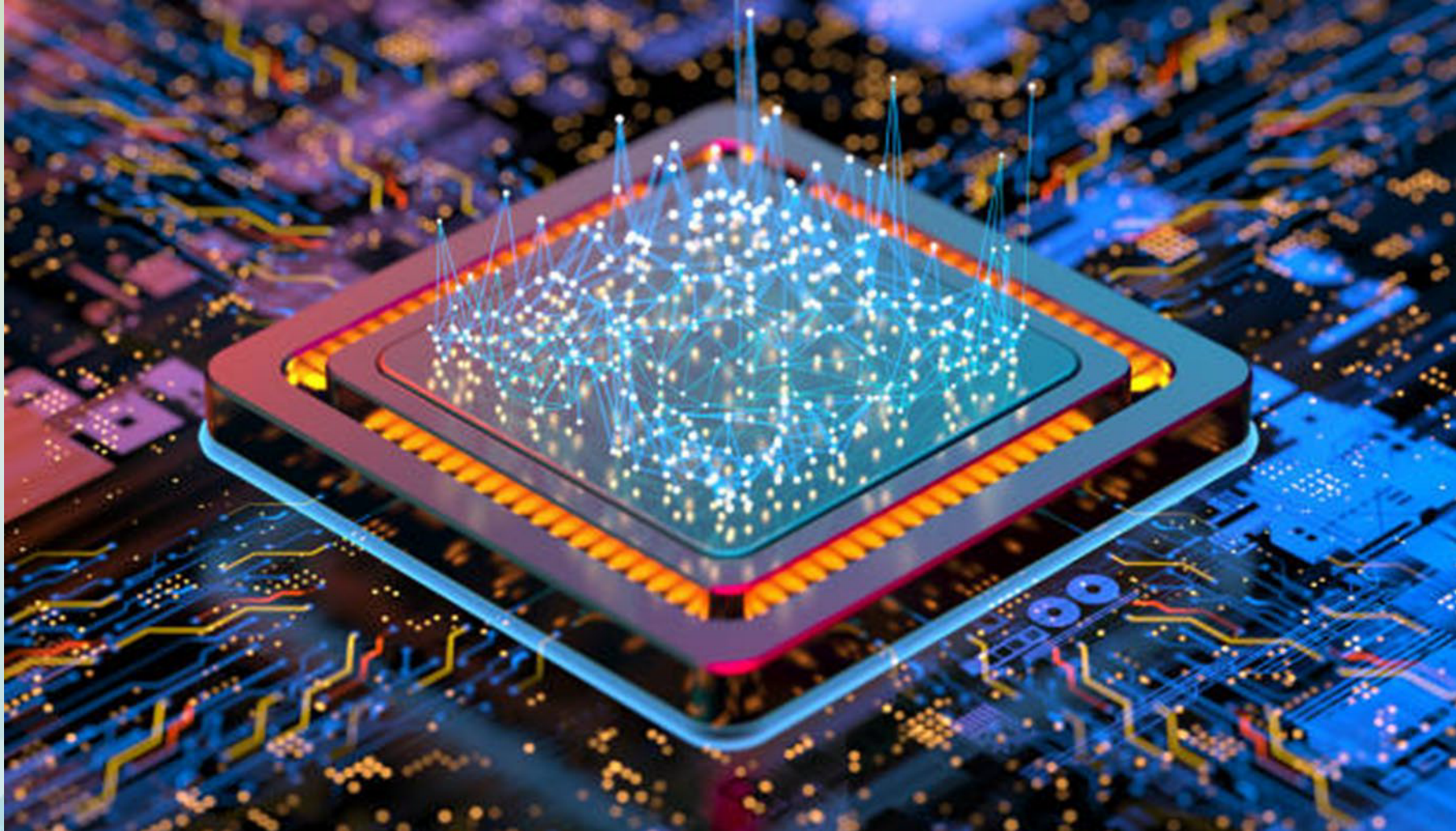
**T. I. P. S.**  
Technical Innovation – Physical Solutions



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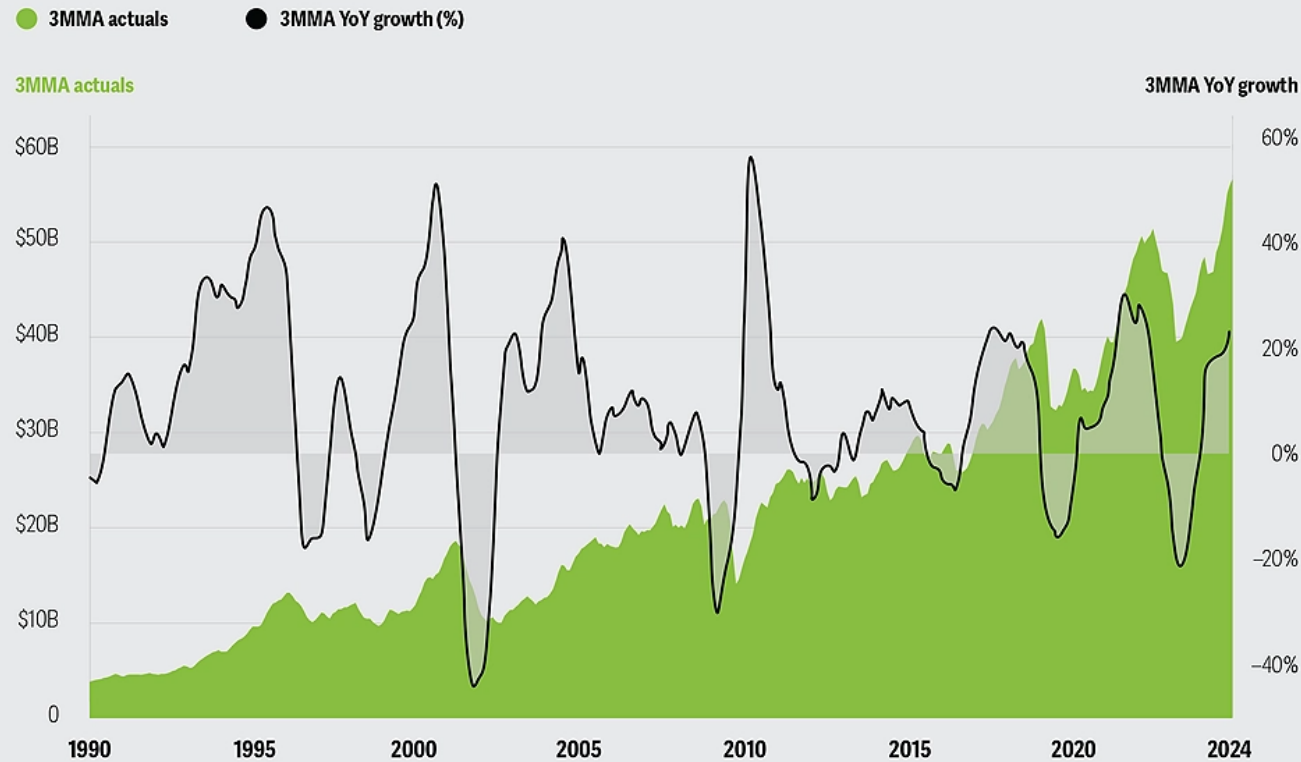
# Semiconductor Landscape





# Semiconductor Is Notoriously Cyclical

Global semiconductor industry—historic billings monthly



Note: 3MMA = Three-month moving average; the average YoY growth during this period was 10.5%.  
Source: World Semiconductor Trade Statistics Historical billings report as of October 2024.

