삼성전자 메모리사업부 주요업무 분야

□ Hardware Design / Analog, Digital, PHY Circuit Design / Verification

- High speed I/O Circuit Design (SERDES/PLL/DLL/Equalizer etc)

Analog & CMOS Mixed Circuit Design (ADC/DAC/TDC/BGR/LDO/Temperature sensor)

Signal Integrity & Power Integrity

DRAM(DDR/mobile/Graphic) , Flash memory(Nor/Nand), DDRPHY, Controller PHY

PRAM digital circuit design(RTL coding, Synthesis, STA)

DRAM/Flash memory architectural design, DFT(SCAN, MBIST) design, Low power design

FPGA integration, implementation

Verilog modeling, system verilog verification(SVA)

Chip design verification(include UVM) & Integration & Implementation

Cycle based system architectural design w/ virtual platform

SATA, SAS, PCIe, USB2.0/3.0, SD/MMC interface,

ARM-based embedded SW development & HW validation,

System Verilog Verification, FPGA Implementation & Verification,

Signal Processing Algorithm Development for Memory & Storage System,

Channel Codes(Error Detection/Correction Codes) Design & HW/FW IP Design

□ Software Design / Security / Verification

- System SW, Computer Architecture, Memory & Storage Algorithm Design

FTL, Flash Memory File System, Journaling File System Design, Linux file system(ext4)

Virtual Memory Management, Cache Algorithm

Dynamic Memory Management Development

Application Processor, Multimedia Processor, Memory Card Controller F/W

Inter-Processor Communication Algorithm Design

Parallel Processing Algorithm for SMP/AMP multi-Processor

HW & SW Performance Trade-off, SW Engineering

Embedded System Test, Test Case Design, Dependability, Fault Tolerant System Test

Embedded System Development Process, Performance Analysis, OS, I/O System

Storage System, Infra(Clear Case, Clear Quest, Test Automation Tool)

Filesystem Failure Analysis

Computer/Memory/Storage Architecture

Performance and power modeling of circuits and systems

High-Level Synthesis

FPGA based data processing algorithms and system for memory and strorage

Linux Kernel Block Layer analysis and development

Linux Device Driver, Block I/O Tracing in Linux

Security system and applications for memory & storage system

Embedded Security and security IP design

Analysis of system vulnerabilities

Information theory and cryptography algorithm

□ Artificial Intelligence / Machine Learning / RTL Design

- Data Mining, Machine Learning, Genetic Algorithm, Optimization Algorithm

A.I, Image Processing, Computer Vision

Big Data Handling & Statistical Analysis

Machine Learning(Deep Learning) Algorithms

ML/DL HW Accelerator Design / Neural Processing Unit Design

Hybrid storage based data processing algorithms

RTL(Synthesis), Code/Function/Interface Coverage Verification

Sign-Off, Static Timing Closure

Block Level & Post Layout Based Simulation (for RTL Block)

□ Analog , Function, ESL Verification / Automated Testing

- Engineering Statistics & Quality : DOE(Design of Experiment), Sampling Methodology,

DRAM/FLASH Circuit Modeling(Circuit element/Core/Analog)

Std Cell Library Characterization

SPICE, Fast Spice Based Simulation Methodology

Mixed(Digital + Analog) Design Simulation Technology

Electrical Sign-Off (Topology, Timing, Power, Noise etc)
Static Timing Analysis(Transistor Level, Gate Level)
Low Power Circuit Design & Analysis Development
High speed I/O Verification (UFS M-PHY, PCIe PHY, NAND PHY)
Using Oscilloscopes and Logic Analyzers
SI/PI(EYE Diagram, Jitter, BER Test/Analysis)
Performance Modeling of Circuits and Systems
SystemC TLM, Embedded SW Development/Verification
ESL Modeling Tool (e.g., Platform Architect, Simics)
Architecture Simulator (e.g., gem5, QEMU), Power Modeling of Circuits and Systems
Automated Testing methodology, Make SoC test scenario (Unit/Integrated/Matrix)
Script language (Python/bash)

