



**SWTEST**

PROBE TODAY, FOR TOMORROW

**2024 CONFERENCE**

**33<sup>rd</sup> SWTest 2024  
Conference and EXPO  
in Carlsbad, CA**

SWTest | June 3 - 5, 2024



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PROBE TODAY, FOR TOMORROW

**2024 CONFERENCE**

# Welcome to 33<sup>rd</sup> SWTest 2024 Conference and EXPO in Carlsbad, CA

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

# Welcome to SWTest Conference and EXPO June 3 to 5, 2024

Omni - La Costa, Carlsbad, CA



# SWTest 2024 eProceedings Download



Password for Monday = blueberry  
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) = Omni Meeting
  - Session and Expo WiFi Password = swtest24
  - 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 San Diego and SWTest Asia



**SWTEST**



**SWTEST  
ASIA**



**38 Years of Combined  
Probe Technology**



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



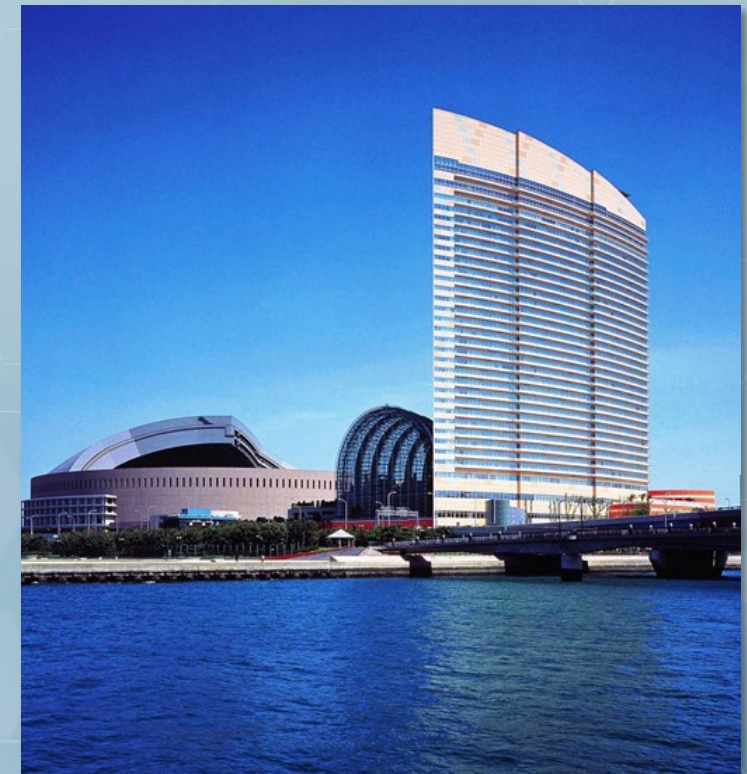
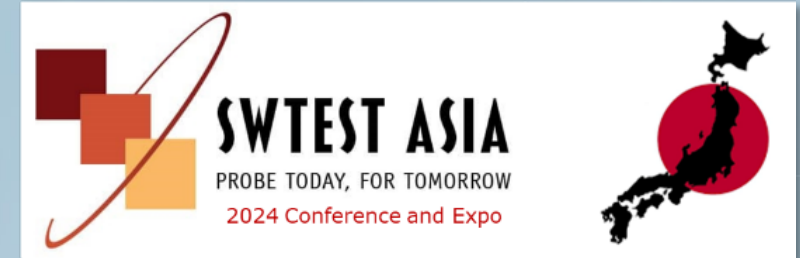
**1,000+ Technical Podium  
and Poster Presentations**



**Repeat Multinational Sponsors  
and Premier Exhibitors**

# SWTest Asia 2024 Japan

- **Schedule : October 24-26, 2024**
- **Location : Hilton Fukuoka Sea Hawk**
- **Conference Day 1 (Oct. 24, 2024)**
  - Opening and Visionary Keynote
    - **Yasuura Hirota, PhD (Vice Director General, National Institute of Information)**
  - Podium Sessions
  - Key Supplier Expo & Poster Sessions
  - Platinum Sponsor Tech-Showcase
  - Networking Event in Expo Hall
- **Conference Day 2 (Oct. 25, 2024)**
  - Opening and Industry Vision Presentations
    - **Shinya Akata (GM SONY) and Tetsu Ozawa (GM Socionext)**
  - Podium Sessions
  - Key Supplier Expo & Poster Sessions
  - Platinum Sponsor Tech-Showcase
  - Outdoor Networking Event - (屋台, Fukuoka Yatai)
- **Charity Golf Tournament and Networking Day 3 (Oct. 26, 2024)**
  - Benefit Golf Tournament to support student participation.



# SWTest Asia 2024 in Fukuoka, Japan



**SWTEST ASIA**  
PROBE TODAY, FOR TOMORROW  
2024 CONFERENCE

October 24 – 26, 2024  
Hilton Fukuoka Sea Hawk  
Fukuoka, Japan

**Abstract Submission Deadline Extended to July 26th**



SWTest Asia celebrates its 5th Anniversary in Fukuoka, Japan  
October 24 – 26, 2024!

5th Annual SWTest Asia | Fukuoka, Japan, October 24-26, 2024

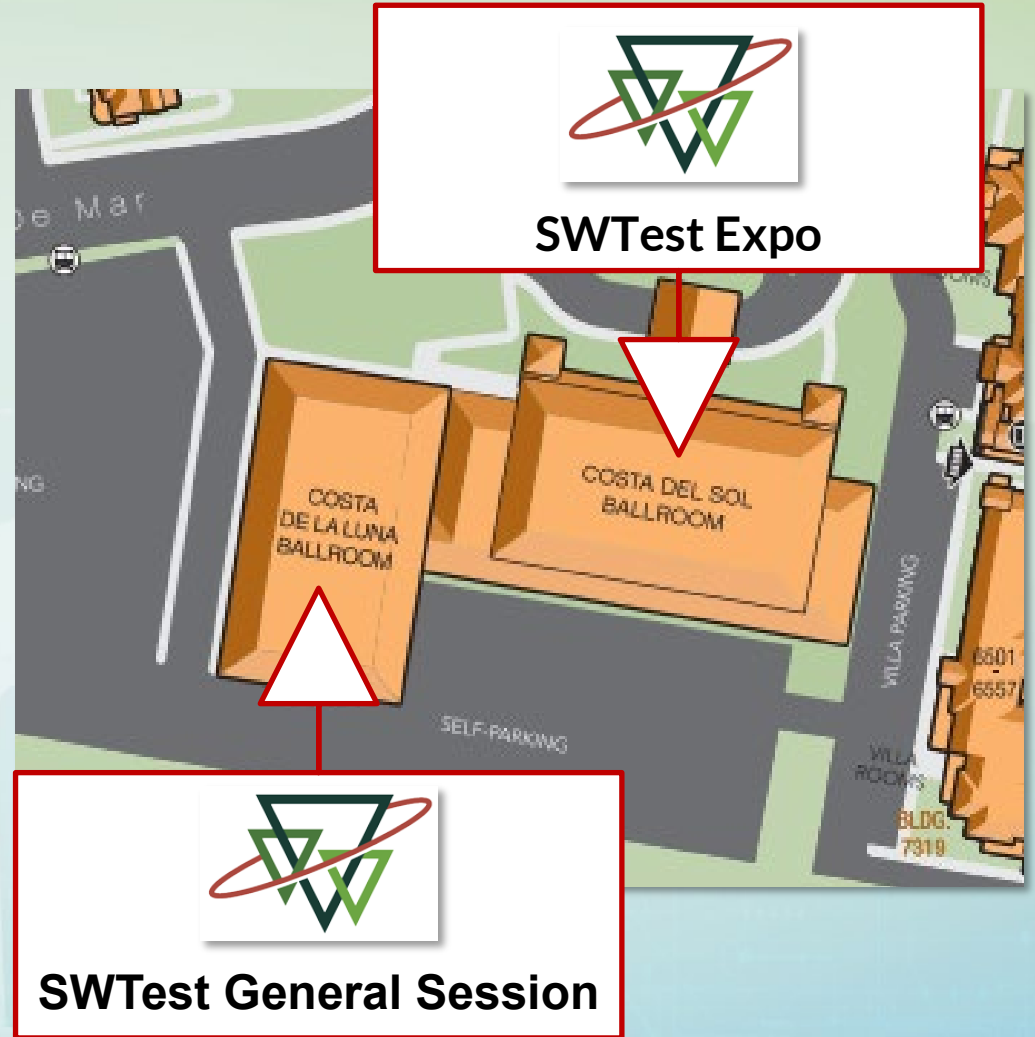
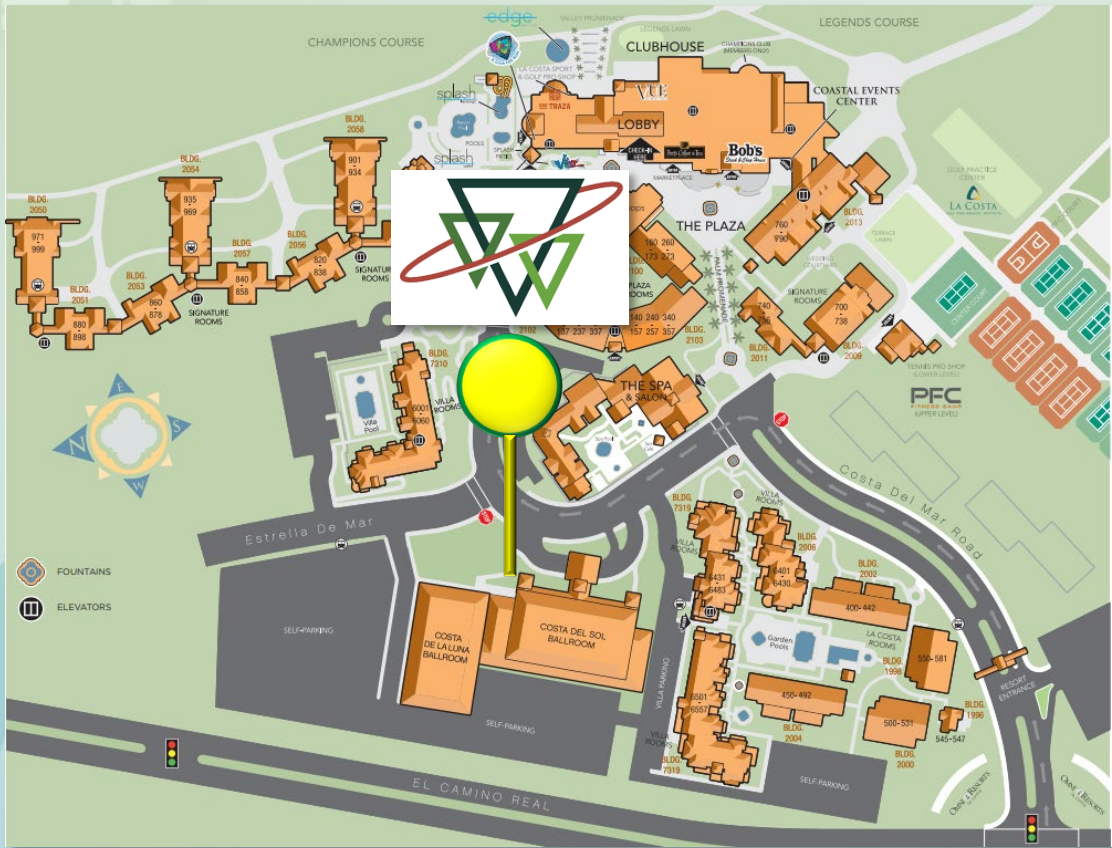
# Mark your Calendar for June 2 to 4, 2025 SWTest 2025 Conference and Expo