Deloitte | [deloitte.com/us/en/insights/research-centers/center-for-technology-media-telecommunications.html](https://deloitte.com/us/en/insights/research-centers/center-for-technology-media-telecommunications.html)

## Factors in play:

- **AI/HPC Demand:** AI chip sales are projected to surpass \$150 billion in 2025. HBM revenue for AI workloads is expected to see a 58% CAGR (2022-2028), with new HBM4 introduced in H2 2025.
- **Advanced Technology & Packaging:** 2025 is critical for 2nm technology, with all major IDMs entering mass production. Advanced node capacity is projected to rise by 12%.
- **Global Talent Shortage:** One million additional skilled workers worldwide by 2030.
- **Supply Chain Risks:** Global companies plan to invest approximately \$1 trillion in new fabrication plants through 2030.
- **Rising Costs & Sustainability:** Global R&D spending is projected to exceed \$300 billion by 2030.

# Consumer Demand

## Data Cloud and AI

High-Capacity Storage, and HPC growing from 5 Zettabytes to > 40 Zettabytes

## 5G and Massive Connectivity

More than 1.1 billion smart-device and high-volume connections

## Smart Devices

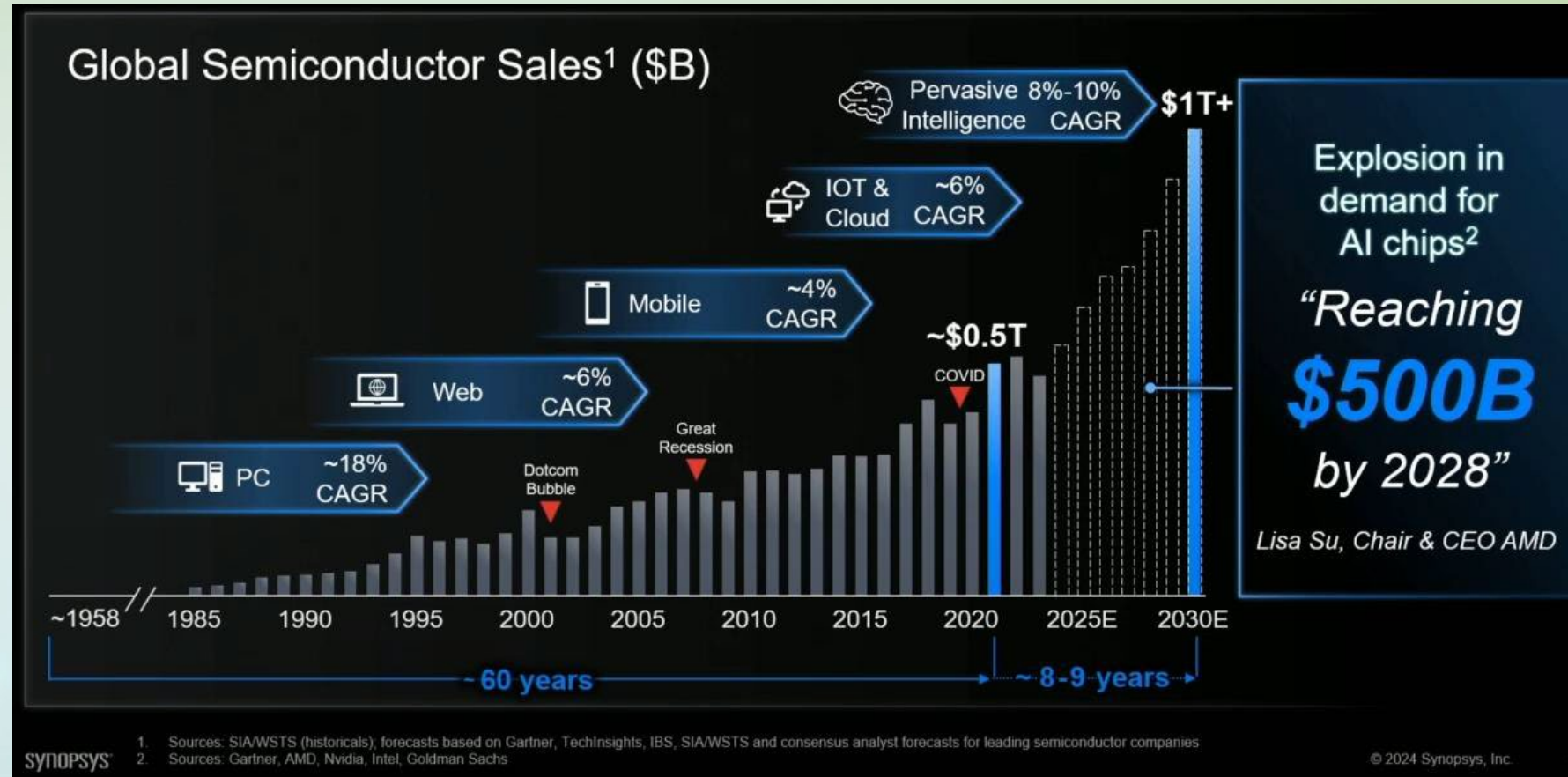
More than 250 million wearables and high-performance devices

## Internet of Things

50B connected devices of low-cost devices and massive data volumes

## Automotive Electronics

89 million connected cars each generating and processing > 1GB of data per second



Process Everything | Store More Data | Compute Faster

# Key Semiconductor End Markets

## Semiconductor share of bill of materials (BOM)

End market: ■ Computing and data storage ■ Wireless communications ■ Consumer electronics ■ Automotive electronics

Example key products	Semiconductor share of total BOM, %	Semiconductor end market by sales, 2024, \$ billion	Share of total (\$677 billion)
Solid-state drives	90	35	5%
Data center server rack	81	166	24%
Notebook PCs	59	51	8%
High-tier smartphones	60	79	12%
Media tablets	58	19	3%
Other smartphones	55	50	7%
Video game consoles	70	46	7%
LCD displays	26		
Electric vehicles	6	76 <sup>1</sup>	11%
Internal combustion engine vehicles	5		

<sup>1</sup>Based on automotive electronics and not automotive sales.  
Source: UN Comtrade Database, 2023 imports; McKinsey analysis

### Memory Segment Growth:

- Surge of over 24%, driven by increasing penetration of high-end products like HBM3 and HBM3e.

