



# Welcome to Session By Technical Education and Skilling on Empowering Bengal: Nurturing Future Ready Skills For A High Precision Work Force

**BENGAL GLOBAL  
BUSINESS SUMMIT**  
5-6 February '25



**Soumya Dey**

**Soumya Dey is a Senior R & D Manager for EDA (Electronic Design Automation) R & D operations of Keysight Technologies since January 2010. He joined Agilent Technologies EEsof as an R & D Manager in June 2005. Soumya is based in the Gurugram R & D center & collaborates with pan-India and worldwide teams**

In his current role, Soumya is responsible for efficient design & delivery of Electronic Design Automation products & plan, lead, manage & execute the Thermal Software Development, Verification Software Product Development, Worldwide Foundry Program & Software Licensing for Keysight Technologies Design Engineering Software (DES) EDA group. He is the lead University Ambassador of Keysight Technologies DES EDA & drives the University Program's India chapter collaborating with academia, start-ups & MNCs.

Soumya is a Quantum & Photonics technology enthusiast & collaborates with customers & educational institutions in adopting Keysight EDA QuantumPro & other measurement instruments for Quantum technology. He is also one of the founding members of the Keysight DES EPDA sub segment.

Prior to this role, Soumya was instrumental in starting the Software Development, Worldwide R & D Foundry Program and Design Flow Verification & Test in Agilent EMG EEsof India in Year 2005. Soumya holds Bachelors in Electronics & Communications Engineering from the University of Mysore, and a P.G.D.B.A., specializing in Finance from Symbiosis.

Prior to Keysight Technologies, Soumya was employed at GE Healthcare, MRI (Magnetic Resonance Imaging) R & D- John F Welch Technology Center, Bengaluru. Soumya has over 26 years of experience in Software & Firmware Design, Development, Prototyping, Quality & IP of healthcare & EDA products.



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**BENGAL** means BUSINESS



BGBS 2025

# Shift Left with Electronic Design Automation

Innovators

▶ start here





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# Maximize Agility and Free Up Designers' Time to Focus on What Matters



From **Lab to Field**, Keysight Empowers You to Develop and Deploy Faster

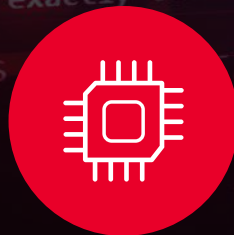
# Design for Context with the Modern Design Center