Omni - La Costa, Carlsbad, CA





# SWTest 2024 Property Map



# SWTest Organization

- **SWTest Executive Team**

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

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

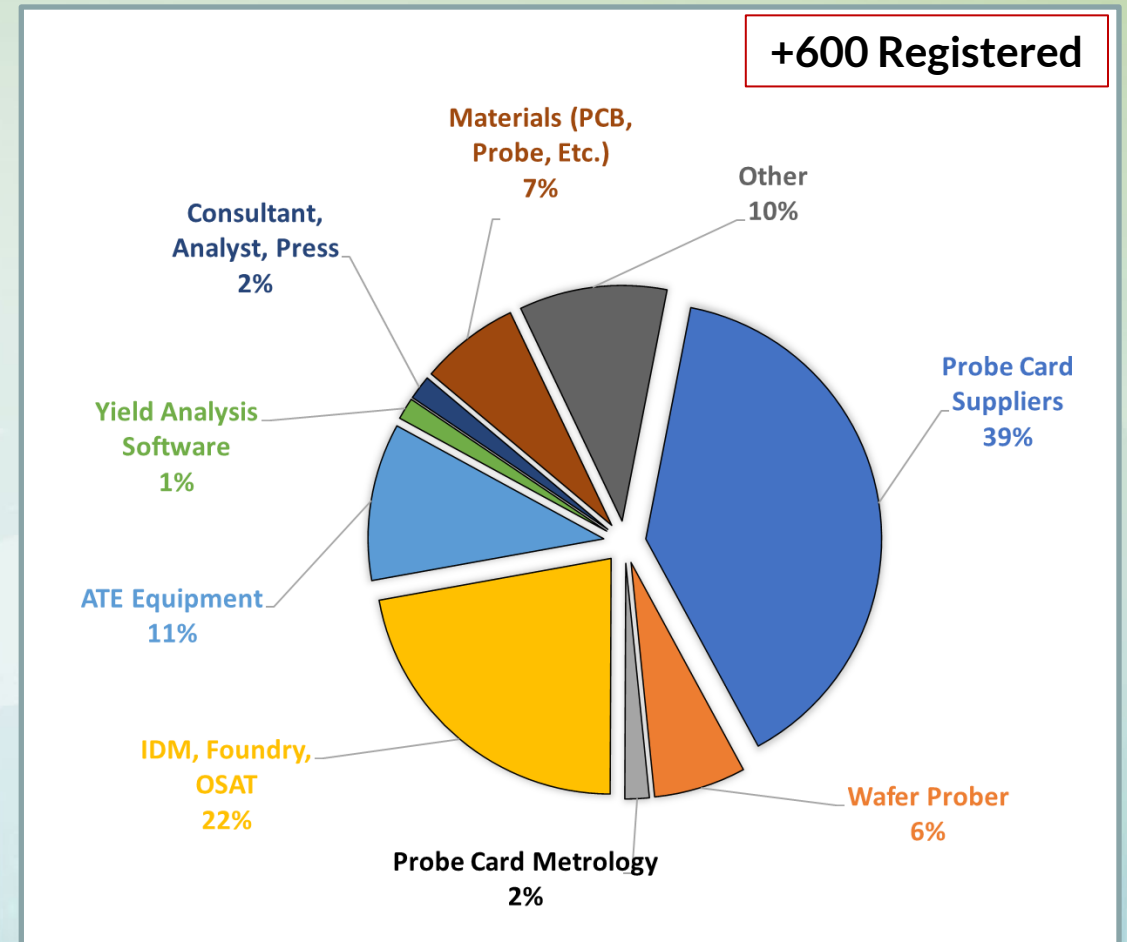
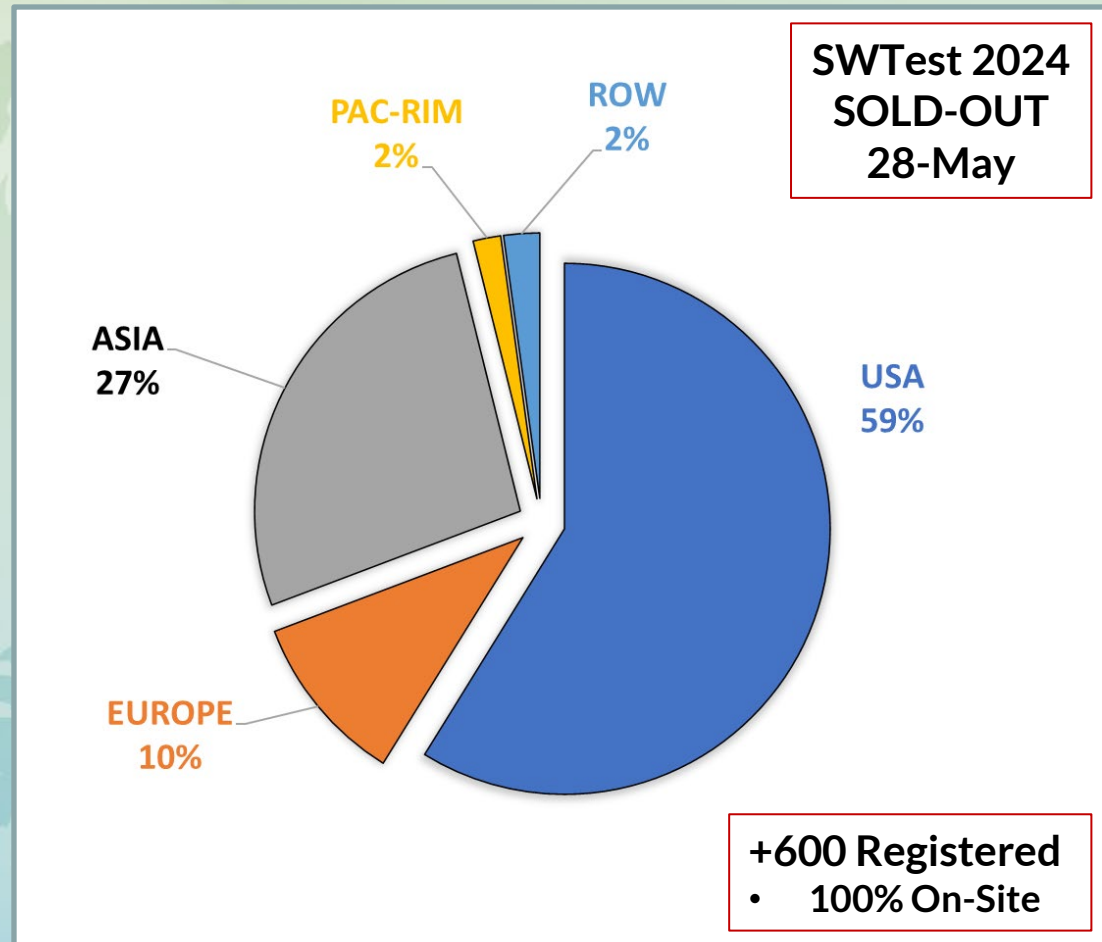
- **Technical Program Committee**

