CALL FOR PAPERS

2022 ACM International Conference on Computing Frontiers

(http://www.computingfrontiers.org)

Turin, Italy

May 17-19, 2022

The next ACM International Conference on Computing Frontiers will take place on May 17th - 19th, 2022. The Computing Frontiers 2022 conference will take place in Turin, Italy. As the situation related to COVID-19 is improving, safety measures and restrictions will remain uncertain for the upcoming months across Europe and worldwide. In the transition towards a future post-pandemic event again, CF2022 will support remote participation for the speakers who undergo travel restrictions.

Computing Frontiers is an eclectic, interdisciplinary, collaborative community of researchers who investigate emerging technologies in the broad field of computing: our common goal is to drive the scientific breakthroughs that support society.

CF's broad scope is driven by recent technological advances in wide-ranging fields impacting computing, such as novel computing models and paradigms, advancements in hardware, network and systems architecture, cloud computing, novel device physics and materials, new application domains of artificial intelligence, big data analytics, wearables and IoT. The boundaries between state-of-the-art and revolutionary innovation constitute the advancing frontiers of science, engineering, and information technology — and are the CF community focus. CF provides a venue to share, discuss, and advance broad, forward-thinking, early research on the future of computing and welcomes work on a wide spectrum of computer systems, from embedded and hand-held/wearable devices to supercomputers and datacenters.

Topics of Interest

We seek original research contributions at the frontiers of a wide range of topics, including novel computational models and algorithms, new application paradigms, computer architecture (from embedded to HPC systems), computing hardware, memory technologies, networks, storage solutions, compilers, and environments.

- Innovative Computing Approaches, Architectures, Accelerators, Algorithms, and Models
    - Approximate, analog, inexact, probabilistic computing
    - Neuromorphic, biologically-inspired computing, and hyperdimensional computing
    - Dataflow architectures, near-data, and in-memory processing
- Quantum computing systems
    - Quantum algorithms and applications for current and near-term quantum devices
    - Quantum programming models, runtime, compilers and microarchitecture
    - Quantum error correction and fault-tolerant quantum computation

    - Architectures and design methodologies for scalable quantum computing systems
    - Benchmarks, methods, and performance metrics to evaluate quantum computing systems
- Technological Scaling Limits and Beyond
    - Limits: Defect- and variability-tolerant designs, graphene and other novel materials, nanoscale design, dark silicon
    - Extending past Moore's law: 3D-stacking, heterogeneous architectures and accelerators, chiplets, distributed and federated computing and their challenges
- Efficient AI computing
    - Deep learning co-processors including architectures, efficient algorithms, chip design and hardware-software codesign, frameworks and programming models
    - Edge deep learning for IoT and Cyber-Physical Systems
    - Distributed AI computing for cloud data servers
- Embedded, IoT, and Cyber-Physical Systems
    - Ultra-low power designs, energy scavenging
    - Physical security, attack detection and prevention
    - Reactive, real-time, scalable, reconfigurable, and self-aware systems
    - Sensor networks, IoT, and architectural innovation for wearable computing
- Large-Scale System Design and Networking
    - Large-scale homogeneous/heterogeneous architectures and networking
    - System-balance and CPU-offloading
    - Power- and energy-management for clouds, datacenters, and exascale systems
    - Big Data analytics and exascale data management
- System Software, Compiler Technologies, and Programming Languages
    - Technologies that push the limits of operating systems, virtualization, and container technologies
    - Large scale frameworks for distributed computing and communication
    - Resource and job management, scheduling and workflow systems for managing large-scale heterogeneous systems
    - Compiler technologies: hardware/software integrated solutions, high-level synthesis
    - Tools for analyzing and managing performance at large scale
    - Novel programming approaches
    - Tools and framework for automated anomaly detection and anticipation of large-scale systems
- Fault Tolerance and Resilience
    - Solutions for ultra-large and safety-critical systems (e.g., infrastructure, airlines)
    - Hardware and software approaches in adverse environments such as space
- Security
    - Methods, system support, and hardware for protecting against malicious code
    - Real-time implementations of security algorithms and protocols
    - Quantum and post-quantum cryptography
- Computers and Society
    - Artificial Intelligence (AI) ethics and AI environmental impact
    - Education, health, cost/energy-efficient design, smart cities, emerging markets, and interdisciplinary applications

We strongly encourage submissions in emerging fields that may not fit into traditional categories — if in doubt, please contact the PC co-chairs by email: Andrea Bartolini (a [DOT] bartolini (AT) unibo [DOT] it) and Anastasiia Butko (abutko (AT) lbl [DOT] gov).

Submission

We encourage the submission of both full and short papers containing high-quality research describing original and unpublished work. Papers must be submitted through https://easychair.org/conferences/?conf=cf22.

Short papers may be position papers or may describe preliminary or highly speculative work. Full papers are a maximum of eight (8) (excluding references) and short papers are a maximum of four (4) (including references) double-column pages in **ACM conference format**. Authors may buy up to two (2) extra pages for accepted full papers. Page limits include figures, tables and appendices, but exclude references for full papers. As the review process is **double-blind**, removal of all identifying information from paper submissions is required (i.e., cite own work in third person). *Papers not conforming to the above submission policies on formatting, page limits and the removal of identifying information will be automatically rejected*. Authors are strongly advised to submit their papers with the final list of authors, as changes may not be feasible at later stages. Authors of interesting work not mature enough for an oral presentation may be offered the option of presenting their work as posters.

No-show policy: Any accepted papers are expected to be presented at the conference and at least one full registration is required from a submission author for each accepted paper. A no-show of papers will result in exclusion from the ACM digital library proceedings. If circumstances arise such that authors are unable to present their papers at the conference, they must contact the PC co-chairs.

Submission Format

Stage 1 - Abstract submission: A title, abstract (approx. 100 words), and a list of all co-authors must be submitted by ~~January 30th, 2022 (AoE)~~ **February 6th, 2022 (AoE) - Extended**. You may also submit the paper at this time.

Stage 2 - Paper submission: The short or full papers must be submitted by ~~February 6th, 2022 (AoE)~~ **February 13th, 2022 (AoE) - Extendend**.