☐ **Device Process**

- Oxidation, Photo Resist, Photolithography, Etch, Diffusion, Cleaning, Thin Film, Ion Impantation, CVD, Metallization, Device Isolation, Transistor, Capacitor, Dielectric, SiO2/SiON Gate Dielectrics, High-K/Metal Gate, Device Analysis

☐ **Manufacturing Technology**

- Yield Enhancement : Defect Reduction, Contamination Evaluation Technology, Particle Detection, Gas Impurity Evaluation Technology, Surface/Chemical Analysis Technology, Contamination Technology
- Metrology : Pattern Process Inspection, Critical Dimension Measurement Inspection & Metrology : Defect Inspection(Optic Inspection, E-beam Inspection), Optics System Design(Optical Microscopy, Ellipsometer, Interferometer, Laser Optics, Optic Design), Mechanical System Design(Stage Control, Vibration Simulation, System Noise Analysis), Advanced Metrology Technology(Scanning Electron Microscopy, X-ray System, Helium Ion Microscopy), Simulation Technology(Monte Carlo Simulation, RCWA&FDTD Simulation for light and electron)
- Equipment Engineering : Preventive Maintenance, Break Maintenance, Automated Equipment System Development, Equipment Development

☐ Quality Engineering for Semiconductor

- Engineering Statistics & Quality : DOE(Design of Experiment), Sampling Methodology, Virtual Metrology, Multi-Stage SPC (Statistical Process Control), APC (Advanced Process Control) Multivariate Modeling & Analysis
- Data Mining : Clustering & Classification, Feature Extraction & Selection, Dimension Reduction
- Stochastic Modeling & Focasting : Scheduling, Queing
- Reliability Modeling & Availability : System, Software, Component Level

☐ Reliability Technology for Semiconductor

- Device Reliability(DRAM, Flash), Advanced Gate Stack Reliability,
- Novel Device Reliability(PCM, MRAM, etc),
- Device Characterization and Reliability Modeling
- Design-In Reliability, Interconnect Reliability, Electro-migration, Stress-migration
- BTS (Bias Temperature Stress), 3D interconnect, Thin Film Stress analysis
- Novel Materials for Interconnects Circuit Reliability
- Failure Analysis & Life Time Projection - Package level reliability, Solder joint reliability, Board level reliability

☐ Sales / Marketing / Product Planning

- B2C/B2B sales strategy planning
- Product mix strategy planning based on market situation (Supply & Demand)
- Price & volume strategy planning (Market Intelligence)
- Product portfolio management (~ end of life)
- New product promotion strategy planning
- Marketing communication strategy (Contents/Event/Digital marketing)
- Discovering new memory business/application
- Next generation memory product planning (Spec.)
- Eco system build-up (Validation, tech., support, etc.)
- Business strategy planning & customer tech. support

참고) 메모리사업부 Solution 세부분야

☐ Computer Architecture

- Processor core architecture, GPGPU architecture, accelerators
- Memory hierarchy design, DRAM controller, cache coherence
- On-chip network, system interconnects
- System virtualization support
- I/O architecture and interfaces, storage architecture
- Software based computer system simulation methods
- FPGA based system prototyping and validation
- Performance and power modeling of circuits and systems

☐ Systems Architecture

- OS-level resouce management
- Distributed systems and resource management
- Virtualization
- Device drivers
- Storage subsystems and management, caching, tiering, deduplication
- RAID and other reliability enhancing methods
- Flash based systems
- Hybrid storage solutions

☐ Big Data Systems and Applications

- Disk and memory based DB systems
- High-performance data appliances
- FPGA based data processing algorithms and systems
- Hadoop based data analytics
- Key-value store systems
- Hybrid storage based data processing algorithms

☐ Coding Theory

- Error correction and detection for/across memory chips,
  Memory modules and systems
- Error correction and detection for storage systems
- Novel coding techniques to reduce storage medium wearing
- Compression algorithms, pattern matching and detection

☐ **Embedded Systems**

- Firmware development & system bring-up
- Hardware-software codesign
- FPGA based prototyping