- John Caldwell, MJC Electronics Corp. (US)
- Geert Gouwy, imec (Belgium)
- Clark Liu, Taiwan MJC Co. (Taiwan)
- Muru Meyyappan, Enfabrica (US)
- Patrick Mui, JEM America (US)
- Mark Ojeda, Infineon (US)
- Rey Rincon, PTSL (US)
- Raffaele Vallauri, Technoprobe (Italy)
- Joey Wu, Member-at-Large (Taiwan)

- **Steering Members**

- Davide Appello, Technoprobe (Italy)
- Karen Armendariz, Celadon Systems (US)
- Michael Huebner, PhD, FormFactor, Inc. (Germany)
- Joonyeon (JY) Kim, Samsung Electronics (Korea)
- Amy Leong, AEM (Singapore)
- Alistair Laing, Micron Technology (US)
- Grace Liu, PhD, Intel Corporation (US)
- Karan Marnier, AEM (US)
- Connie Smith, Texas Instruments (US)

# SWTest 2024 Participation



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

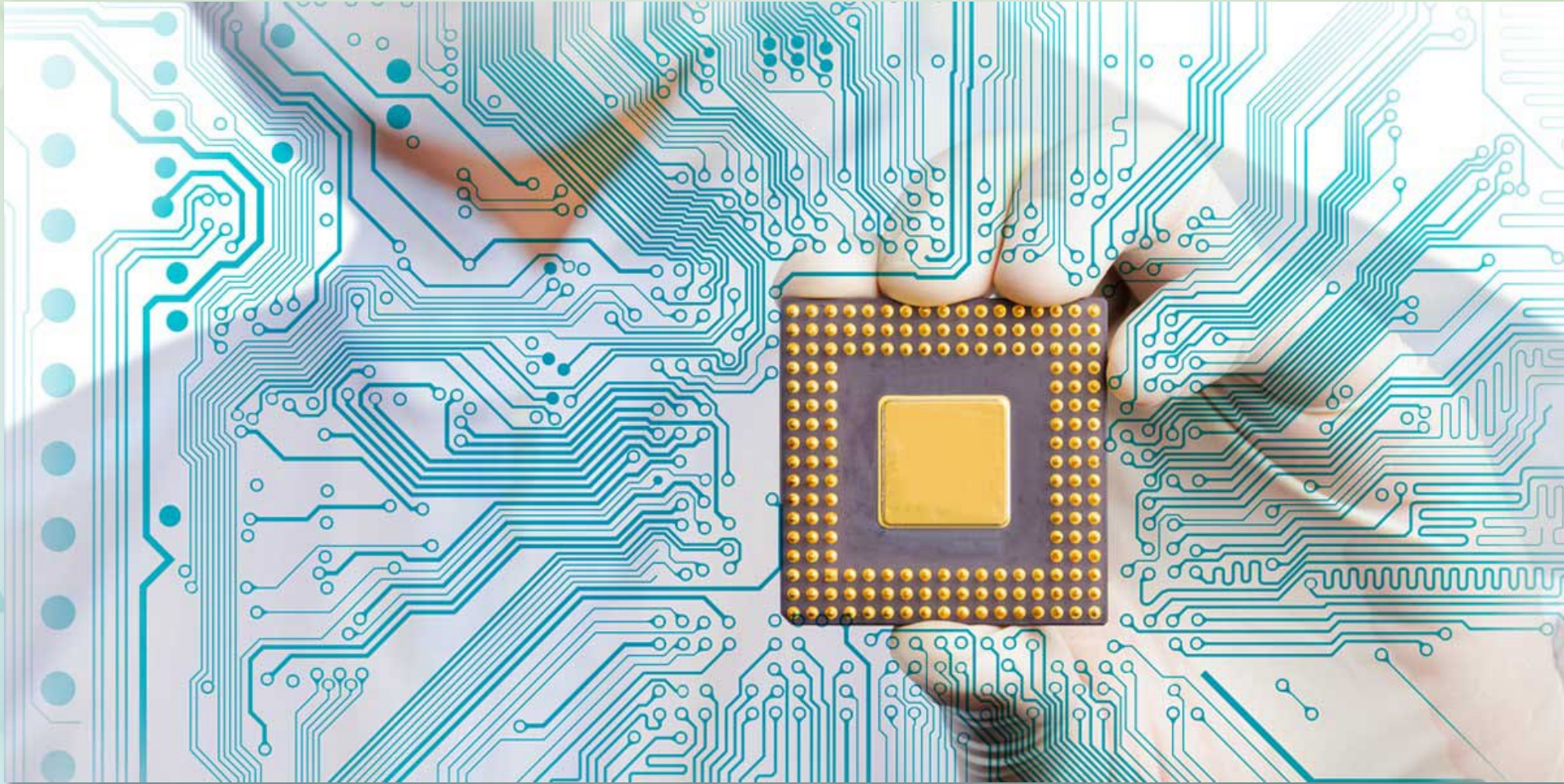
# Phishing for SWTest Mailing List and Third-Party Hotel Reservations



- 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.

