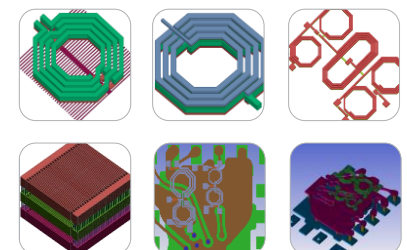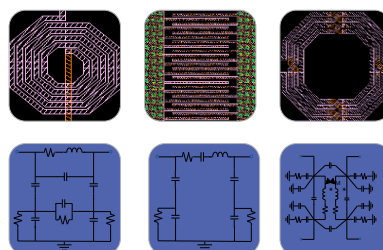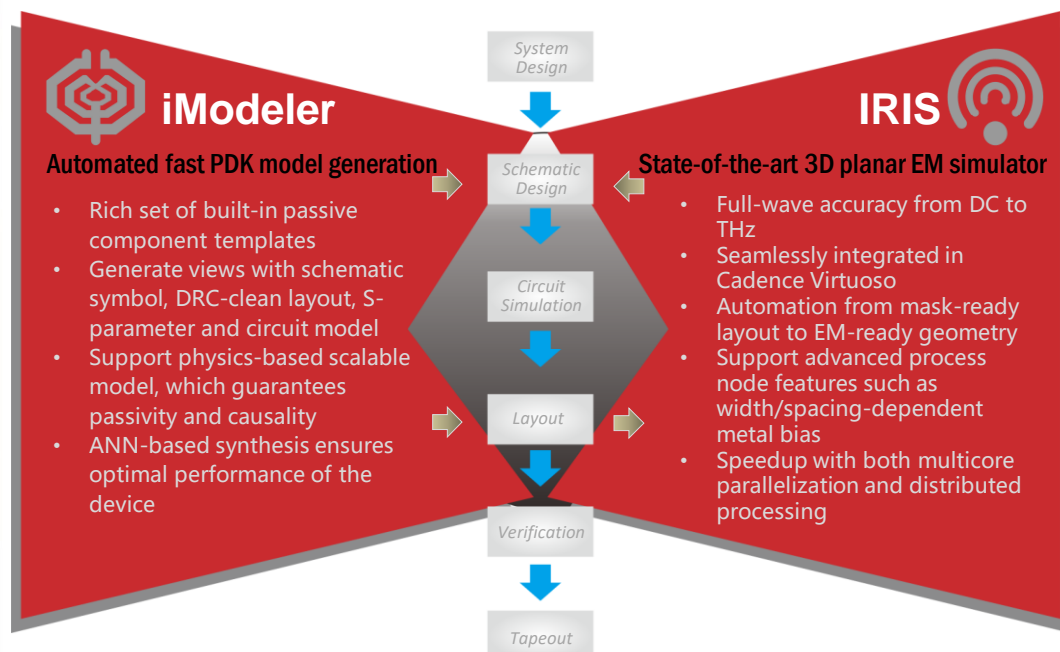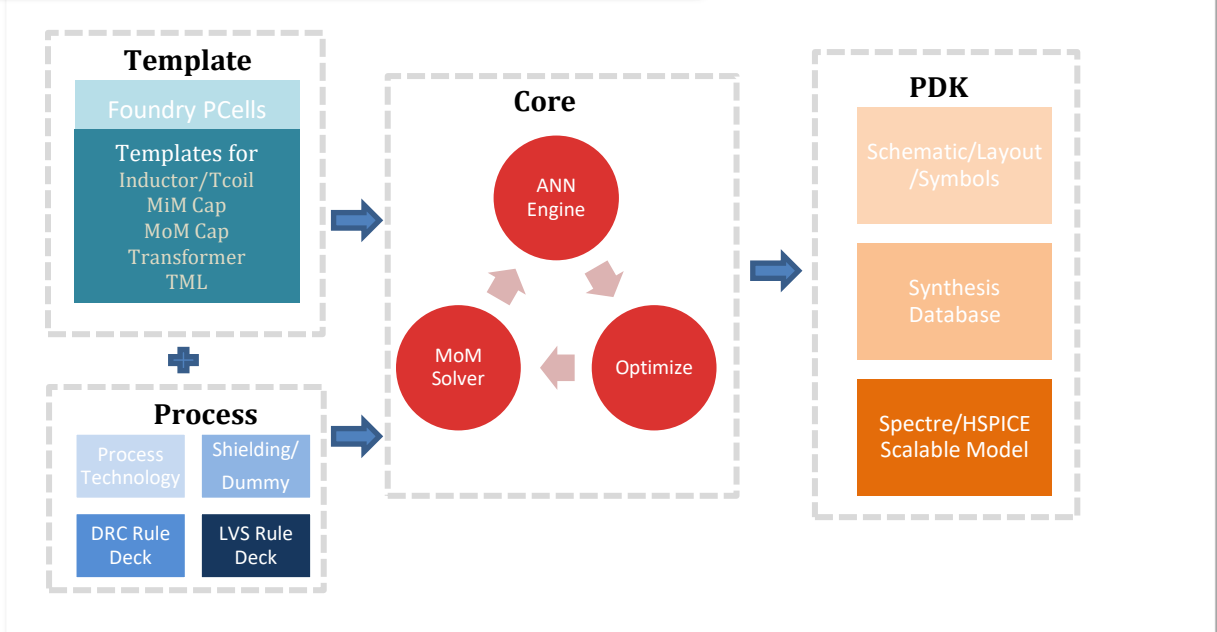# IRIS & iModeler:
A Complete EM Simulation Suite for On-Chip Passives in Advanced Nodes

Highlights

1 As semiconductor process keeps shrinking, on-chip passives in **advanced process nodes** require **three-dimensional** EM simulation.