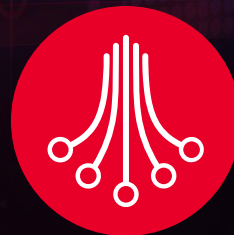
**Design RF  
Circuits**



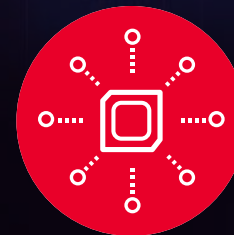
**Design RF  
Systems**



**Model and  
Characterize  
Devices**



**Design  
High-Speed  
Digital**

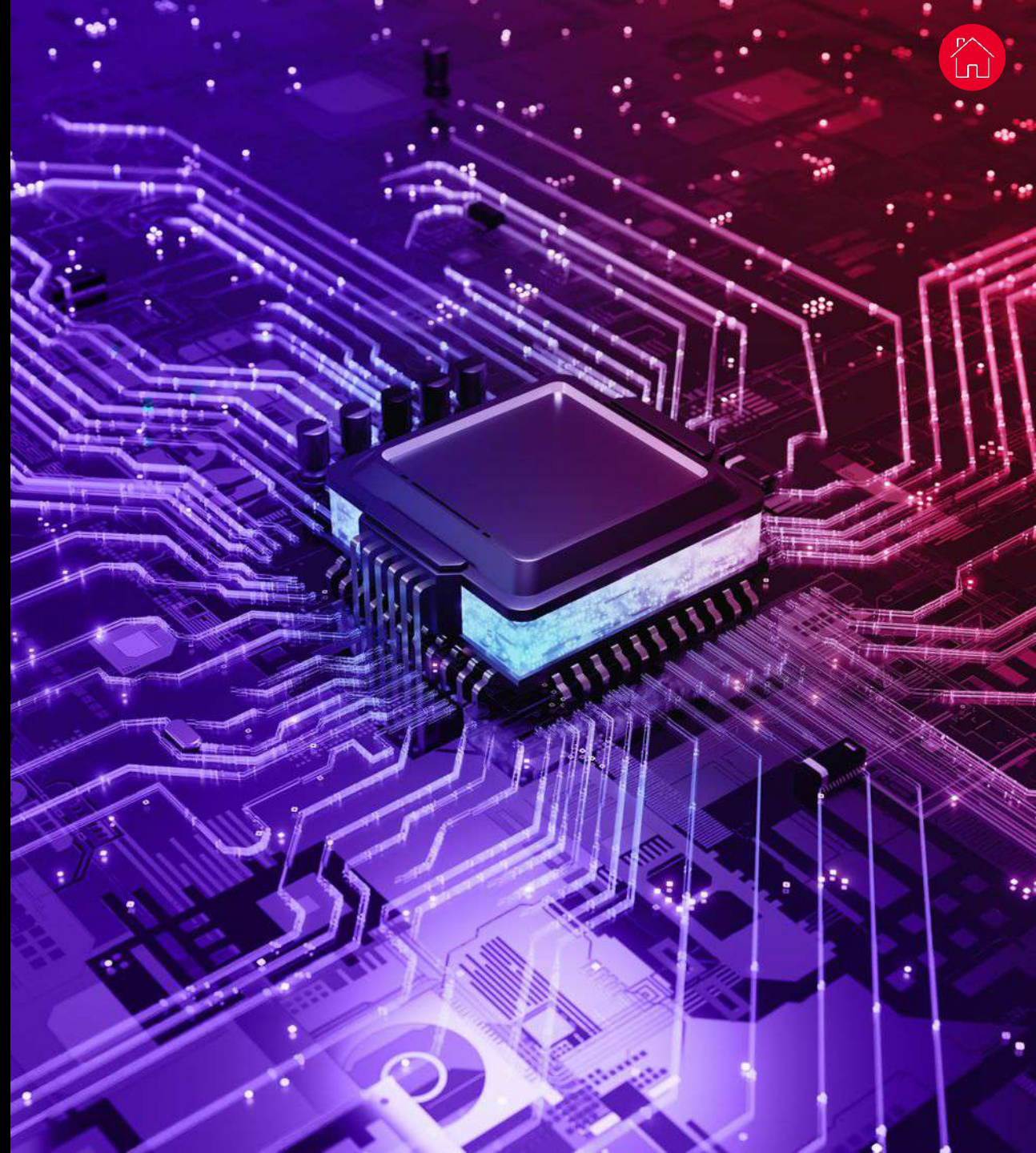


**Design Power  
Electronics**

# RF and Microwave Circuit Design

## Key Challenges

- Increasing complexity around system integration, including mixed fabrication technologies and phased array antennas in 5G MMICs and modules
- Assembling multi-technology structures and performing simulations across technology boundaries.