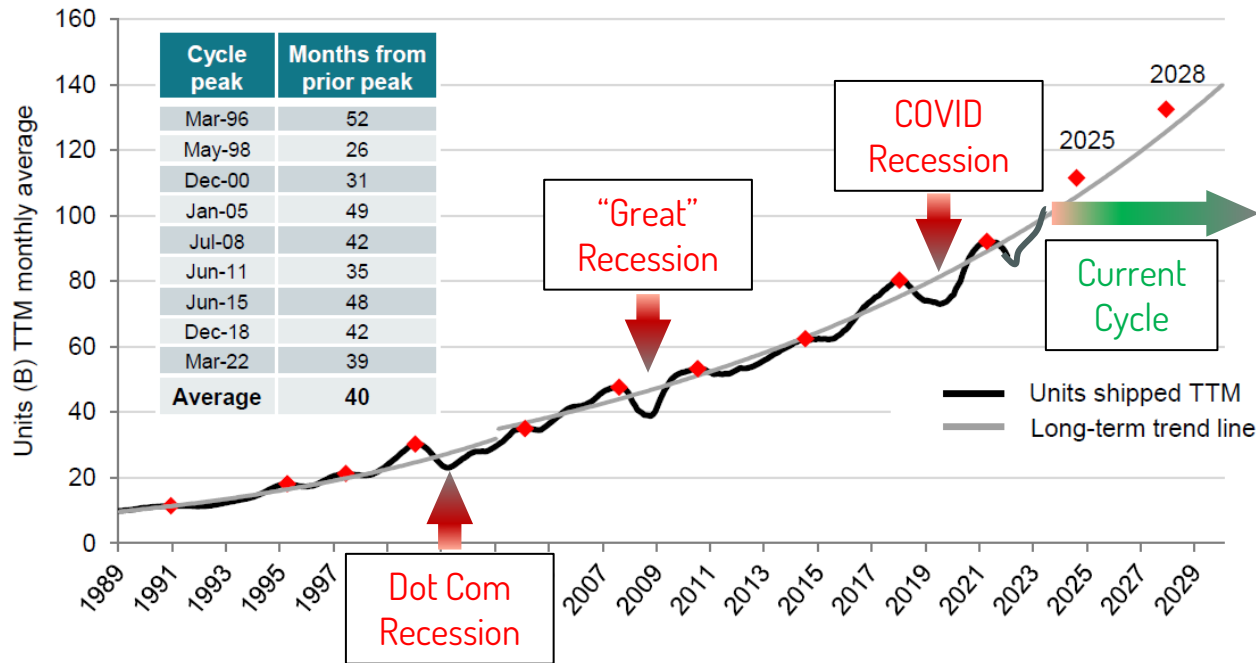
**Never have and never will !**

# Semiconductor Landscape



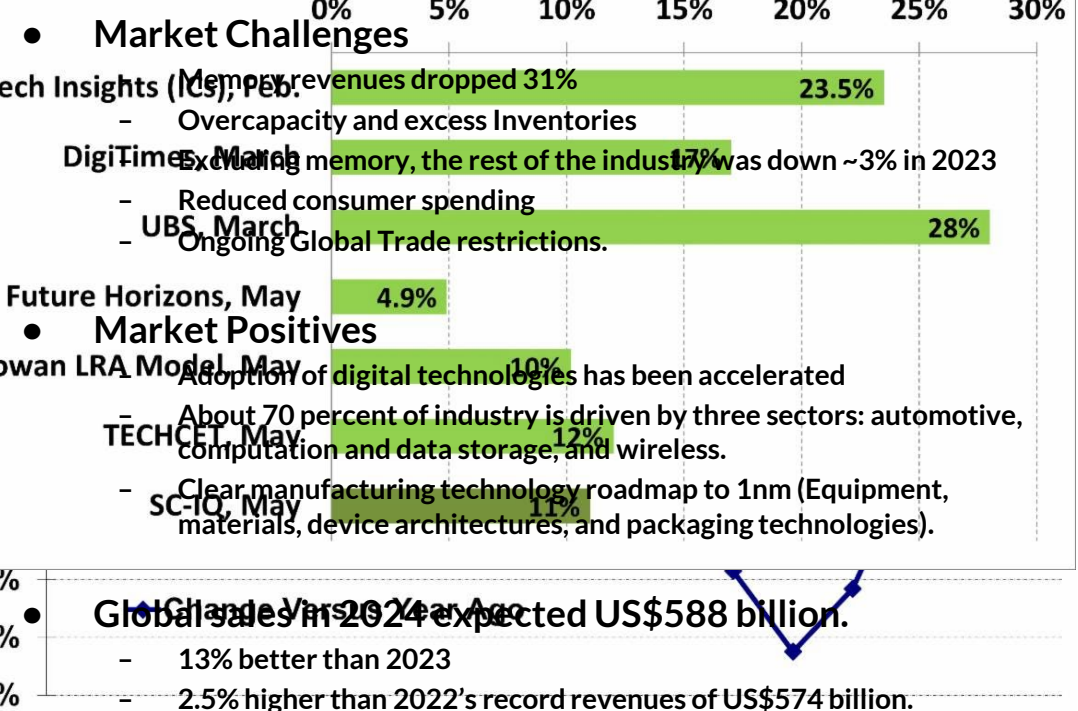
# Semiconductor Is Notoriously Cyclical

## Semiconductor market units shipped\*



Source: Texas Instruments Investor Day - 2024

## 2024 Semiconductor Market Forecasts



# Insatiable Consumer Appetite

## 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

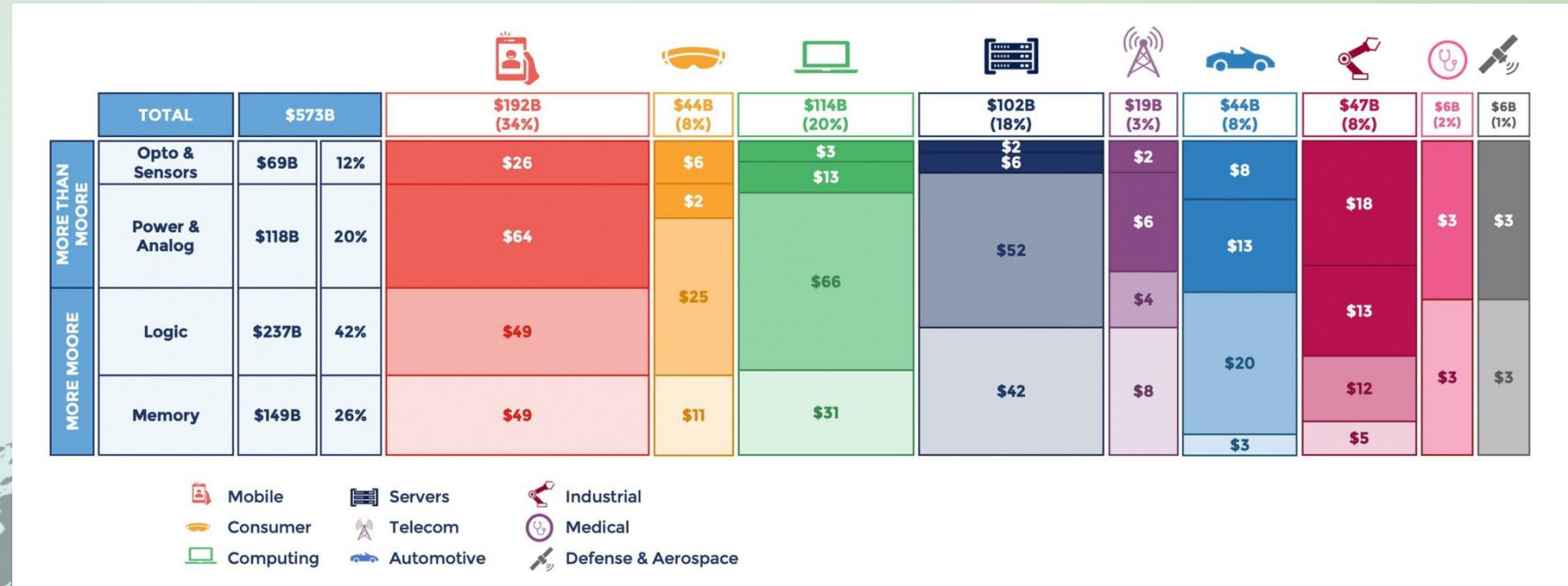
More than 250 million wearables and high-performance devices

