
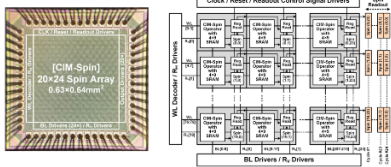
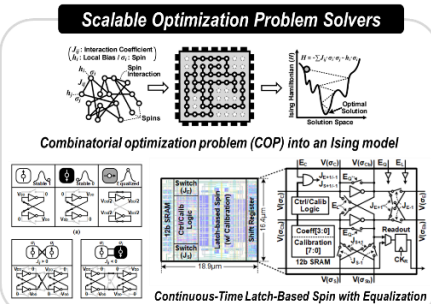
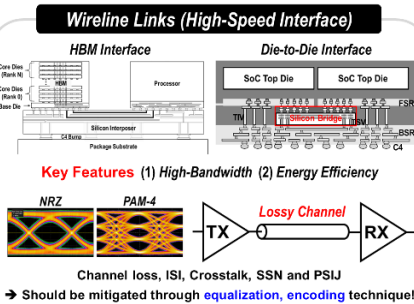


<Professor Bongjin Kim>

<div></div>	■ Contact information		
	Professor	Email: bongjin@kaist.ac.kr	Tel: 7479
	Office	E3-2, Room 5228	
	Website	http://bongjin.com	
■ Current state of the Lab. (2025 Spring) PhD Student: 1 Master's Student: 5			
■ Research Areas			
Vision: Develop VLSI circuit, system, and chip design techniques and application/domain-specific hardware accelerators for sustainable next-generation computing & communication			
○ Processing-in-Memory, AI/ML Hardware Accelerators			
<ul style="list-style-type: none">Hybrid analog/digital PIM macros & processorsOn-device inference/training using foundry memory			
○ Scalable Optimization Problem Solvers			
<ul style="list-style-type: none">Ising machine: Physical-inspired computingLarge scale, high-precision, densely-connected digital Ising Processor for solving domain-specific problems			
○ Wireline Links			
<ul style="list-style-type: none">TRX Signal Integrity ImprovementHigh-Bandwidth Memory (HBM) and Die-to-Die (Chiplet) InterfaceComputing-communication co-design and optimization			
<div><div><div><p>PIM & Hardware Accelerator for AI/ML</p><p>Application</p><div><div>(1) Autonomous Driving<ul style="list-style-type: none">✓ Safety Assurance✓ Collision Avoidance</div><div><div>(2) Cyber Security<ul style="list-style-type: none">✓ Intrusion Detection✓ Threat Prediction</div><div><div>(3) Aerospace & Defense<ul style="list-style-type: none">✓ Missile Systems✓ Fault Tolerance</div></div></div></div></div><div><div><p>Scalable Optimization Problem Solvers</p><p>Combinatorial optimization problem (COP) into an Ising model</p><p>Continuous-Time Latch-Based Spin with Equalization</p></div></div><div><div><p>Wireline Links (High-Speed Interface)</p><p>Key Features (1) High-Bandwidth (2) Energy Efficiency</p><p>NRZ, PAM-4, TX, Lossy Channel, RX</p><p>Channel loss, ISI, Crosstalk, SSN and PSIJ</p><p>→ Should be mitigated through equalization, encoding technique!</p></div></div></div></div>			
■ Recommended courses: Circuit courses (analog, digital, and mixed-signal), computer architecture, VLSI, Digital systems			
■ Career after graduation: Recently graduated students joined academia and research institutes (Peking University, SLAC at Stanford, CAS) and industry (AMD, Micron, SK Hynix, SAMSUNG).			
■ Introduction to the Lab.			
<ul style="list-style-type: none">We have been working on the design VLSI circuit for sustainable next-generation computing & communication.We regularly gather and have dinner at local restaurants and sometimes go for drinks. We will also plan for having regular fun activities.			
■ Recent research achievements			
- Recent top conference and journal publications: 6 ISSCC, 4 CICC/VLSI/ESSERC, 9 JSSC Papers (from 2022 to 2024)			
- Recent student awards: 2 SSCS Pre-Doctoral Awards, 1 SSCS Rising Star Award, Multiple SSCS Student Travel Awards			
1. VIP-Sat: A Boolean Satisfiability Solver Featuring 5×12 Variable In-Memory Processing Elements with 98% Solvability for 50 Variables 218 Clauses 3-SAT Problems, IEEE ISSCC 2024			
2. CTLE-Ising: A 1,440 Spins Continuous-Time Latch-based Ising Machine with One-Shot Fully-Parallel Spin Updates Featuring Equalization of Spin States, IEEE ISSCC 2023			
3. A 65nm 8T SRAM Compute-In-Memory Macro with Column ADCs for Processing Neural Networks, IEEE JSSC, Nov. 2022			
4. FlexSpin: A Scalable CMOS Ising Machine with 256 Flexible Spin Processing Elements for Solving Complex Combinatorial Optimization Problems, IEEE ISSCC 2022			
5. A 28nm 29.2TFLOPS/W BF16 and 36.5TOPS/W INT8 Reconfigurable Digital CIM Processor with Unified FP/INT Pipeline and Bitwise in-Memory Booth Multiplication for Cloud Deep Learning Acceleration, IEEE ISSCC 2022			