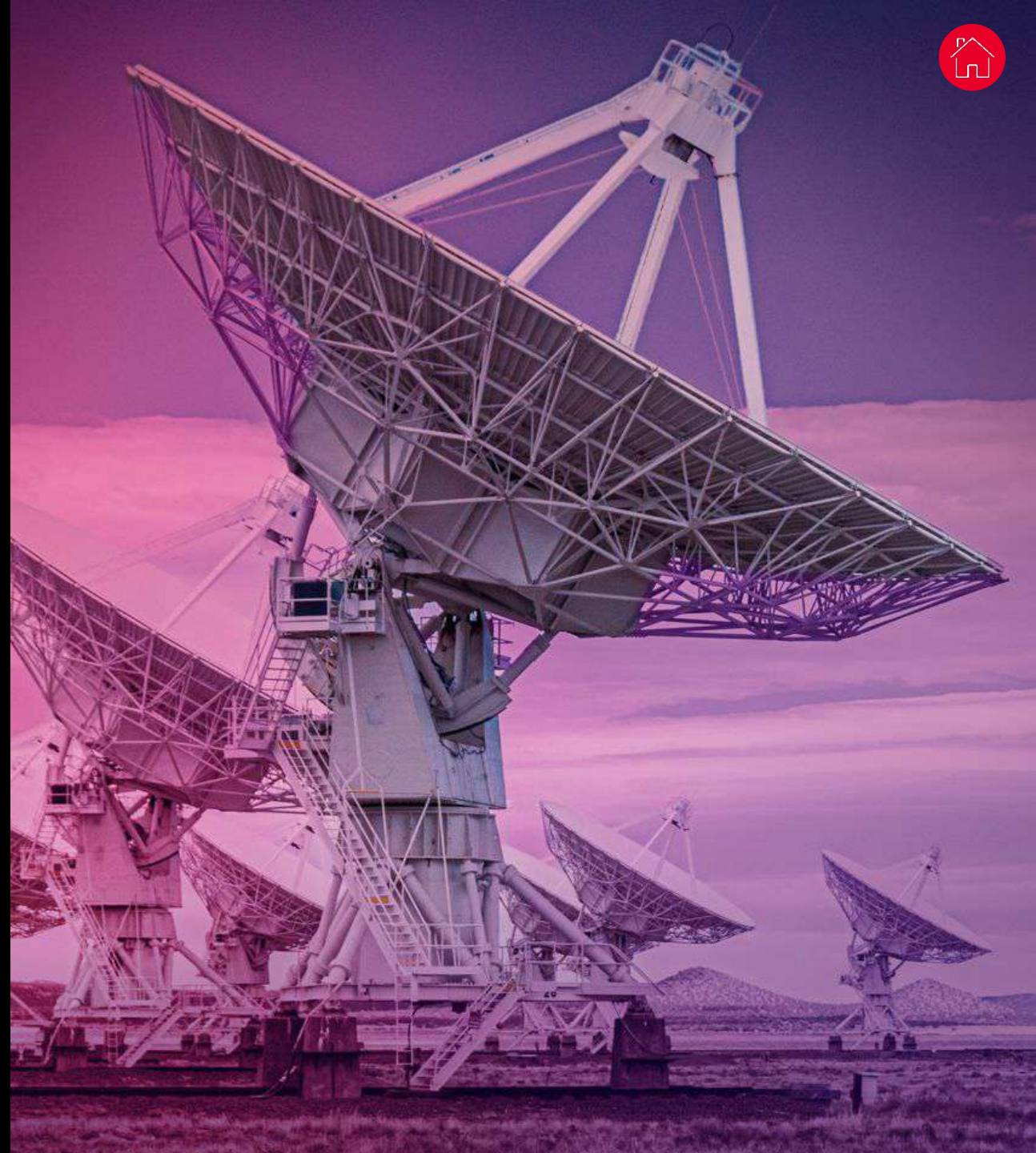




# RF System Modeling and Simulation

## Key Challenges

- High-fidelity modeling requires system architecture, DSP / baseband algorithm development, and RF system design.
- Accurate digital twin system models require integrated scenario-modeling and network simulation.