## 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



Source: Yole Intelligence Industry Report, 2023

**Process Everything | Store More Data | Compute Faster**

# High Costs of Leading-Edge Innovation

## Mobility



## IoT



## Automotive



## HPC





# \$800B Global Investment



**\$205B**

- US CHIPS Act \$52B
- Intel \$40B
- TI \$41B
- Micron \$35B
- Wolfspeed \$5B



**\$61B**

- EU CHIPS Act \$47B
- Infineon \$6B
- Bosch \$3B
- ASML \$0.5B/yr



**\$143B+**

- Objective : 100% domestic self sufficiency by 2030



**\$8B**

- SONY \$7B
- Gov't \$1B



**\$115B**

- TSMC \$100B
- UMC \$15B



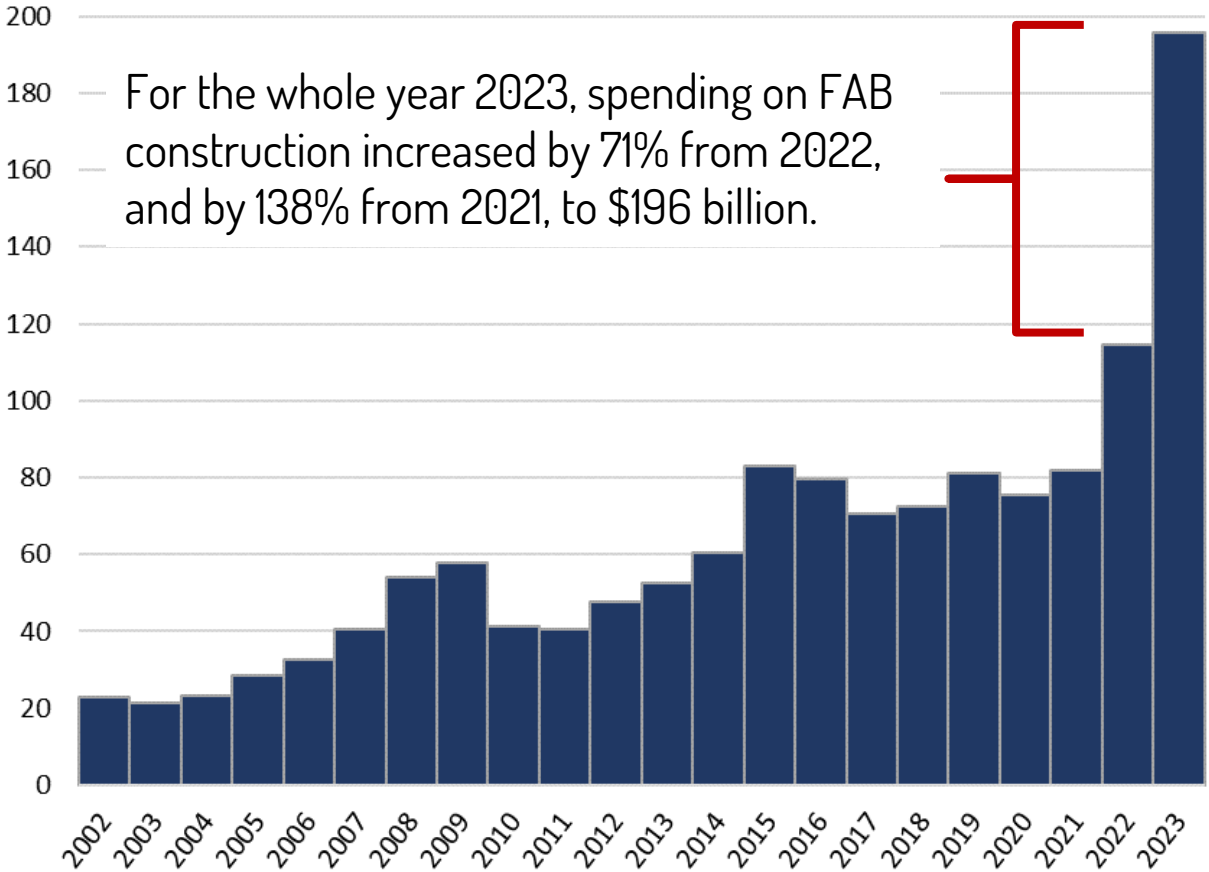
**\$241B+**

- Samsung \$230B
- SK Hynix \$11B

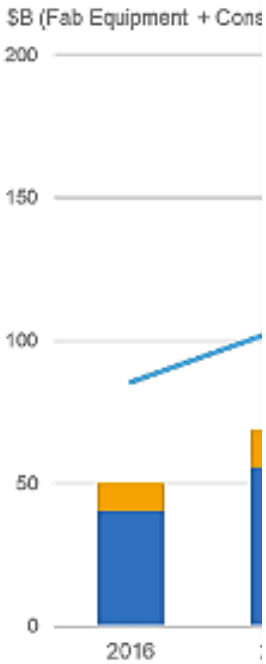
Source: WSTS, SIA, Yole Intelligence Industry Report, 2023

# Global FAB Spending

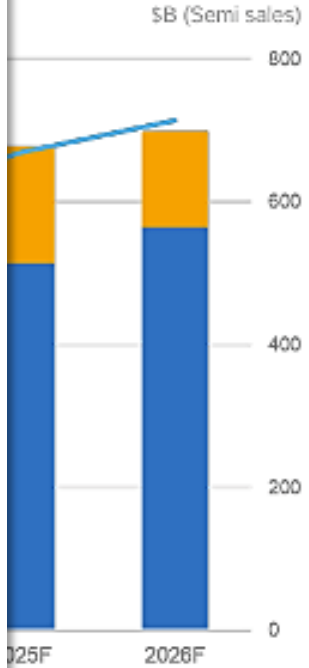
**Construction Spending for Factories, \$ billion per Year**



For the whole year 2023, spending on FAB construction increased by 71% from 2022, and by 138% from 2021, to \$196 billion.