### Non-Memory Segment Growth:

- Projected to grow 13% due to demand for advanced node ICs in AI servers, high-end mobile phones, and WiFi7.

### Data Center Growth:

- Data centers, particularly for AI workloads, with demand for GPUs, HBM, SSDs, and NAND.

### AI Acceleration:

- AI accelerators are expected to contribute significantly to revenue growth, with mid-40% CAGR for this segment.

### Automotive:

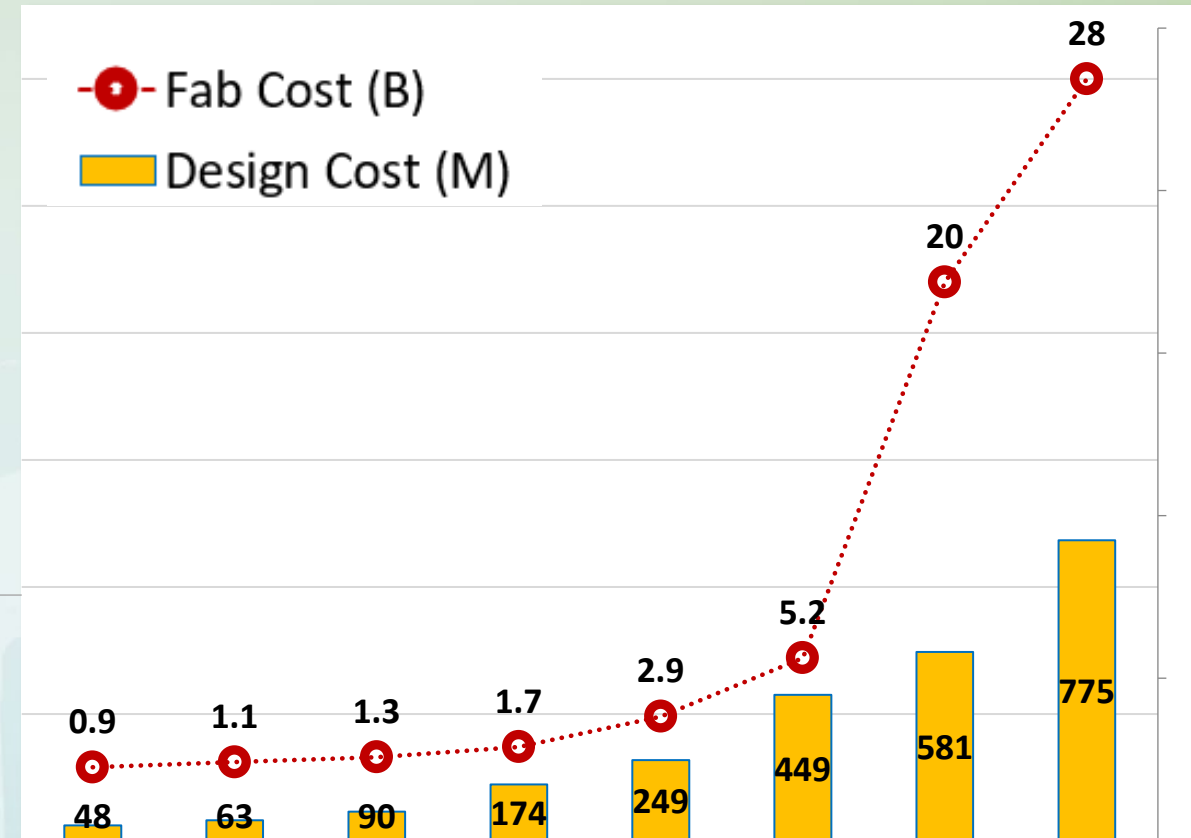
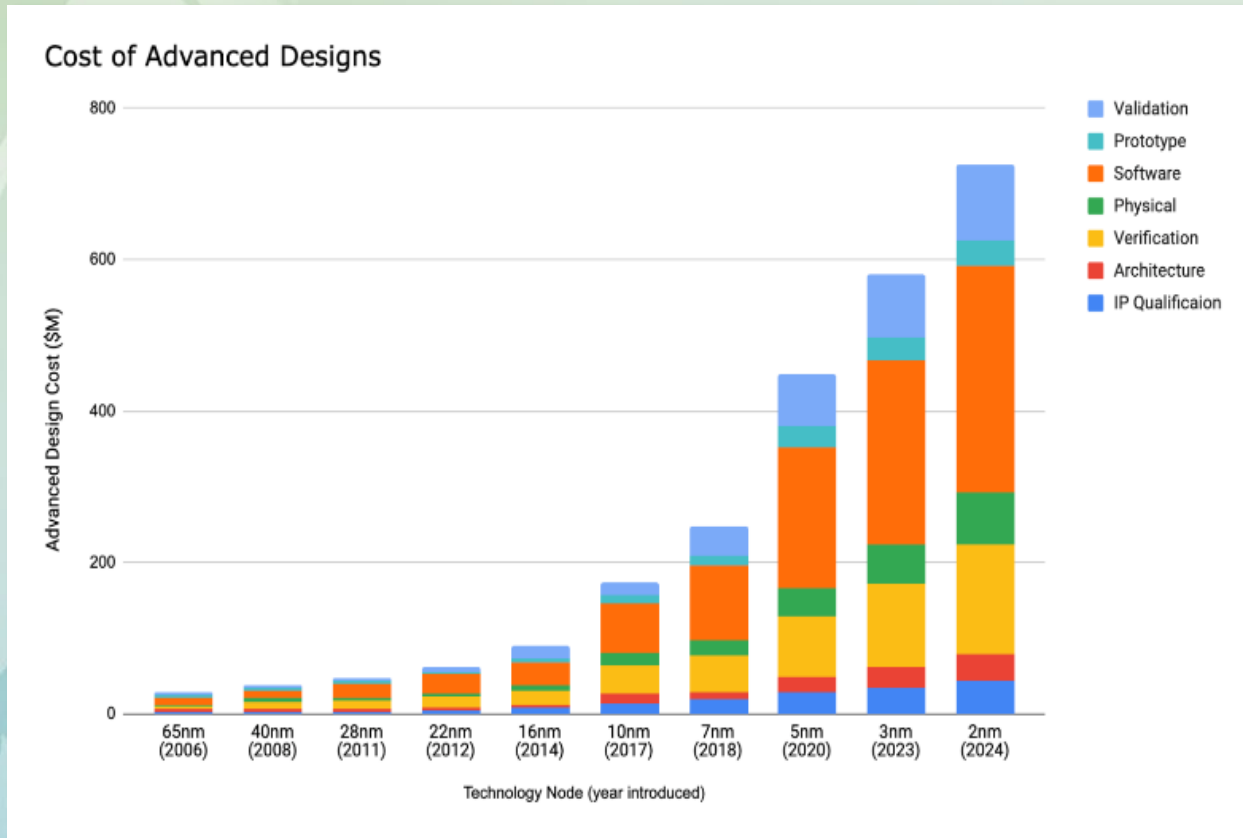
- Demand for advanced driver-assistance systems (ADAS), electric vehicles (EVs), and connected cars for a 9.8% CAGR.