# Device Modeling

## Key Challenges

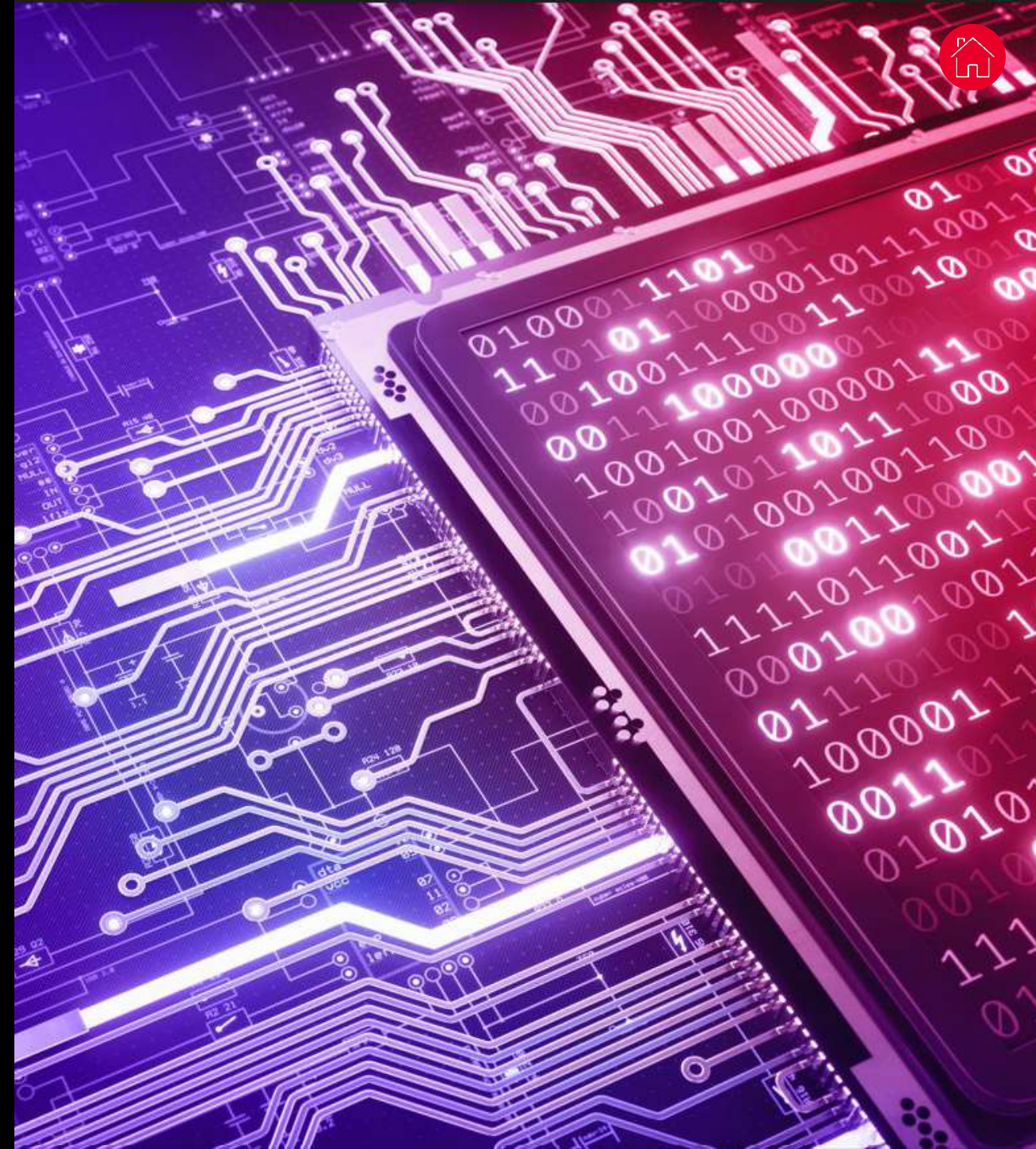
- Smaller technology nodes, higher frequencies, and new materials make model extraction increasingly intricate and data-intensive.
- In-house solutions lead to manual data workflows and resource-intensive maintenance, which diverts resources from model quality and leads to poor interoperability.