Source: SEMI, December 2016

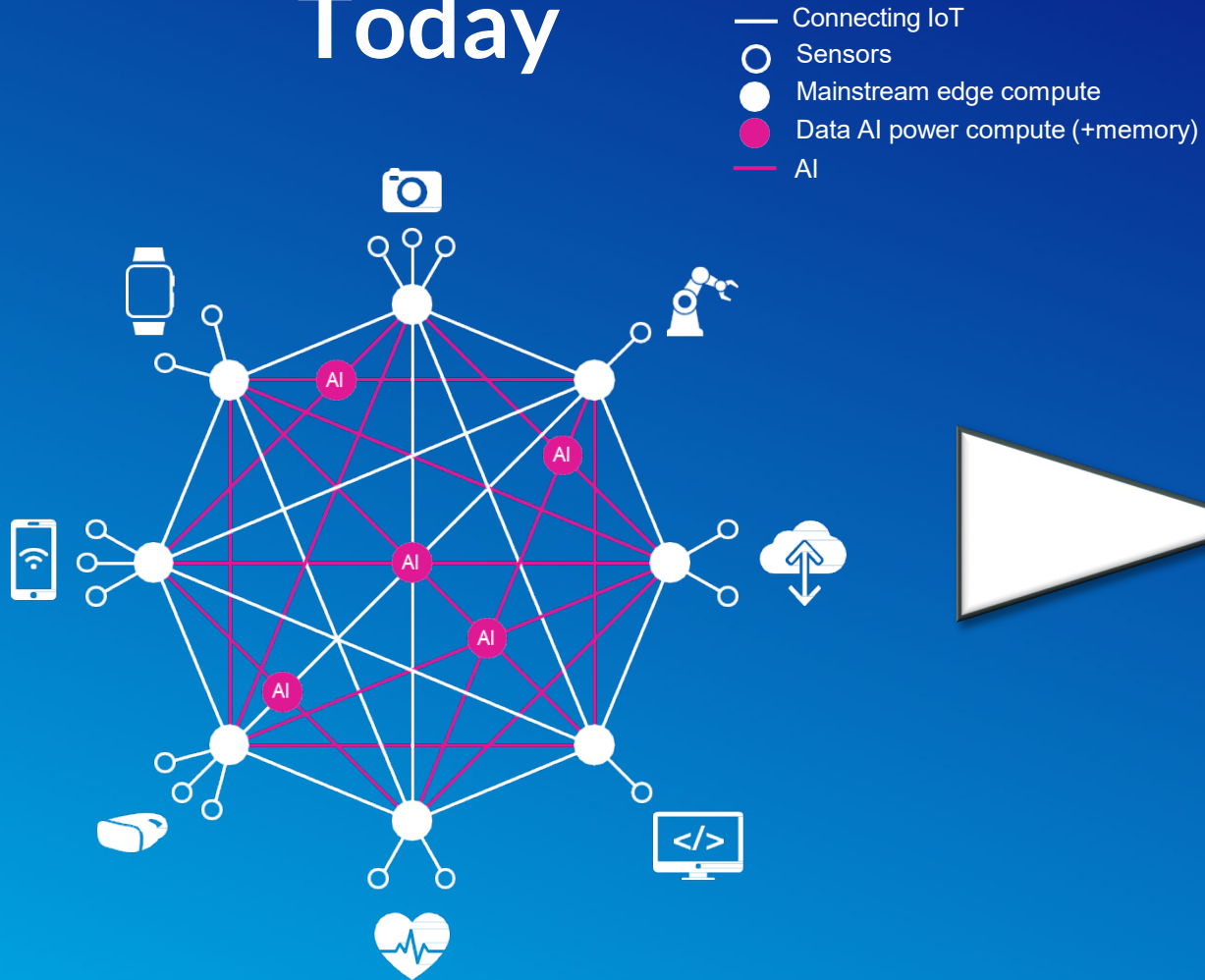


Source: Census Bureau

WOLFSTREET.com

# Data Creation Drives AI

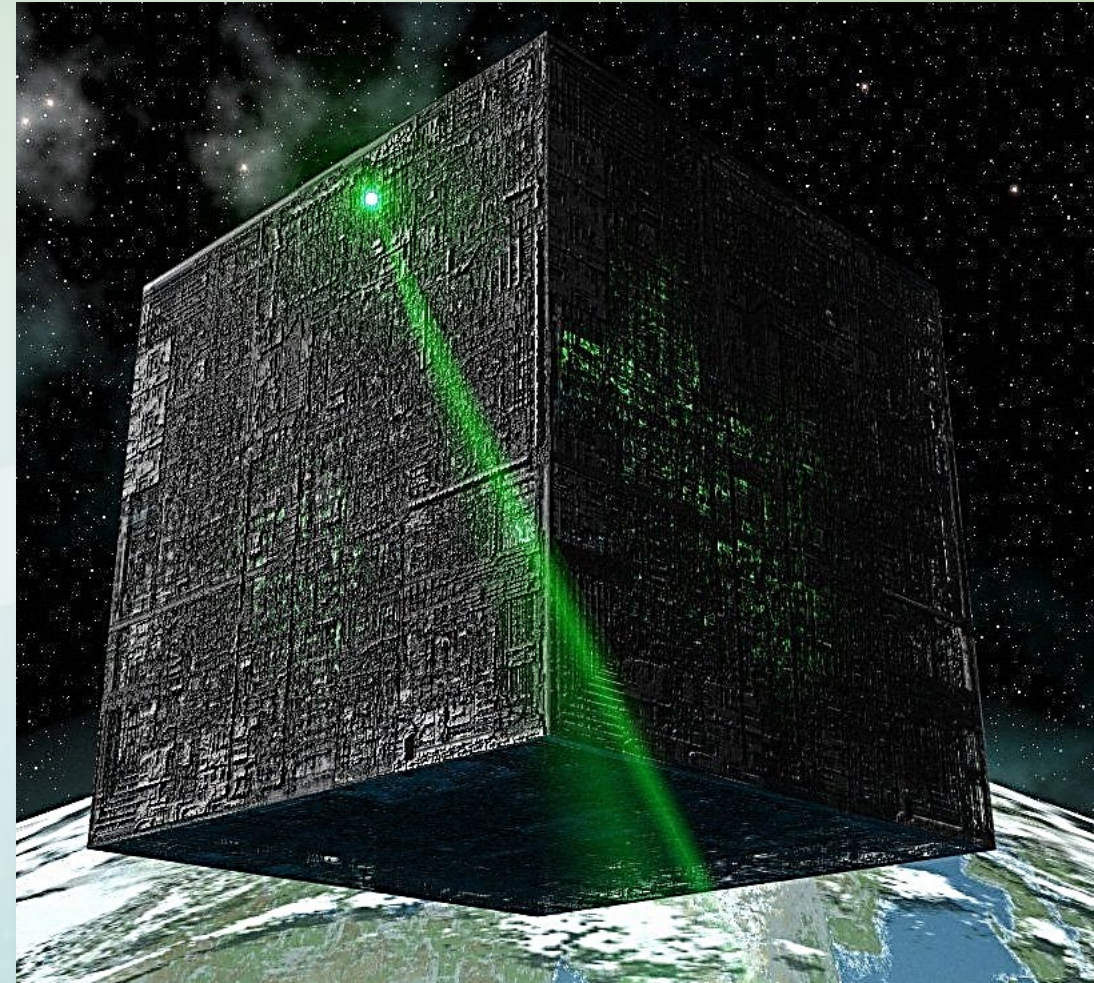
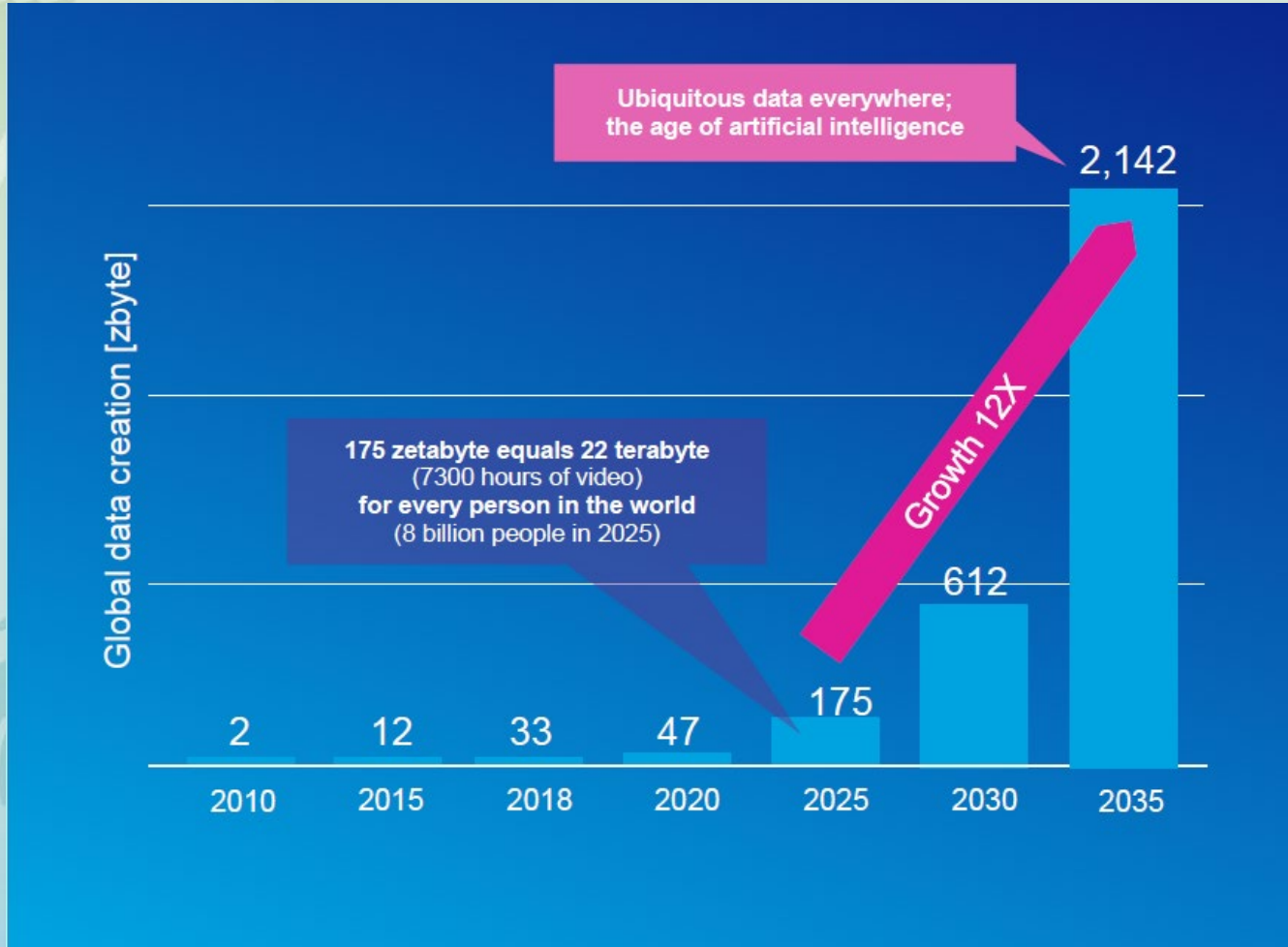
## Today