## Overall BOM Growth

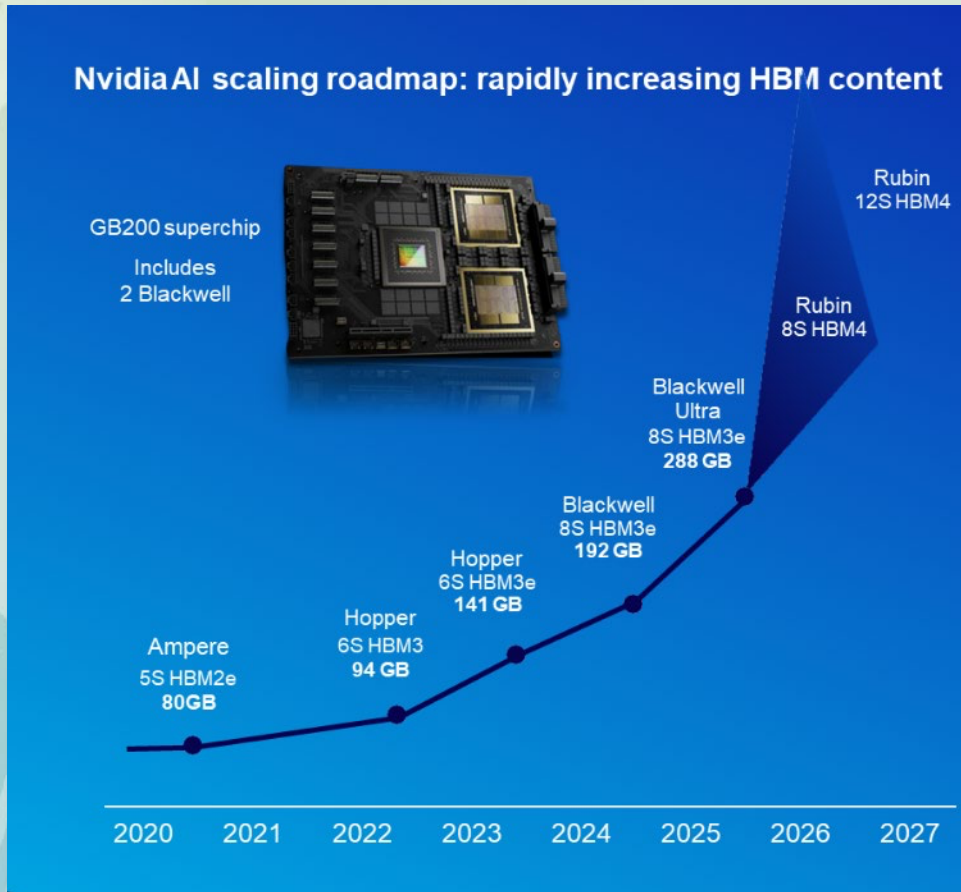
Market is expected to grow by 15% in 2025.



