IEEE COINS 2026

IEEE International Conference on Omni-layer Intelligent Systems

Univ. of Bologna, Italy | September 7-9, 2026 |

https://coinsconf.com

The IEEE International Conference on Omni-Layer Intelligent Systems (https://coinsconf.com) brings together researchers, engineers, and industry leaders to advance next-generation AI and intelligent systems spanning devices, architectures, and applications. It emphasizes cross-layer co-design, energy-efficient and secure computing, and the responsible integration of AI from embedded and edge platforms to agentic and autonomous systems. COINS serves as a premier forum to exchange ideas, showcase innovations, and shape the future of intelligent, connected, and sustainable technologies. The technical program of IEEE COINS 2026 is organized into four thematic clusters—Enabling Intelligence, Connected Intelligence, Trusted and Autonomous Intelligence, and Human-Aligned and Applied Intelligence—each encompassing multiple tracks that collectively span the entire lifecycle of intelligent systems, from device-level design to large-scale, ethical, and domain-driven deployment:

Cluster 1: Enabling Intelligence (Hardware – Design – Architecture)

1. ***Track1***: AI Hardware, Circuits, and Devices
2. ***Track2***: AI-Driven Design Automation and Optimization
3. ***Track 3***: AI Architectures and Systems Design

Cluster 2: Connected Intelligence (Network – Cloud – IoT)

4. ***Track4***: AI-Native Connectivity, Networks, and Distributed Intelligence
5. ***Track5***: Cloud, Infrastructure, and Data-Centric Intelligence
6. ***Track6***: Internet of Things (IoT) and Cyber-Physical Intelligence

Cluster 3: Trusted and Autonomous Intelligence (Security – Agency – Cognition)

7. ***Track7***: Secure, Reliable, and Trustworthy AI Systems
8. ***Track8***: Agentic and Robotic AI Systems
9. ***Track9***: Foundational, Generative, and Cognitive AI

Cluster 4: Human-Aligned and Applied Intelligence (Human – Ethics – Industry)

10. ***Track10***: Human-Centered AI, Interaction, and Visualization
11. ***Track11***: Responsible, Ethical, and Sustainable AI
12. ***Track12***: Vertical Applications in Smart Cities, Industry 4.0, Healthcare, Agriculture, and Emerging Sectors

New Important Dates:

- **Full paper** submission: **29 April** 2026
- Special session, workshop, tutorial proposal submission: 29 April 2026
- Acceptance notification: 2 June 2026
- Camera-ready submission: 29 June 2026

Featured Program Activities

1. Panels
2. Diversity, Equity, and Inclusion
3. Industrial Talks
4. Workshops/Tutorials
5. Special Sessions
6. Workforce Development

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Call for Papers

Confirmed KEYNOTE SPEAKERS

Luca Benini

University of Bologna, Italy – ETH Zurich, Switzerland

Designing Digital Platforms for Wearable Contextual intelligence

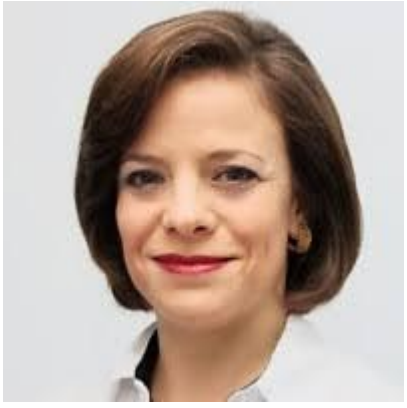
Wearable devices are evolving toward smart, context-aware digital assistants by leveraging rapidly increasing generative AI capabilities on device, at the extreme edge. Running multimodal generative AI models on a wearable device requires tackling major challenges in model distillation, as well as in energy and latency aware hardware-software platform design. In this talk I will explore model-to-chip design for wearable contextual intelligence, focusing on brain inspired heterogeneous computing with multi-domain acceleration.