## The Future

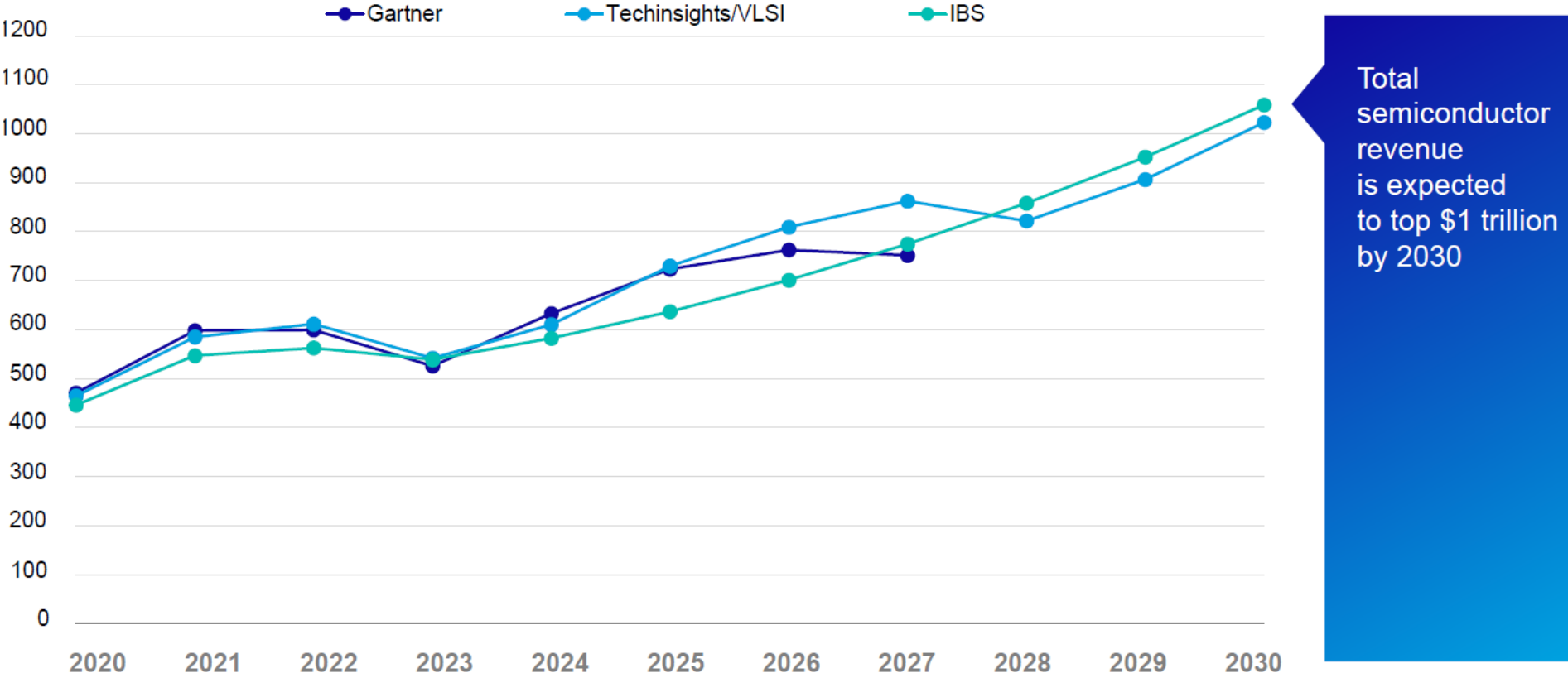


# Data Creation That Fuels AI



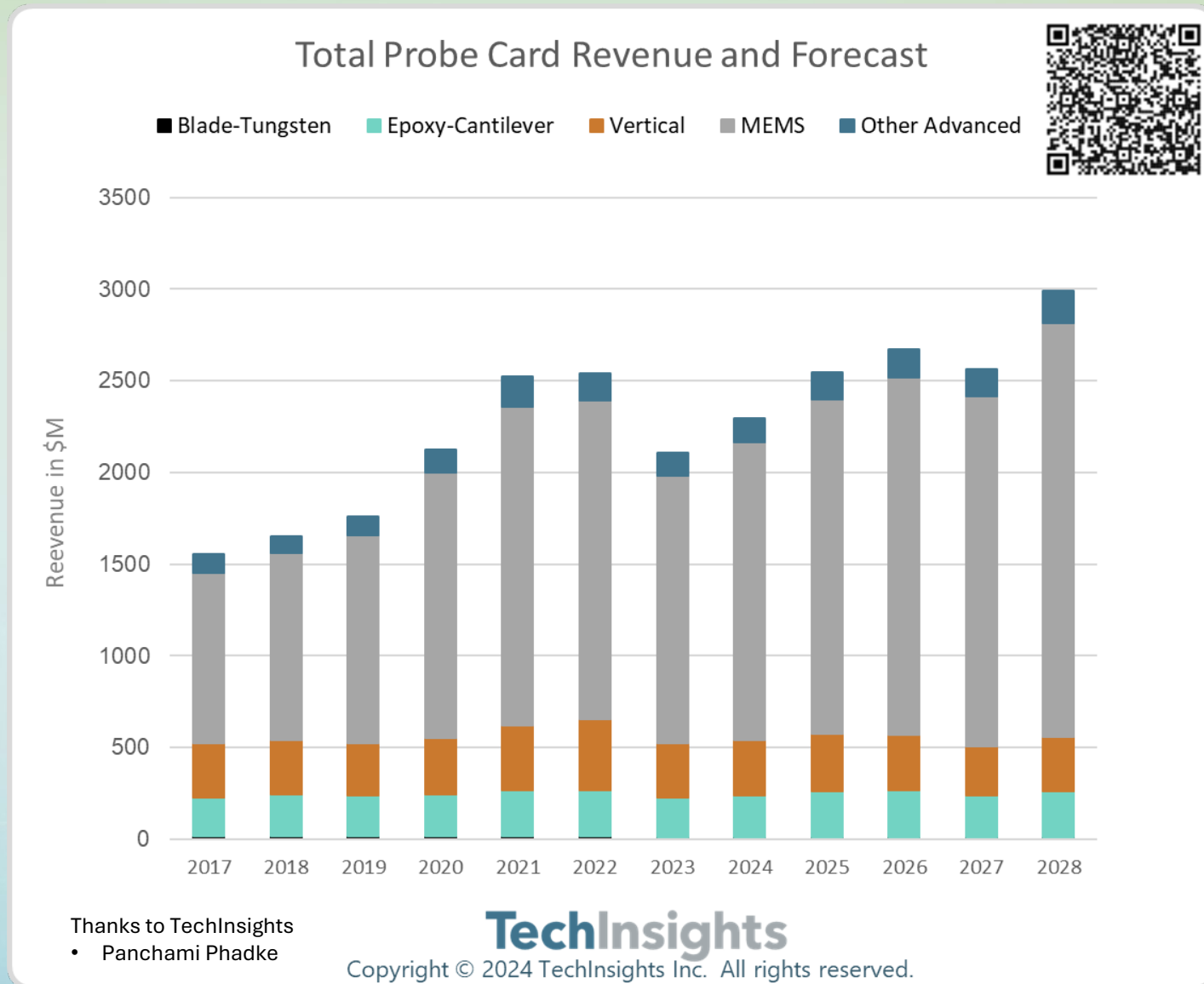
# Total Revenue Predictions Towards 2030

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



Total semiconductor revenue is expected to top \$1 trillion by 2030

# Probe Card Market Landscape



# Top Probe Card Vendors of 2023

**Semiconductor Probe Cards**

Sales, \$M, Calendar Year

**Tech Insights** Thanks to TechInsights  
• Panchami Phadke

| Rank             | Company           | Market | % Growth |
|------------------|-------------------|--------|----------|
|                  |                   | 2023   | YoY      |
| 1                | FormFactor        | 497.9  | -15.8%   |
| 2                | Technoprobe       | 442.5  | -23.3%   |
| 3                | Micronics Japan   | 259.6  | -15.5%   |
| 4                | MPI Corporation   | 133.3  | -3.7%    |
| 5                | JEM               | 116.7  | -24.5%   |
| 6                | Nidec SV Probe    | 73.2   | -13.0%   |
| 7                | Korea Instrument  | 65.1   | -7.9%    |
| 8                | Will Technology   | 46.1   | 6.2%     |
| 9                | STAr Technologies | 41.1   | -19.0%   |
| 10               | Synergie CAD      | 40.3   | 10.8%    |
|                  | Other             | 393.7  | -13.1%   |
| Probe Card Sales |                   | 2109.3 |          |
| Annual Growth    |                   | -17.0% |          |

**Semiconductor Probe Cards**

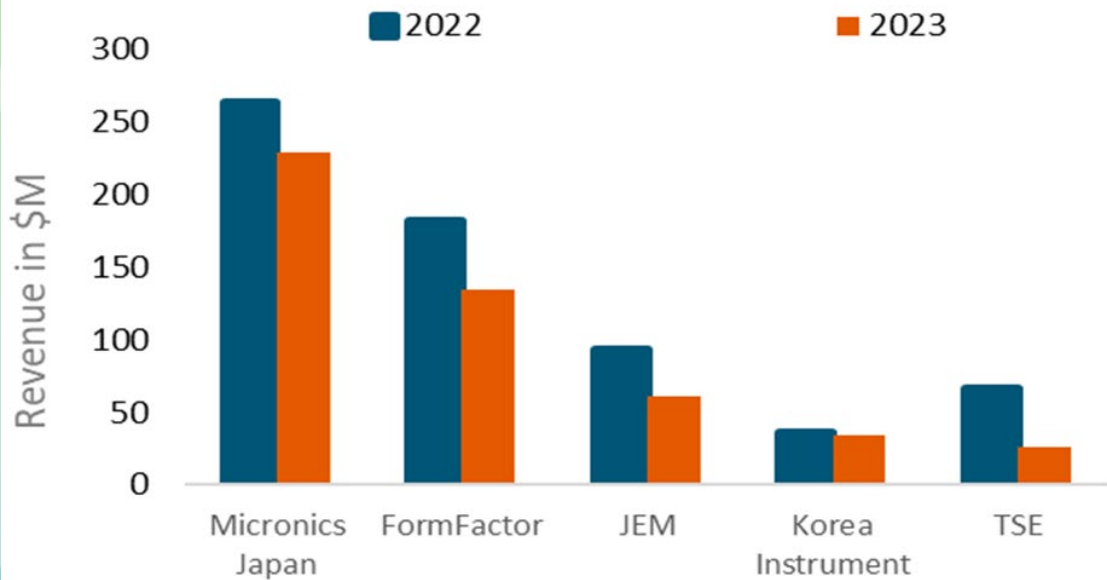
Sales, \$M, Calendar Year

**YOLE Group** Thanks to Yole Group  
• John West

| Rank             | Company           | Market | % Growth |
|------------------|-------------------|--------|----------|
|                  |                   | 2023   | YoY      |
| 1                | FormFactor        | 495.0  | -16.3%   |
| 2                | Technoprobe       | 390.0  | -32.4%   |
| 3                | Micronics Japan   | 260.0  | -15.4%   |
| 4                | MPI Corporation   | 135.0  | -2.5%    |
| 5                | JEM               | 120.0  | -22.4%   |
| 6                | Korea Instrument  | 70.0   | -1.0%    |
| 7                | STAr Technologies | 55.0   | 8.5%     |
| 8                | Nidec SVTCL       | 50.0   | -40.6%   |
| 9                | Will Technology   | 45.0   | -31.6%   |
| 10               | Max One           | 40.0   | -15.8%   |
|                  | Other             | 460.0  | -0.2%    |
| Probe Card Sales |                   | 2120.0 |          |
| Annual Growth    |                   | -16.0% |          |