# Escalating Costs of Innovation



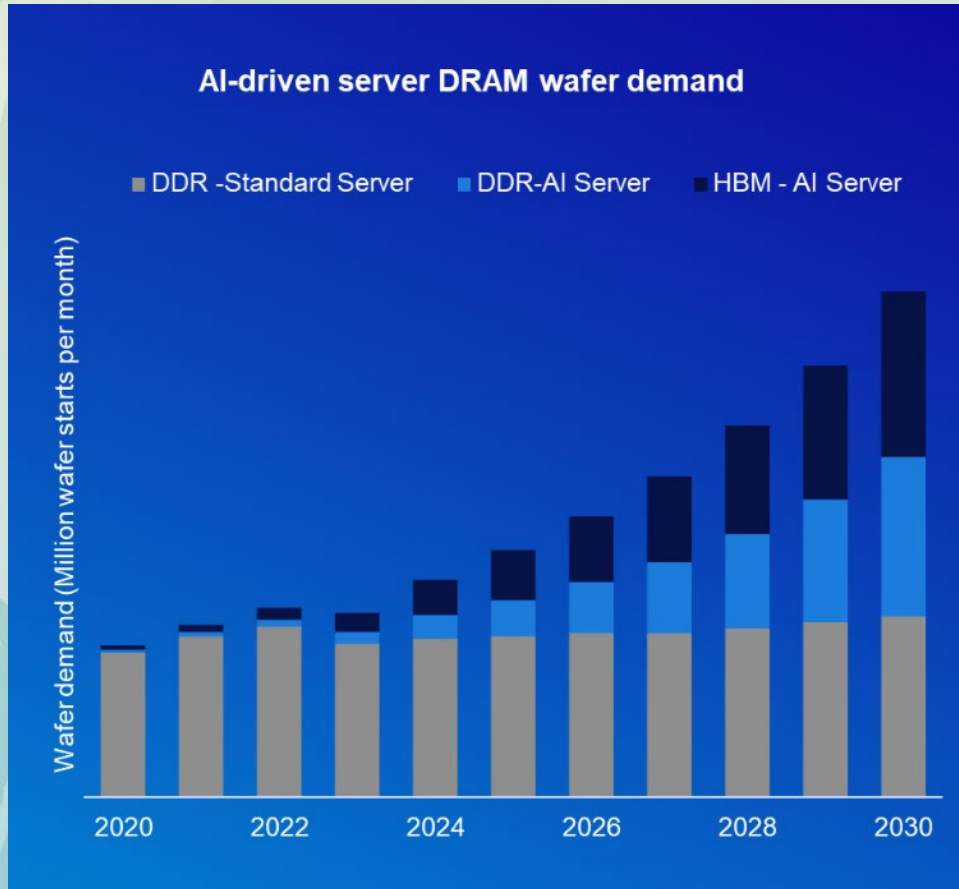
# Demand for HBM & AI



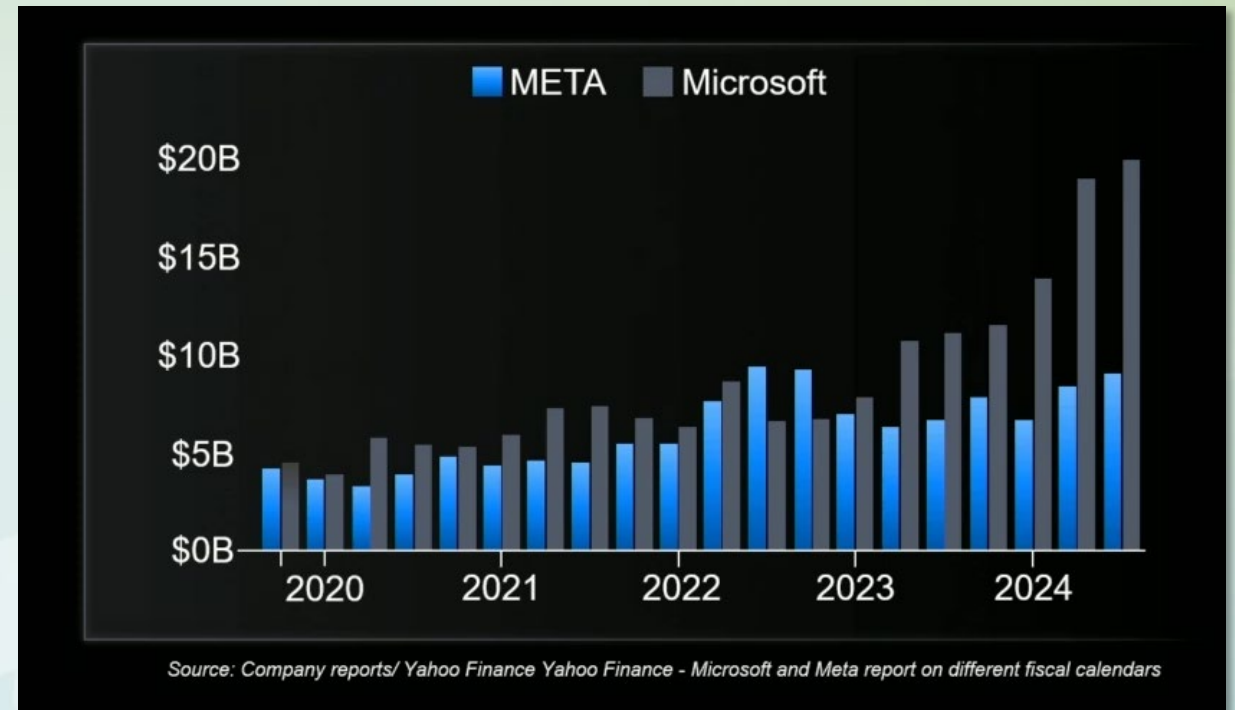
- **Memory had 71.8% revenue growth in 2024.**
  - Memory's share as a percentage of total semiconductor sales increased to 25.2% in 2024.
  - DRAM revenue improved 75.4% in 2024 while NAND revenue increased 75.7% year-over-year.
- **H**
- **igh-bandwidth memory (HBM) production contributed significantly to DRAM revenues.**
  - HBM was 19.2% of DRAM Revenue in 2025 (up 13.6% over 2024)
  - HBM revenue is estimated to increase 66.3% in 2025, reaching \$19.8B.

Source: ASML 2024 Investors, Yole Intelligence, Semi-Wiki, IBS

# AI Demand & Expenditures



Source: ASML 2024 Investors, S. Kirshnamoorthy, IEEE ITC 2024



Memory and AI semiconductors will drive near-term growth, with HBM projected to account for an increasing share of DRAM revenue, reaching 19.2% in 2025.



# Wafer Capacity | Global Investments

## US CHIPS and Science Act



- \$52B investment
- Tax credits
- Intel \$40B
- TI \$41B
- Micron \$35B
- Wolfspeed \$5B

## European Chips Act



- \$48B investment
- Tax credits
- Infineon \$6B
- Bosch \$3B
- ASML \$0.5B/yr

## SOUTH KOREA-Semi Strategy

- Government support via tax credits and loans
- Samsung \$230B
- SK Hynix \$11B

## JAPAN Strategy for Semi

- \$26B investment
- Tax credits
- SONY \$7B



## CHINA “Big Fund” Phase 3

- \$48B central government investment



## INDIA Semiconductor Mission

- \$10B government investment



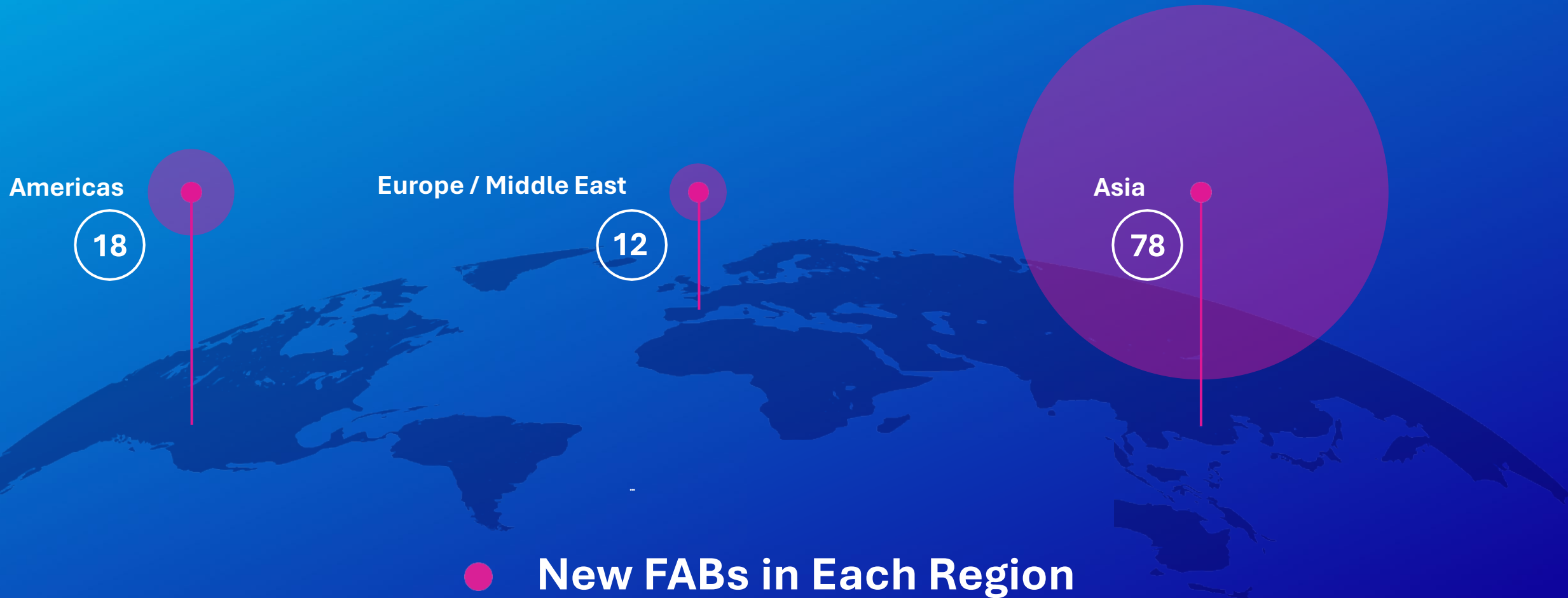
## TAIWAN Chip-Based Industrial Innovation Program