Monday 7th 2026
9-10 a.m. CEST

Confirmed INDUSTRIAL KEYNOTE

Valeria Tomaselli

SW Design Senior Team Leader
STMicroelectronics



Tuesday 8th 2026
1-1.45 p.m. CEST

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Confirmed KEYNOTE SPEAKERS

Vijay Janapa Reddi

Harvard University, USA

From Omni Layer AI to AI Engineering: Why Intelligent Systems Need a Discipline

AI spans the computing stack—from in-memory hardware and chiplets to cloud models, agentic autonomy, and safety deployments. Conferences like COINS unite these layers, yet intellectual foundations fragment: hardware optimizes efficiency, systems scale operations, agentic AI enhances reasoning, responsible AI governs ethics. Lacking cross-layer abstractions and lifecycle evaluations, progress stalls. AI Engineering emerges as the solution, integrating all via shared frameworks, reproducibility, and deployment principles—treating systems as impactful infrastructures. Pillars include abstractions, evaluations, benchmarking, and education. Goal: trustworthy, scalable intelligence. Key question: Can we engineer omni-layer AI responsibly at scale?

Tuesday 8th 2026
9-10 a.m. CEST

Elisa Ricci

University of Trento - Fondazione Bruno Kessler

Trustworthy AI

Wednesday 9th 2026
9-10 a.m. CEST

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Organizing Committee:

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Andrea Acquaviva, Univ. of Bologna , Italy

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Federica Zonzini, Univ. of Bologna, Italy

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Sumit K. Mandal, Indian Institute of Science, India
Nicolo' Bellarmino, Politecnico di Torino, Italy

Track 1:
Maryam Parsa, George Mason Univ., USA
Nathaniel Bleier, Univ. of Michigan, United States

Track 2:
Alessio Burrello, Polytechnic of Turin, Italy
Peipei Zhou, Brown Univ., USA

Track 3:
Edoardo Ragusa, Univ. of Genoa, Italy
Federica Zonzini, Univ. of Bologna, Italy

Track 4:
Sokol Kosta, Aalborg Univ., Denmark
Luca Borgianni, Xtremion+Univ. of Pisa, Italy

Track 5:
Leila Ismail, United Arab Emirates Univ., UAE
Renyu Yang, Beihang Univ., China

Track 6:
Francesco Barchi, Univ. of Bologna, Italy
Francesco Ponzio, Polytechnic of Turin, Italy

Track 7:
Annachiara Ruospo, Polytechnic of Turin, Italy
Francesco Regazzoni, Univ. della Svizzera italiana, Switzerland

Track 8:
Mary He, Univ. of Salford, UK
Laura Falaschetti, Univ. Politecnica delle Marche, Italy

Track 9:
Yante Li, Oulu Univ., Finland
Yang Merik Liu, Standford Univ., USA

Track 10:
Fadi Al Machot, NMBU, Norway
Edlira Vakaj, Birmingham City Univ., UK

Track 11:
Ferhat Ozgur Catak, Univ. of Stavanger, Norway
Ogerta Elezaj, Birmingham City Univ., UK

Track 12:
Ioanna Roussaki, National Technical Univ. of Athens, Greece
Luigi Borzi, Polytechnic of Turin, Italy

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Cluster 1: Enabling Intelligence (Hardware – Design – Architecture)

Track 1: AI Hardware, Circuits, and Devices
Main Topics

- Compute-in-memory (CIM/PIM) and near-sensor computing
- Analog and mixed-signal AI accelerators
- On-chip and in-memory learning
- Low-power and energy-efficient AI hardware
- Heterogeneous integration (2.5D/3D, chiplets)
- Emerging devices and materials (photonic, quantum, neuromorphic)
- Reliability, variation tolerance, and aging-aware design

Track 2: AI-Driven Design Automation and Optimization
Main Topics

- Machine learning for EDA flows
- AI-assisted placement, routing, and timing closure
- Reinforcement learning for design-space exploration
- Generative design and circuit synthesis
- Formal verification, testing, and ATPG
- HW/SW co-design and PPA optimization
- Telemetry-driven and runtime optimization

Track 3: AI Architectures and Systems Design
Main Topics

- AI accelerator architectures and dataflow design
- Memory-centric and bandwidth-aware architectures
- Sparsity, quantization, and compression support
- Chiplet-based and RISC-V AI systems
- Interconnects, NoCs, and coherence protocols
- Compiler and runtime co-design
- Scalable training and inference systems

Cluster 2: Connected Intelligence (Network – Cloud – IoT)

Track 4: AI-Native Connectivity, Networks, and Distributed Intelligence
Main Topics

- AI-native and semantic communications (6G/7G)
- Federated and in-network learning
- O-RAN RIC (xApps/rApps)
- Integrated sensing, communication, and computation
- Reconfigurable intelligent surfaces (RIS)
- Network digital twins and self-organizing networks
- Digital twins of networks