# PC Market Rank by Application

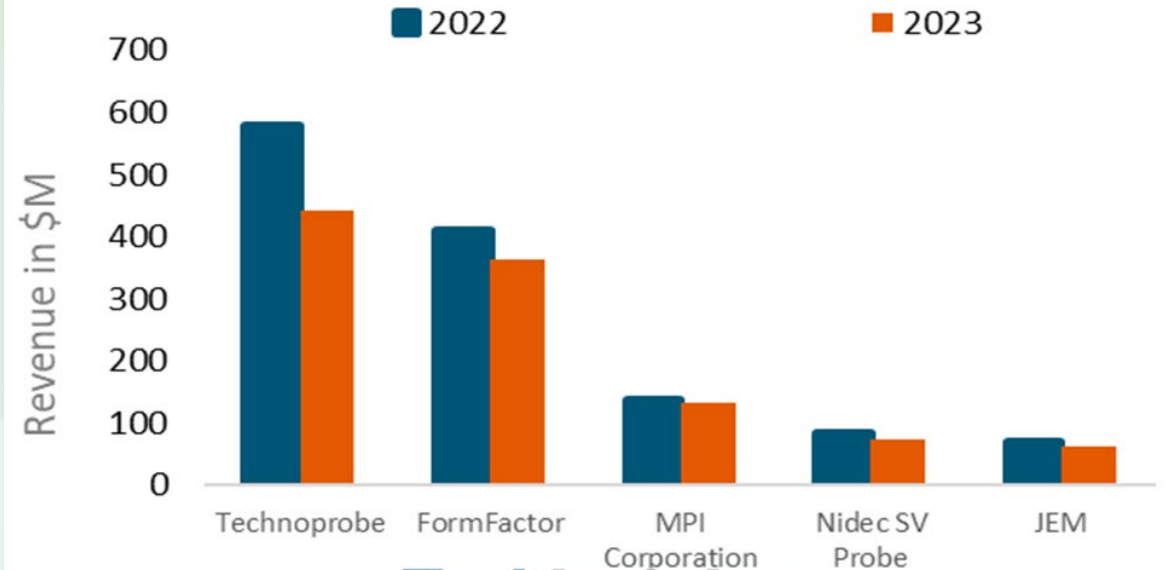
## Top 5 Memory Suppliers



**TechInsights**

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## Top 5 NonMemory Suppliers



**TechInsights**

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**TechInsights**

Thanks to TechInsights  
• Panchami Phadke



# Technical Program Overview

- **Sunday, June 2**
  - William Mann Memorial Benefit Golf Tournament
- **Monday, June 3**
  - Technical Program with a Visionary Keynote and 4-Technical Sessions / Poster Session
  - SWTest EXPO with 68-Key Suppliers and w/ Meal Reception Stations
  - Meet and Greet with the Speakers at the “Speaker’s Corner”
- **Tuesday, June 4**
  - SWT Crew Update and 3-Technical Sessions / Poster Session
  - SWTest EXPO with 68-Key Suppliers On-site
  - Meet and Greet with the Speakers at the “Speaker’s Corner”
  - Tuesday night Social and Networking Event
- **Wednesday, June 5**
  - Technical Program with 2-Technical Sessions
  - Conference adjourns



# Visionary Keynotes for 2024

**Known Good Die as a Key Enabler  
for Advanced Packaging in a  
Disaggregated World**



**Joseph PARKS, PhD**

VP of Technology  
Development  
Intel Corporation



**Packaging Trends in the  
Power Semiconductor Market**

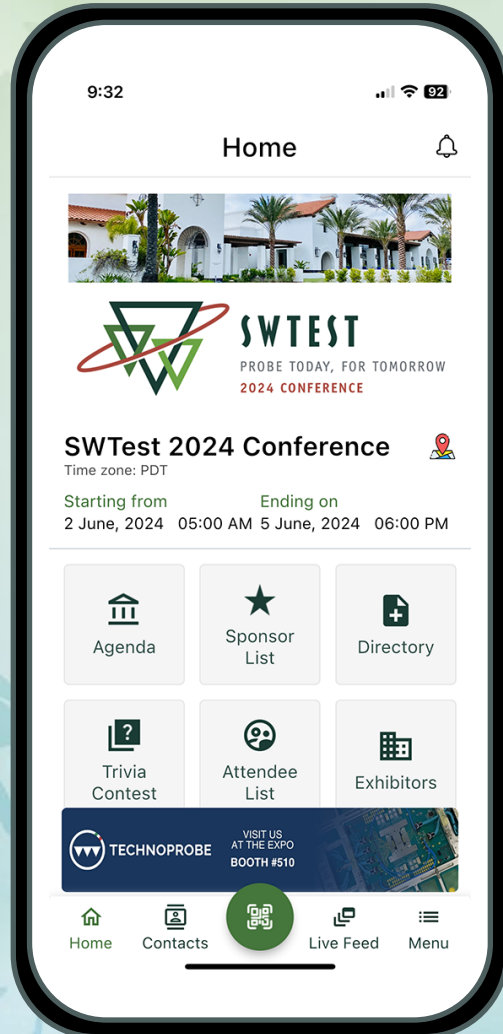


**Joseph ROYBAL**

SVP, Global Backend  
Operations  
Wolfspeed, Inc.



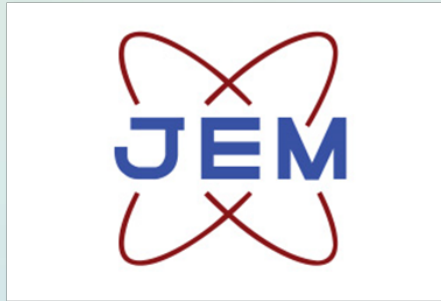
# SWTest Conference Mobile App



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 Agenda
- View Exhibitor and Sponsor Videos
- Read the Literature from the Exhibitors
- Connect with Attendees that have “opted-in”
- Check out the Job Board Postings

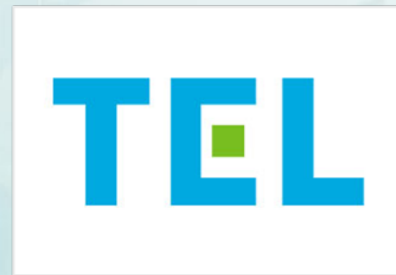
# Platinum Sponsors



# Gold Sponsors



# Silver Sponsors



# Recognition & Awards

- Best Overall Presentation
  - Best Data Presentation
  - Most “Inspirational” Presentation
  - Best Presentation, Tutorial in Nature
  - People’s Choice Award
- 
- A presentation from SWTest 2024 will be selected for publication in Chip Scale Review



# SWTest 2023 Awards

## Best Presentation, Tutorial in Nature

High Heat Dissipation: Facing New Challenges with High-Power Testing at the Wafer Level

Lane Huston (Micron Technology-USA)



## Most Inspirational Presentation (tie)

MEMS Probe Cards for Advanced High-Volume Inline Process Control Monitoring (PCM) and End-of-Line Wafer-Acceptance Tests (WAT)

Choon-Leong Lou, Yu-Ming Chien, Daniel Lo, Tee Whay Lim, Jee Fong Jong, Eric Sik Kiang Lau (STAr Technologies – Taiwan)

Flying Probe Card Design for Medical and Other Challenging Applications

Luca Fanelli (SPEA S.p.A. – Italy)





# SWTest 2023 Awards

## Best Data Presentation

## People's Choice Award

Maximizing CCC in a Probe Card and the March to an Unburnable Probe

David Raschko and Hadi Najjar (FormFactor – USA)



## Best Overall Presentation

High Speed Probe Card architecture for High End Devices

Xin-Reng Foo and Chee Hoe Lin (AMD – Singapore)

Raffaele Vallauri and Alberto Berizzi (TechnoProbe – Italy)



# 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 2024
  - Dipl.-Ing. Lea Andrea Lumper, *PhD Student at Montanuniversität Leoben (University of Mining Leoben/ Austria)*
  - Laura Mae Welcomer, *Undergraduate Student at Pennsylvania State University (University Park), State College, PA*

# Want to Learn More ?

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



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



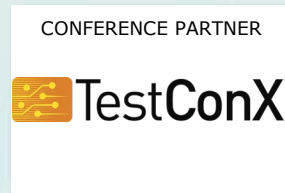
- **IEEE European Test Symposium (ETS)**  
<https://www.ieee-ets.org/>



- **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/>



# Monday, June 3, 2024

8:00 to 8:15 Opening Remarks for SWTest 2024

Jerry Broz, PhD (SWTest General Chair)

8:15 to 9:30 - Visionary Keynote

**Known Good Die as a Key Enabler for  
Advanced Packaging in a Disaggregated World**

**Joseph PARKS, PhD**

VP of Technology Development  
Intel Corporation

**intel**®