- \$9B investment
- Tax credits
- TSMC \$100B
- UMC \$15B

## Government & Industry Investment

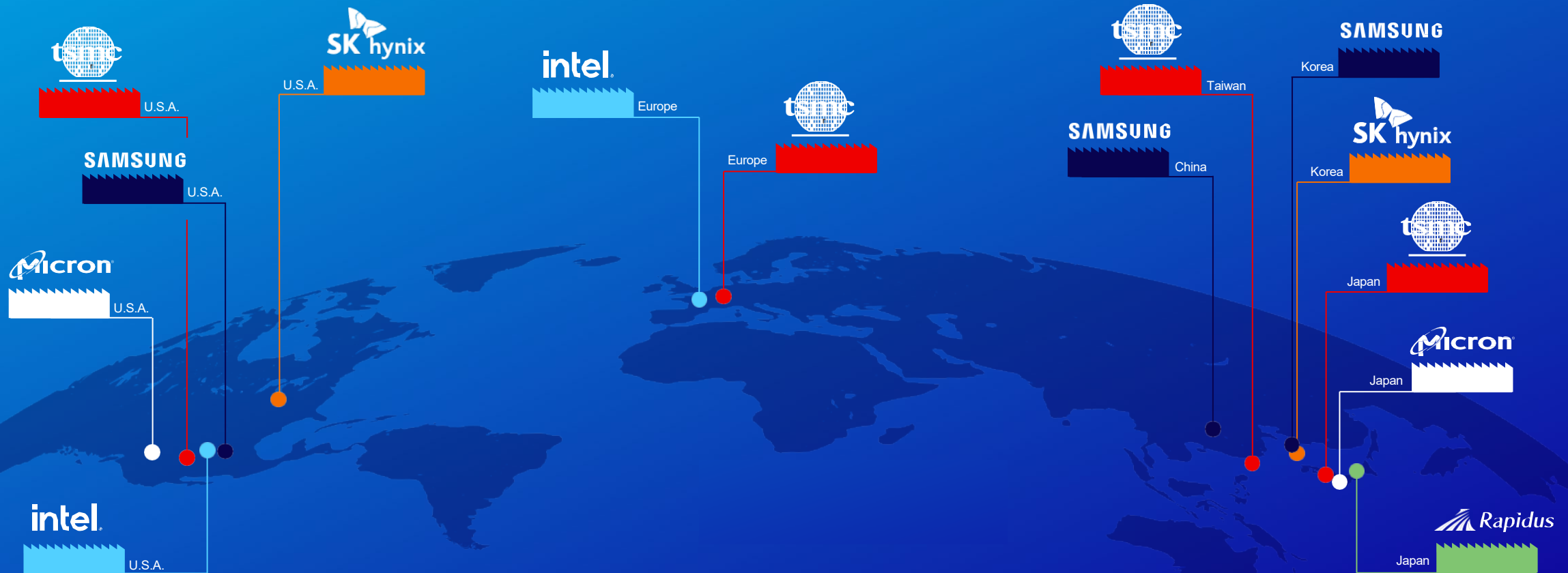
Source: SEMI.org, Public announcements, FTI Consulting analysis and ASML analysis; Note: The overview is not exhaustive

# Wafer Capacity | Global Investments



Source: SEMI.org, Public announcements, FTI Consulting analysis and ASML analysis; Note: The overview is not exhaustive

# Wafer Capacity | Global Investments



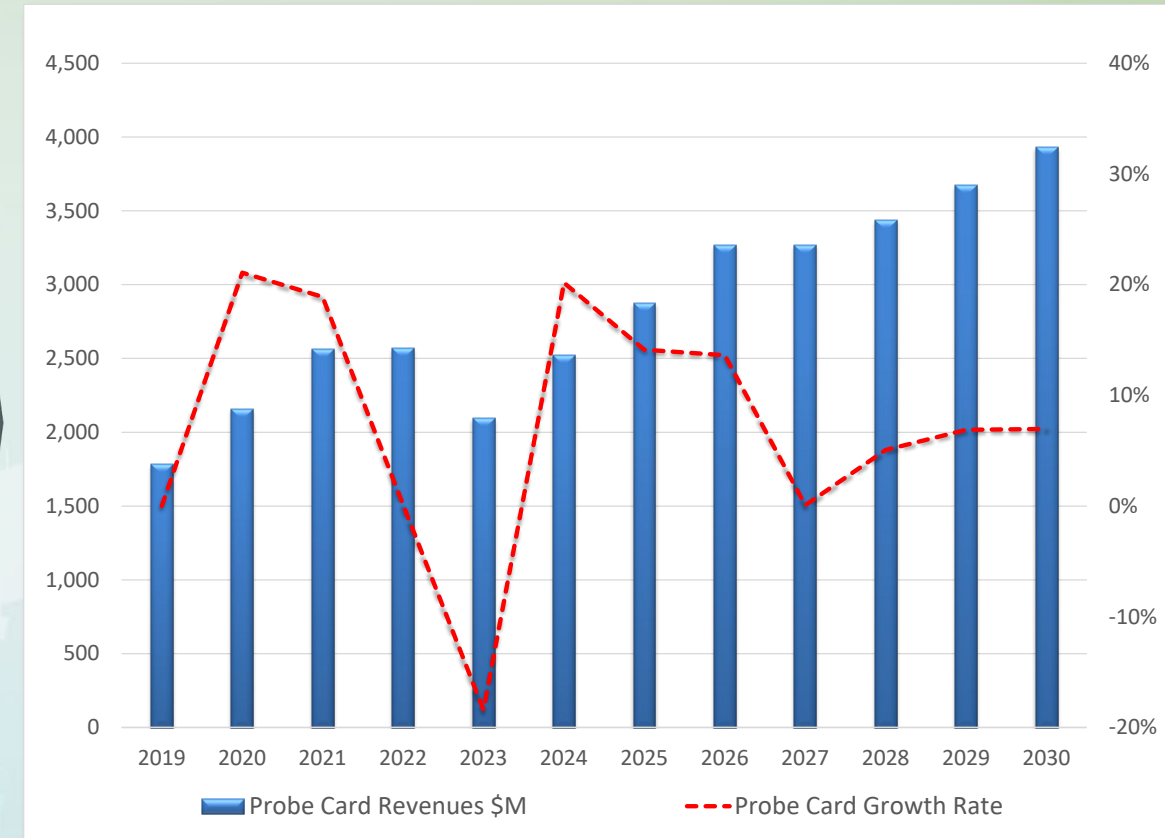
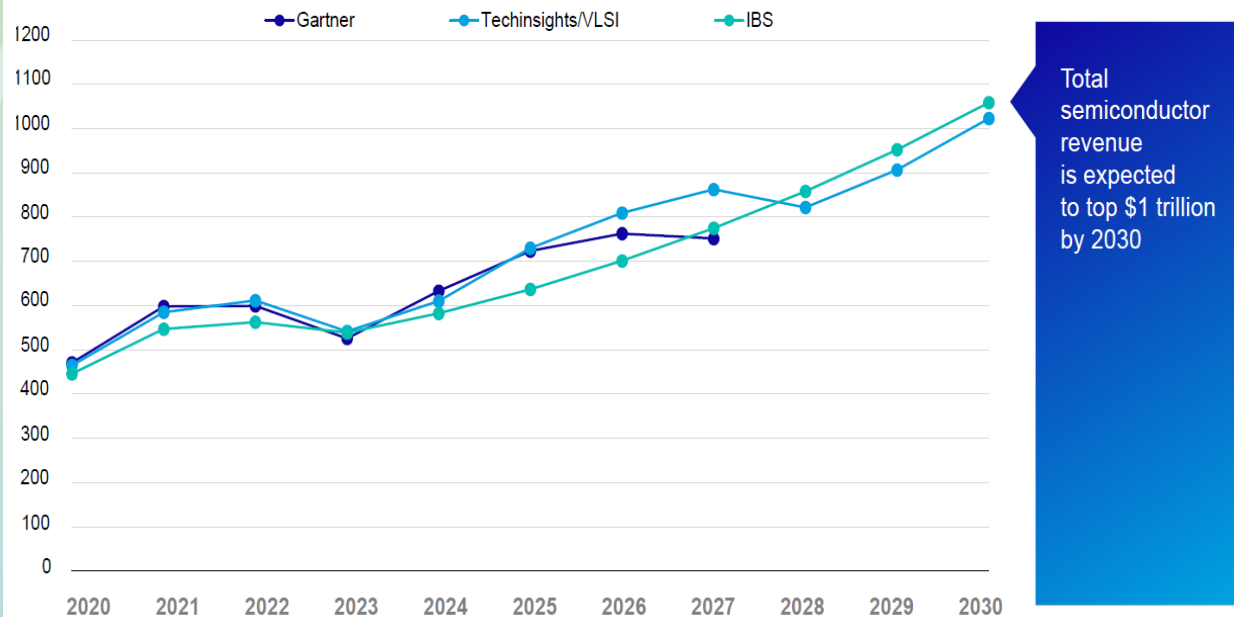
## Leading Edge Non-Memory