# Signal and Power Integrity

## Key Challenges

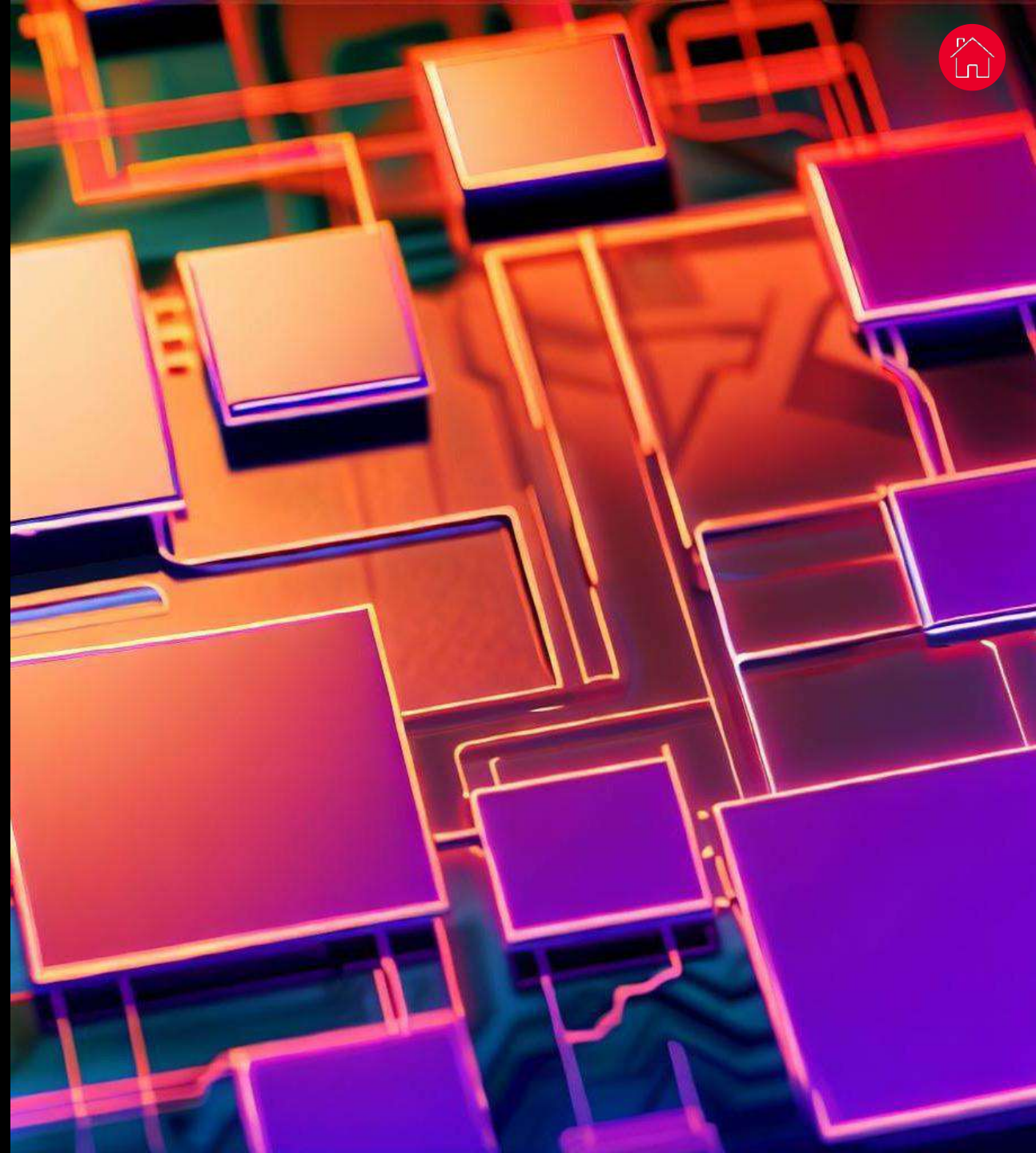
- Increasingly complex electronic devices that require more time to explore design tradeoffs with each new generation.
- New standards take time to become finalized. To be first with market-leading products, designers must deal with ever-changing specifications.



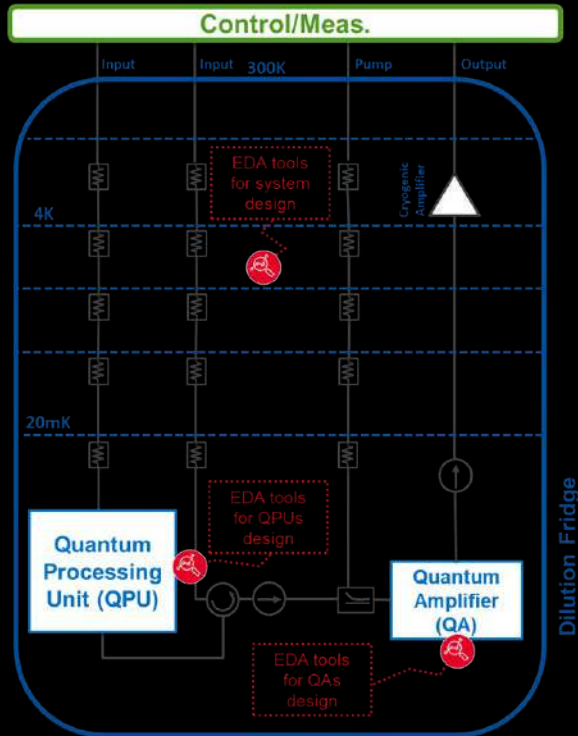
# High-Speed Digital Design Workflow

## Key Challenges

- The fast pace of technology and global competition have added to the pressure on designers to reduce go-to-market time.
- Eliminating inefficiencies can make or break new business opportunities. Knowledge silos and serialized workflows waste time and slow down time-to-insight.



