UNIVERSITY of STIRLING | RAS AL KHAIMAH CAMPUS

ICAIN-2025
International Conference on Artificial Intelligence and Networking

Organized by
University of Stirling - RAK Campus, UAE

10th - 11th October 2025

*************** CALL FOR PAPERS ***************

SPECIAL SESSION ON

Transforming VLSI Circuit Design through Artificial Intelligence

SESSION ORGANIZERS:

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EDITORIAL BOARD: (Optional)

[Name, University or Organization, Country, e-mail]

SESSION DESCRIPTION:

The integration of Artificial Intelligence (AI) into Very-Large-Scale Integration (VLSI) design has marked a paradigm shift in Electronic Design Automation (EDA). AI-driven tools are redefining traditional workflows by enabling faster design space exploration, better power-performance-area (PPA) trade-offs, and intelligent decision-making in synthesis, placement, routing, and verification. This paper reviews recent advancements in applying AI to VLSI design, examines industrial implementations, and explores the challenges and opportunities presented by this convergence.

The complexity of integrated circuits has surged exponentially in recent decades, demanding innovative design methodologies. Traditional algorithmic approaches, while robust, face challenges in managing growing design complexities and ensuring optimal performance within time and cost constraints. Artificial Intelligence (AI), with its data-driven and adaptive capabilities, has emerged as a transformative force in the domain of VLSI circuit design. By learning from historical design data and dynamically optimizing workflows, AI augments human decision-making and accelerates design closure.

RECOMMENDED TOPICS:

1. **AI in Electronic Design Automation (EDA):** Integration of AI into traditional EDA tools and workflows.
2. **Design Space Exploration using AI:** Leveraging AI for rapid and efficient exploration of design alternatives.
3. **Power-Performance-Area (PPA) Optimization:** AI-driven methods to optimize trade-offs between power consumption, performance, and chip area.
4. **AI in Logic Synthesis:** Enhancing logic synthesis through machine learning algorithms.
5. **Placement and Routing using AI Techniques:** Applying AI to optimize layout and interconnect strategies.

6. **Verification and Testing with AI:** Use of AI in functional verification, formal verification, and automated testing.
7. **Machine Learning Models for Design Prediction:** Predictive modeling for estimating timing, congestion, and power.
8. **Reinforcement Learning in VLSI Design:** Application of reinforcement learning for sequential decision-making in the design flow.
9. **Industrial Applications and Case Studies:** Real-world implementations of AI-driven VLSI design in industry.
10. **Challenges and Limitations of AI in VLSI:** Addressing issues like data availability, model interpretability, and integration complexity.
11. **Future Trends and Opportunities:** Emerging research directions and potential breakthroughs in AI-VLSI integration.

SUBMISSION PROCEDURE:

Researchers and practitioners are invited to submit papers for this particular theme session on **[session name]** *on or before* **[30th May 2025]**. All submissions must be original and may not be under review by another publication. INTERESTED AUTHORS SHOULD CONSULT THE CONFERENCE'S GUIDELINES FOR MANUSCRIPT SUBMISSIONS at https://www.icain-conf.com/downloads. All submitted papers will be reviewed on a double-blind, peer-review basis.

NOTE: While submitting a paper in this special session, please specify [Session Name] at the top (above paper title) of the first page of your paper.

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