Source: SEMI.org, Public announcements, FTI Consulting analysis and ASML analysis; Note: The overview is not exhaustive



# Probe Card vs. Semi Market

Market expectations remain unchanged: around 1 trillion of sales by 2030




Thanks to Yole Group

- John West
- Nur Hilwani Razi

# Top Probe Card Vendors of 2024

Semiconductor Probe Cards		<div>Tech Insights</div>		Thanks to TechInsights • Panchami Phadke	
Sales, \$M, Calendar Year					
Rank	Company	Market		% Growth	
		2024		YoY	
1	FormFactor	625.0		25.5%	
2	Technoprobe	511.0		15.5%	
3	Micronics Japan	353.4		36.2%	
4	MPI Corporation	195.6		46.8%	
5	JEM	125.6		7.7%	
6	MaxOne Semiconductor	86.2			
7	Nidec SV TCL	74.5		1.7%	
8	Korea Instrument	65.4		0.5%	
9	TSE	57.3			
10	STAr Technology	51.2		24.6%	
	Other	496.0			
	Probe Cards	2520.0			
	Annual Growth	19.5%			

Semiconductor Probe Cards



Thanks to Yole Group

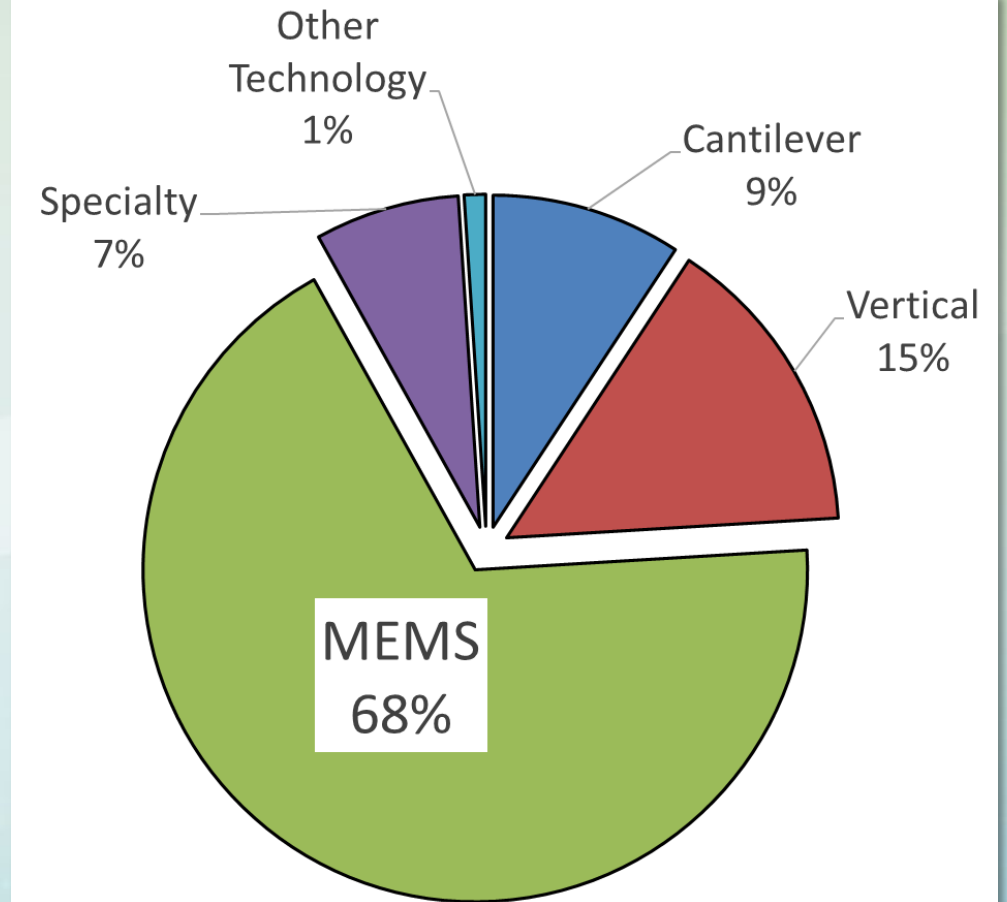
- John West
- Nur Hilwani Razi

Sales, \$M, Calendar Year

Rank	Company	Market	% Growth
		2024	YoY
1	FormFactor	627.5	26.0%
2	Technoprobe	410.9	0.9%
3	Micronics Japan	349.5	36.1%
4	MPI Corporation	195.0	46.4%
5	JEM	124.2	8.0%
6	MaxOne Semiconductor	86.1	71.4%
7	Korea Instrument	69.8	10.1%
8	TSE	56.5	106.0%
9	STAr Technology	53.1	-1.5%
10	Nidec SVTCL	51.2	-2.7%
	Other	496.0	
	Probe Cards	2520.0	
	Annual Growth	18.9%	