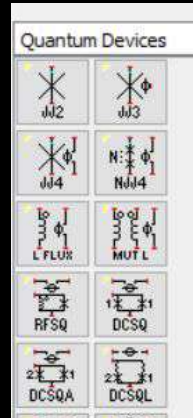
# Key Themes for Quantum EDA



## Components of a Superconducting Quantum Computer

1. Quantum Processing Unit (QPU)
2. Quantum Amplifier (QA)
3. Cryogenic Microwave System

Technology	Supercond. Qubits	Trapped Ions	Quantum Dots	Diamond Vacancies	Photonics	Cold Atoms
	Under the hood			Design		
Supercond. Qubits	Coplanar waveguide resonance circuits			Adjust frequencies, coupling etc.		
Quantum Amplifiers	Nonlinear parametric microwave circuits			Adjust gain, noise with a pump etc.		



	Quantum Layout	EM for Quantum	Quantum Circuit	Quantum System
Needs	Versatile and robust quantum layout	Faster design cycle for quantum chips	Gaining insights into complex quantum amplifiers	Gaining insights into quantum experimental setup
Specifics	<ul style="list-style-type: none"> <li>Wide range of quantum components</li> <li>Single and multilayers</li> <li>Easy circuit buildup</li> </ul>	<ul style="list-style-type: none"> <li>Multiple solvers (MoM, FEM)</li> <li>Multiple analysis (freq domain and eigenmode)</li> <li>Automated quantum extraction</li> </ul>	<ul style="list-style-type: none"> <li>Robust nonlinear analysis that can handle 1000s JJs</li> <li>Flux quantization</li> </ul>	<ul style="list-style-type: none"> <li>Noise analysis</li> <li>Pulsed system response</li> <li>What if troubleshooting</li> </ul>
Product	ADS Layout	QuantumPro	Quantum Ckt Sim	In the Roadmap!

Ofer Naaman, Research Scientist, Google Quantum AI, said: "Using Quantum Ckt Sim, it is now possible to enforce flux quantization conditions in ADS frequency-domain simulations of superconducting devices. This is a critical capability whose absence thus far limited the usability of modern EDA tools in microwave



# Photonic Design Flow Challenges

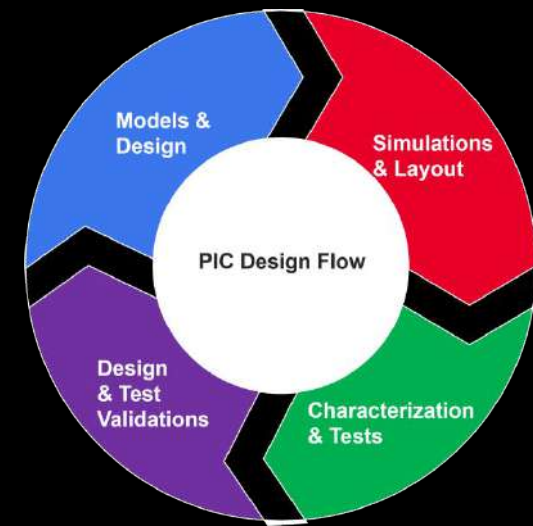
Issues cited by industry leading photonics design teams

- **Predictive Simulation**
  - Lack of accuracy
  - Capturing the underlying physics
  - Fast simulation
  - Achieving yield