Track 5: Cloud, Infrastructure, and Data-Centric Intelligence
Main Topics

- Cloud–edge orchestration and virtualization
- Data pipelines, feature stores, and vector databases
- MLOps and LLMOps
- LLM serving and inference optimization
- Autoscaling, SLA-aware resource management
- Sustainable and energy-efficient cloud infrastructures
- Blockchain and data provenance

Track 6: Internet of Things (IoT) and Cyber-Physical Intelligence
Main Topics

- Intelligent sensing and actuation
- Embedded AI and TinyML
- Cyber-physical systems and real-time analytics
- Time-sensitive networking (TSN)
- Hardware-in-the-loop simulation
- Industrial IoT and smart infrastructure
- Digital twins and adaptive IoT systems

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Cluster 3: Trusted and Autonomous Intelligence (Security – Agency – Cognition)

Track 7: Secure, Reliable, and Trustworthy AI Systems
Main Topics

- Hardware and AI security
- Side-channel and fault-injection attacks
- Privacy-preserving and federated learning
- Model watermarking and supply-chain security
- Runtime attestation and monitoring
- Certified robustness and verification
- AI governance and lifecycle assurance

Track 8: Agentic and Robotic AI Systems
Main Topics

- Autonomous and agentic AI systems
- Robotics perception, SLAM, and manipulation
- Task and motion planning (TAMP)
- Reinforcement learning for control
- Multi-robot systems and coordination
- LLM-enabled robotic agents and embodied AI
- Sim-to-real transfer and field validation

Track 9: Foundational, Generative, and Cognitive AI
Main Topics

- Foundation and multimodal models (LLMs, VLMs)
- Generative AI and generative design
- Retrieval-augmented generation (RAG)
- Parameter-efficient fine-tuning (LoRA/QLoRA)
- Reinforcement learning and alignment
- Neurosymbolic and cognitive architectures
- Continual and efficient learning

Cluster 4: Human-Aligned and Applied Intelligence (Human – Ethics – Industry)

Track 10: Human-Centered AI, Interaction, and Visualization
Main Topics

- Explainable and interpretable AI interfaces
- Human–AI interaction and decision support
- Visualization of uncertainty and provenance
- XR/AR/VR for operations and training
- Conversational interfaces and multimodal interaction
- Human-in-the-loop systems and evaluation
- Trust, usability, and safety UX

Track 11: Responsible, Ethical, and Sustainable AI
Main Topics

- Fairness, accountability, and transparency
- AI risk management and impact assessment
- Auditing, reporting, and model documentation
- AI governance and policy frameworks
- Safety certification and compliance
- Environmental impact of AI systems
- Sustainable AI practices

Track 12: Vertical Applications in Smart Cities, Industry, Healthcare, and Beyond
Main Topics

- AI applications in healthcare and digital medicine
- Industry 4.0 and predictive manufacturing
- Process control and industrial automation
- Smart energy, mobility, and logistics
- Urban digital twins and smart cities
- Resilient and sustainable infrastructures
- Cross-domain AI integration

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Special Sessions

Emerging Technology Enablers for IoT–AI Ecosystems

This special session focuses on emerging enabling technologies that drive the convergence of the Internet of Things (IoT) and Artificial Intelligence (AI), with particular emphasis on embodied, physical, and agentic intelligence in real-world systems. In addition to foundational advances in hardware, software, and system architectures, the session highlights how these technologies translate into impactful vertical applications across domains such as smart cities, healthcare, industrial automation, robotics, and intelligent infrastructure. Topics include edge and embedded AI, distributed and multi-agent systems, large-scale AI models, and next-generation communication technologies. The session aims to bring together researchers and practitioners to explore novel enablers that support scalable, adaptive, secure, and trustworthy IoT–AI ecosystems in diverse real-world environments.

Chair: Mian Ahmad Jan – University of Sharjah

Emerging Blockchain Technologies for IoT and AI Systems

This special session focuses on emerging blockchain and distributed ledger technologies as key enablers for secure, decentralized, and trustworthy IoT and AI systems. It explores how blockchain can address critical challenges such as data integrity, trust management, decentralized coordination, and secure data sharing across heterogeneous and large-scale IoT–AI ecosystems. The session also highlights integration with edge computing, AI-driven automation, and smart contracts, as well as applications in domains such as smart cities, supply chains, healthcare, and industrial IoT. Contributions on novel architectures, scalability, interoperability, and privacy-preserving mechanisms are particularly encouraged.