2 5G moving to millimeter wave also requires EM simulation to be **full-wave**, accurate from DC to THz.

3 **IRIS** is the state-of-the-art EM simulation technology tailored to **Advanced Process Nodes.** It has been certified by multiple leading foundries and widely adopted by fabless design companies. IRIS support MPI to improve the limitation of simulation scale.

4 **iModeler** automates the PDK model generation with the rich set of built-in templates or third-party PDK. It is ideal for PDK engineers to generate parameterized models.

iModeler
Automated fast PDK model generation

- Rich set of built-in passive component templates
- Generate views with schematic symbol, DRC-clean layout, S-parameter and circuit model
- Support physics-based scalable model, which guarantees passivity and causality
- ANN-based synthesis ensures optimal performance of the device

IRIS
State-of-the-art 3D planar EM simulator

- Full-wave accuracy from DC to THz
- Seamlessly integrated in Cadence Virtuoso
- Automation from mask-ready layout to EM-ready geometry
- Support advanced process node features such as width/spacing-dependent metal bias
- Speedup with both multicore parallelization and distributed processing

System Design

Schematic Design

Circuit Simulation

Layout

Verification

Tapeout

iModeler: Automated Fast PDK Model Generation

Template

Foundry PCells

Templates for
Inductor/Tcoil
MiM Cap
MoM Cap
Transformer
TML

+

Process

Process Technology

Shielding/ Dummy

DRC Rule Deck

LVS Rule Deck

Core

ANN Engine

MoM Solver
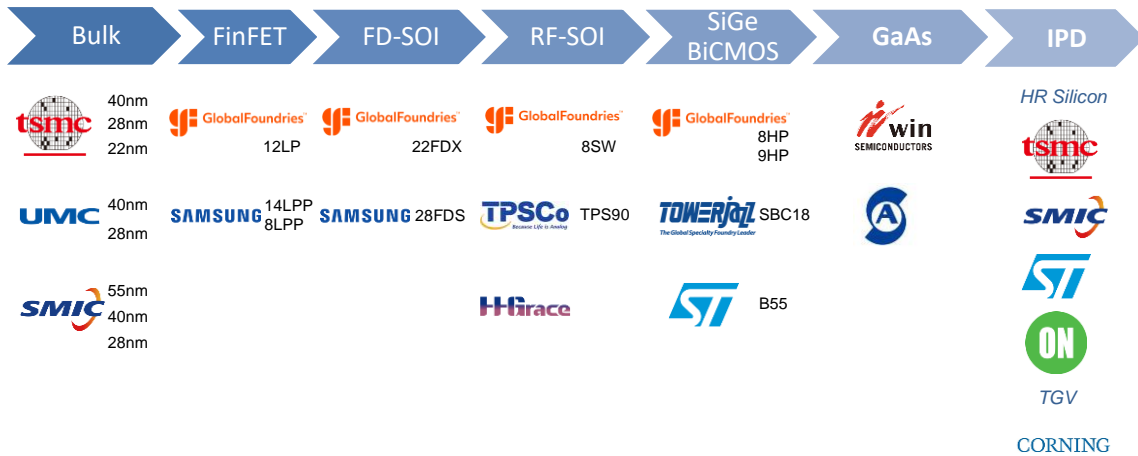
Optimize

PDK

Schematic/Layout /Symbols

Synthesis Database

Spectre/HSPICE Scalable Model

IRIS: Foundry Certified EM Simulator

- IRIS has been widely adopted for IC designs in many different foundry process nodes.

Bulk	FinFET	FD-SOI	RF-SOI	SiGe BiCMOS	GaAs	IPD

HR Silicon

tsmc 40nm 28nm 22nm	**GlobalFoundries** 12LP	**GlobalFoundries** 22FDX	**GlobalFoundries** 8SW	**GlobalFoundries** 8HP 9HP	**win** SEMICONDUCTORS	**tsmc**
UMC 40nm 28nm	**SAMSUNG** 14LPP 8LPP	**SAMSUNG** 28FDS	**TPSCo** TPS90	**TOWERJAZZ** SBC18	**A**	**SMIC**
SMIC 55nm 40nm 28nm		**HHrace**	**ST** B55			**ST**
						ON

TGV

CORNING

- IRIS gives excellent correlation with measured data.

	Qmax %	L %
Meas	4.4%	0.3%

	TIME(s)
IRIS	1.5h
Ref	18h