# Probe Card Technology Revenue

Semiconductor Probe Card Forecast - Revenues, \$M			
Market Segment	2022	2023	2024
Cantilever	253.34	238.04	232.99
Vertical	356.54	287.11	373.05
MEMS	1,775.11	1,390.38	1,710.57
Specialty	161.78	158.66	177.26
Other Technology	23.88	23.20	26.18
Semiconductor Probe Cards	2570.65	2097.39	2520.05



Thanks to Yole Group  
• John West  
• Nur Hilwani Razi





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PROBE TODAY, FOR TOMORROW

2025 CONFERENCE

# 34<sup>th</sup> SWTest 2025 Conference and EXPO in Carlsbad, CA

34<sup>th</sup> SWTest Conference | Carlsbad, CA, June 2 – 4, 2025

# Technical Program Overview

- **Sunday, June 1**

- William Mann Memorial Benefit Golf Tournament



- **Monday, June 2**

- Technical Program with a Visionary Keynote and 4-Technical Sessions / Poster Session
- SWTest EXPO with 70-Key Suppliers and w/ Meal Reception Stations
- Connect and Network with your Colleagues



- **Tuesday, June 3**

- SWT Crew Update and 4-Technical Sessions / Poster Session
- SWTest EXPO with 70-Key Suppliers and w/ Meal Reception Stations

- **Wednesday, June 4**

- Technical Program with 2-Technical Sessions
- Conference adjourns

# William R. Mann Student Travel Grant



**Bill Mann**  
Founder of SWTest

- Partially funded by the Sponsors and Exhibitors Golf Team registration fees.
- SWTest Conference provides a stipend of up to \$1,000 to cover expenses for travel, hotel accommodations, and student registration.
- Student Grant was Awarded for 2025
  - **David Kim**  
*Undergraduate at Emory University in Atlanta, Georgia*



# Recognition & Awards

- Best Overall Presentation
  - Best Data Presentation
  - Most “Inspirational” Presentation
  - Best Presentation, Tutorial in Nature
  - People’s Choice Award
- 
- A presentation from SWTest 2025 will be selected for publication in Chip Scale Review



# SWTest 2024 Awards

## Best Presentation, Tutorial in Nature

### Study of Contamination and Key Parameters in Wafer Probe Card Testing

Cédric HERMET (STMicroelectronics - France), Salvatore DE SIENA (Technoprobe SpA - Italy)



## Most Inspirational Presentation

### People's Choice Award

### Unlocking Secrets: Enhancing Semiconductor Testing with Pd-Cu-Ag Alloys

Lea LUMPER, Verena MAIER-KIENER (Montanuniversität Leoben - Austria), Andreas STARK (Helmholtz-Hereon - Germany)



# SWTest 2024 Awards

## Best Data Presentation

### **Towards Ultra-High Pin Count Probe Card for High End Logic Devices**

Alice GHIDONI, Elia MISSAGLIA (Technoprobe SpA - Italy)



## Best Overall Presentation

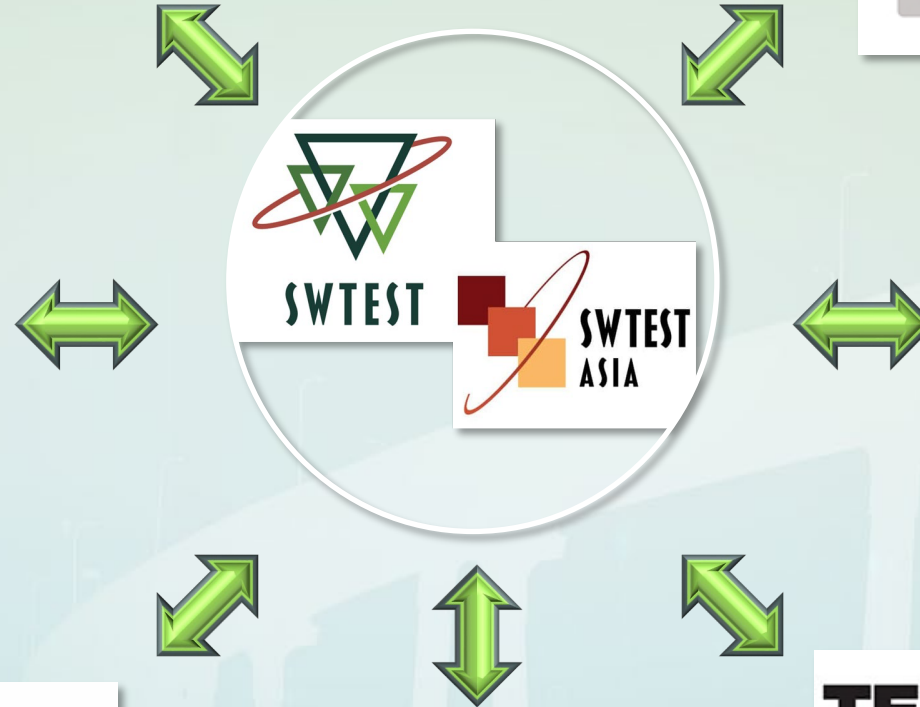
### **Risk Mitigation Strategies for mmWave Production Test Environments**

Kevin AYERS, Ryan GARRISON (FormFactor, Inc. - USA)





# SWTest Cross-Promotions



# Want to Learn More ?

- **Chip Scale Review**  
<https://chipscalereview.com/>



- **TechInsights**  
<https://www.techinsights.com/>



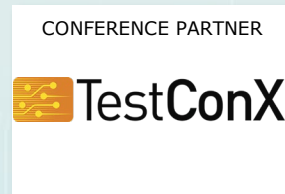
- **IEEE European Test Symposium (ETS)**  
<https://www.ieee-ets.org/>



- **Yole Group**  
<http://www.yole.fr/>



- **TestConX**  
*Formerly BiTS Burn In & Test Strategies*  
<https://www.testconx.org/>



- **IS-Test Conference**  
<http://www.is-test.com>



- **SEMI - Test Vision Symposium**  
<https://www.semi.org/en/connect/events/test-vision-symposium>



- **Semiconductor Review**  
<https://www.semiconductorreview.com/>