**Photonic Design Workflow**  
 Fragmented solutions  
 Manual efforts – lack of automation

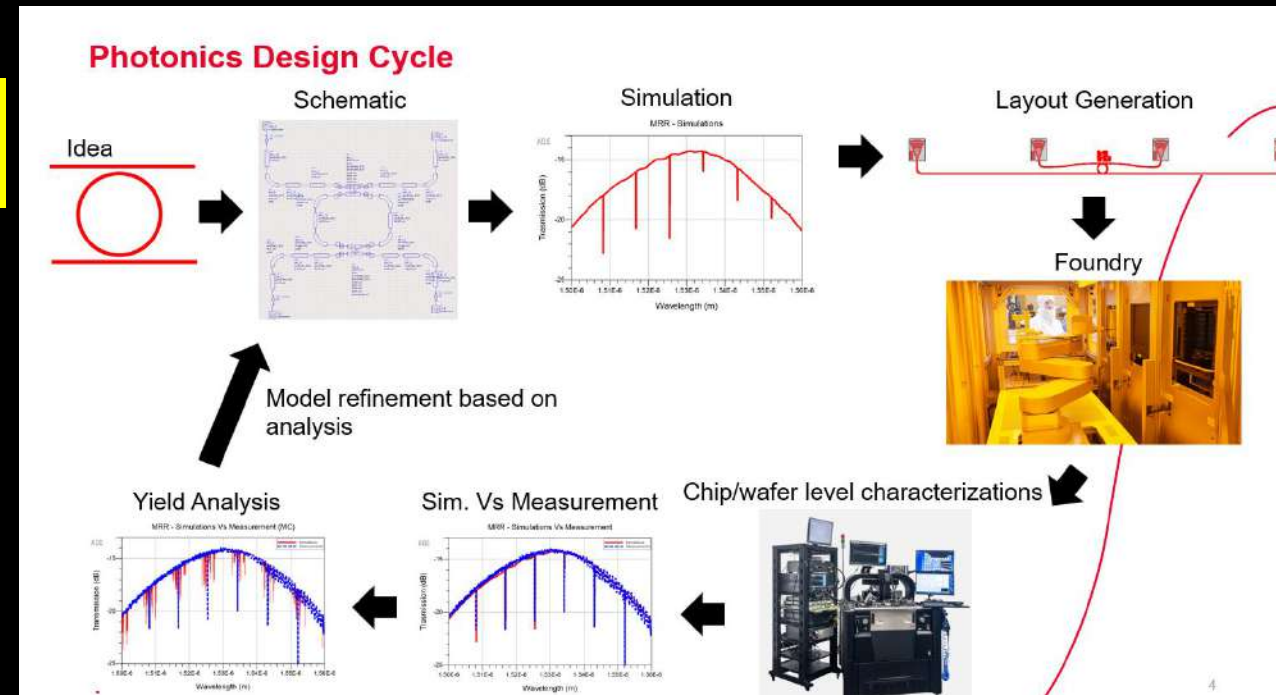
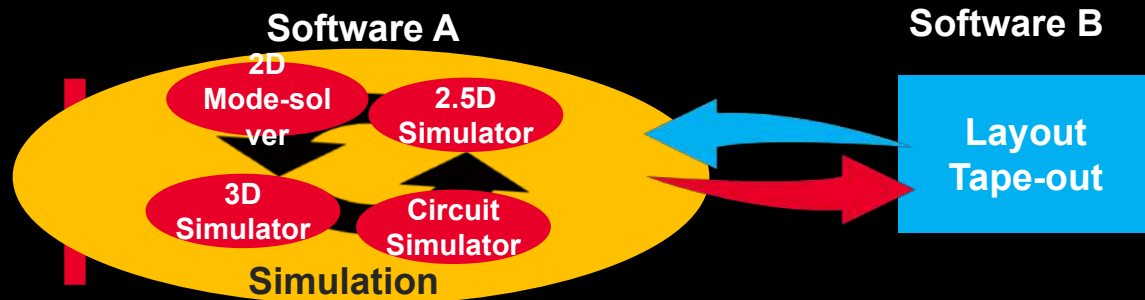
## Design & Test Eco-system

Not an easy way to correlate design and test results  
 Using measurements to update models



E-O-E design, simulation and measurement flow

**First to market in integrating 2D mode-solver into photonic component models. This eliminates manual efforts required during the circuit simulations**