Emerging Edge AI and Generative AI: On-Device LLMs and Intelligent Systems

This special session focuses on emerging technologies that enable the convergence of Edge AI and Generative AI, with particular emphasis on on-device large language models (LLMs) and intelligent systems. As AI capabilities move from cloud-centric infrastructures to edge and embedded platforms, new challenges arise in efficiency, latency, scalability, and privacy. The session covers a broad spectrum of edge intelligence, ranging from ultra-low-power TinyML systems to resource-aware deployment of generative and foundation models on mobile, embedded, and edge devices. Topics include model compression and quantization, Mixture-of-Experts (MoE), efficient inference, distributed edge–cloud collaboration, and hardware–software co-design. The session also highlights vertical applications in wearables, robotics, smart infrastructure, and industrial IoT, aiming to advance scalable, efficient, and trustworthy AI at the edge.

PhD & Student Forum

The Ph.D. forum will be organized as a poster session with 1-minute 1-slide oral introductions from the students to get the attention of the audience. The forum will provide an opportunity for graduate students to explore their research interests in an interdisciplinary workshop under the guidance of a panel of distinguished experts. The Ph.D. forum aims to bring together young Ph.D. students to exchange their research, ideas, and experiences. More precisely, the PhD forum will provide students with an opportunity to:

- Present their ongoing research work (1 slide, 1 minute oral presentation, and 1 poster) to very well known specialists and a broad audience in the CAD, CAS, IoT, and AI community from both industry and academia.
- Receive valuable feedback, suggestions and foster networking from peers and experienced faculty members.
- Establish contacts for entering the job market.
- Discuss ongoing trends in the fields of AI, IoT, CAS, RAS.

This forum also provides a great chance for industry experts to meet junior researchers, giving an avenue for incorporating the latest research developments into their companies.
PhD forum chair: Laura Falaschetti, l.falaschetti@univpm.it

Eligibility

The following two classes of students are eligible:

- Students who have finished their PhD thesis within the last 12 months
- Students at any year of the PhD research activity.

Submission

A 2-page extended abstract describing the novelties and advantages of the thesis work as a single PDF file via the submission website. The abstract should also include name and affiliation. There will be no IEEE publications, but the abstracts will be made available to all attendees in electronic format.

Tutorials

Tutorials aim to highlight innovative ideas, emerging trends, or breakthrough applications in various fields covered by the conference. Participants will have the opportunity to learn cutting-edge techniques, explore pioneering concepts, and gain insights from domain experts. Two sessions are confirmed:

- **From TinyML to EdgeAI - Tutorial and Practical Examples**
  Danilo Pau, STMicroelectronics
- **RISC-V architectures and ecosystem**
  University of Bologna - ETH Zürich

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Submission Details and Important Information

Paper Submission

IEEE COINS 2026 invites **original, unpublished research papers** that are not currently under review elsewhere. Submissions must clearly describe the motivation, methodology, results, and significance of the work.

All papers must be submitted electronically through the conference submission system (EasyChair). The review process will follow a **double-blind policy**; therefore, manuscripts must be **fully anonymized** and must not contain author names, affiliations, acknowledgments, or other identifying information.

Accepted papers will be included in the **IEEE COINS 2026 Proceedings** and submitted for inclusion in **IEEE Xplore**, subject to IEEE quality standards.

Call for Special Sessions, Tutorials, and Workshops

IEEE COINS 2026 welcomes proposals for **Special Sessions, Tutorials, and Workshops** that complement the main technical program and address emerging research topics, industrial challenges, or interdisciplinary themes.

Proposals should include:

- Title and scope
- Motivation and relevance to COINS
- Organizer(s) information
- Tentative list of speakers or contributors
- Expected audience and format

Accepted proposals will be integrated into the conference program and announced on the conference website.

Panels

The conference also solicits proposals for **panel sessions** addressing timely and impactful topics related to:

- Diversity, Equity, and Inclusion (DEI)
- Industrial perspectives and technology transfer
- Future research directions and policy implications

Panel proposals should clearly describe the topic, format, and proposed panelists.

Contact Information

For questions related to submissions, tracks, or the technical program, please contact the **Program Chairs**:

- **Florenc Demrozi** – University of Stavanger, Norway
- **Federica Zonzini** – University of Bologna, Italy

General conference information, updates, and submission links are available at: **https://coinsconf.com**

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