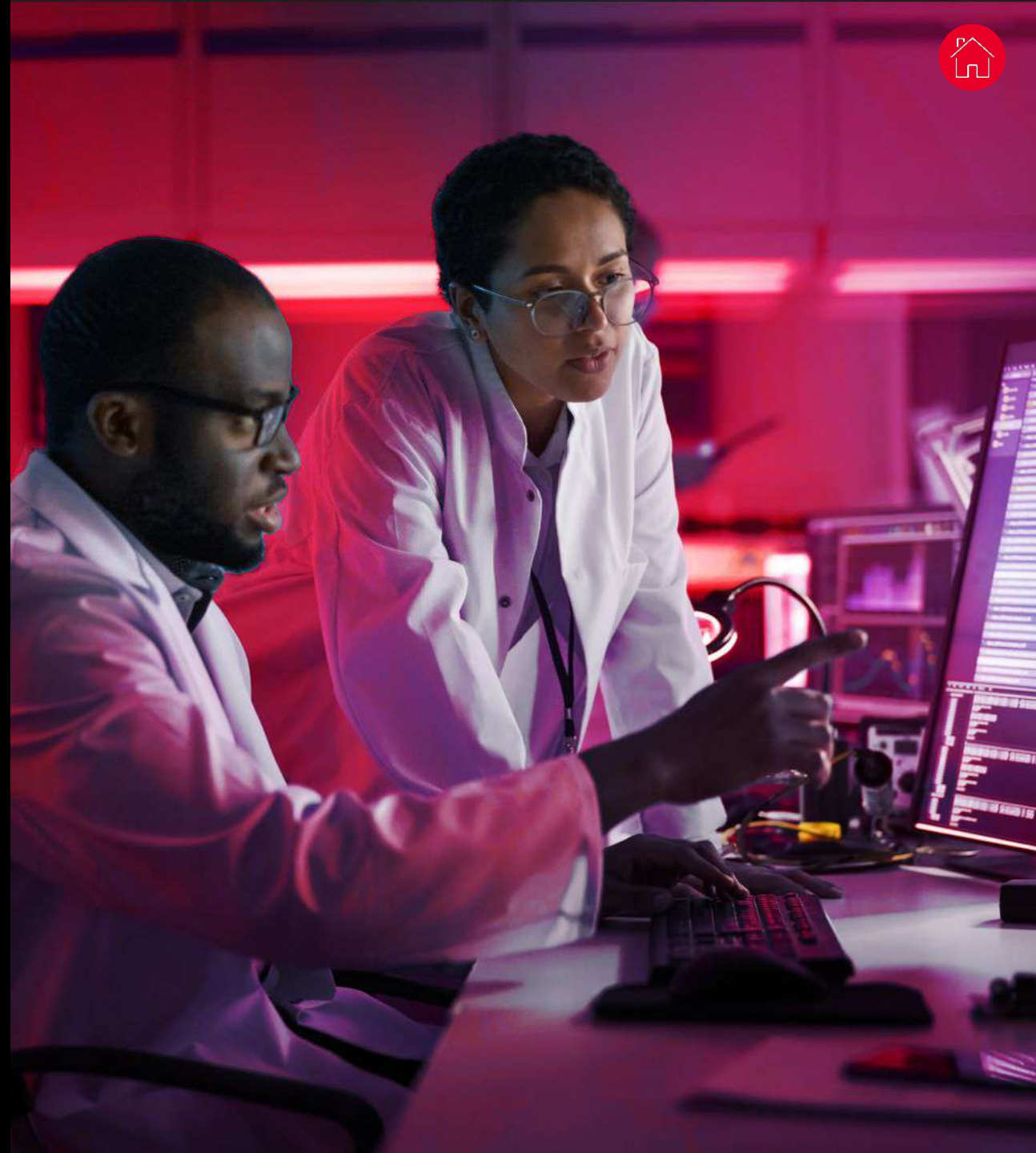




# Power Electronics Design

## Key Challenges

- Switched-mode power supplies produce noise and EMI that can interfere with other electronics and degrade performance and / or reliability.
- Higher voltage and current levels damage semiconductor parts on the board.
- With higher switching frequencies to reduce the filter sizes in power converters, switching loss becomes a major bottleneck.



# Semiconductor IC Designs

## Key Challenges

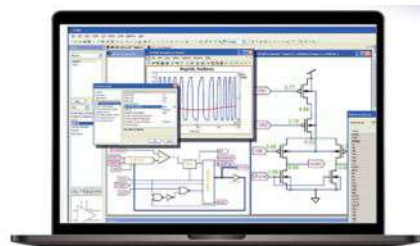
- Complex designs with large, globally distributed teams.
- Tight schedules and market window pressures.
- Multiple releases and variants.
- Need for traceability, especially in the automotive and aerospace / defense industries.





# Design Data and IP Management

- Accelerate your semiconductor IC designs.



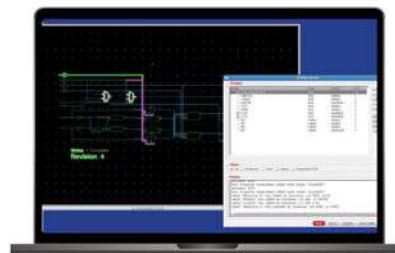
## Design Data Management

Design management for analog, mixed signal, digital and RF, and microwave designs.



## Intellectual Property Management

Manage IP, reuse, and traceability for design projects and the enterprise.



## Visual Design Reporting

Schematic and layout comparison tool for analog, mixed-signal, and RF designs in Cadence Virtuoso.

