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## CONFERENCE

### ON-SITE EVENT

14 – 15 March 2022  
Antwerp, Belgium

### ONLINE EVENT

16 – 23 March 2022  
Virtual Platform

## INFORMATION

### SUBMISSION KEY DATES

D, A, T, and E papers	Deadline:	12 September 2021	AoE (abstracts)
	Deadline:	19 September 2021	AoE (full paper)
Tutorial proposals	Deadline:	1 October 2021	(AoE)
Workshop proposals	Deadline:	1 October 2021	(AoE)
PhD Forum	Deadline:	15 November 2021	(AoE)
Multi-Partner Projects	Deadline:	15 November 2021	(AoE)
University Fair	Deadline:	15 November 2021	(AoE)
Young People Program	Deadline:	15 November 2021	(AoE)
Notification of acceptance:		11 November 2021	
Camera-ready paper due date:		13 December 2021	(AoE)
Paper presentation video due date:		21 January 2022	(AoE)

**Kindly note that all deadlines are strict and no extensions will be given.**

### CONFERENCE ORGANISATION

K.I.T. Group GmbH Dresden  
Bautzner Str. 117-119  
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### GENERAL CHAIR

Cristiana Bolchini  
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### PROGRAMME CHAIR

Ingrid Verbauwhede  
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DATE conference is the main European event bringing together designers and design automation users, researchers and vendors, as well as specialists in the hardware and software design, test and manufacturing of electronic circuits and systems. DATE puts a strong emphasis on both technology and systems, covering ICs/SoCs, reconfigurable hardware and embedded systems, and embedded software.

The multi-day event consists of a conference with regular papers, complemented by panels, hot-topic sessions, tutorials, workshops, special focus days and executives. The event will also host the Young People Program, the University Fair and Multi-Partner Projects dissemination on innovative research activities fostering the networking and the exchange of information on relevant issues, recent research outcomes and career opportunities.

DATE 2022 is the 25th edition of an event that has been the place for researchers, young professionals and industrial partners to meet, present their research, and discuss the current development and next trends, with high emphasis on social interaction.

For its 2022 event, DATE presents a special format, as the situation related to COVID-19 is improving but safety measures and restrictions will remain uncertain for the upcoming months across Europe and worldwide. In transition towards a future post-pandemic event again, DATE 2022 will host a two-day live event in presence in the city of Antwerp, to bring the community together again, followed by other activities carried out entirely online in the subsequent days. This setup combines the in-presence experience with the opportunities of online activities, fostering the networking and social interactions around an interesting program of selected talks and panels on emerging topics to complement the traditional DATE high-quality scientific, technical and educational activities.



## THE CONFERENCE

The conference addresses all aspects of research into technologies for electronic and (embedded) systems engineering. It covers the design process, test, and tools for design automation of electronic products ranging from integrated circuits to distributed large-scale systems. This includes both hardware and embedded software design issues. The conference scope also includes the elaboration of design requirements and new architectures for

challenging application fields such as telecom, wireless communications, multimedia, healthcare and automotive systems. Persons involved in innovative industrial designs are particularly encouraged to submit papers to foster the feedback from design to research.

## SPECIAL TALKS & PANELS ON EMERGING TOPICS

The scientific research track is complemented by a set of focused sessions on emerging topics bringing new challenges to the community, with presentations and interactions on interesting and timely issues, for both the in presence and online events.

**Giovanni De Micheli and Marco Casale-Rossi**

### Focus on Quantum and Neuromorphic Computing

The emergence of the quantum computing and neuromorphic computing technology areas are initiating paradigm shifts in the world of compute. To fulfil their potential, these technologies require innovative new architectures, cutting-edge materials, and specialized hardware and software. Focused talks on these topics will provide an opportunity to hear from leaders in these fields about the newest results that are driving these technologies to fruition.

**Aida Todri-Sanial and Anne Matsuura**

### Focus on Interpretable AI and Nanoelectronics-Based Designs of edge computing systems in the IoT 2.0 Era

Our society is evolving to a point where objects and people will be almost permanently connected and exchanging information. This scenario, called the Internet of Things (IoT), is the result from the convergence in the evolution and integration of communication, computing, sensing, and the new wave of artificial intelligence (AI) technologies. Moreover, the progress in nanoelectronics can potentially enable a new generation of autonomous sensor nodes executing complex AI algorithms onboard, or also called edge AI computing systems. This new concept of IoT (or IoT 2.0) can enable monitor and react unobtrusively during our daily lives for all types of application domains, such as, personalized healthcare or Industry 4.0. Focused talks on these topics will cover the latest trends towards alternative edge AI architectures and design paradigms using nanoelectronics technologies, as well as discussing how the challenges related to ethics and interpretability of AI results can be nurtured for the benefit of society in the IoT 2.0.

**David Atienza and Ayse K. Coscun**

DATE 2022 will also host a timely Special Initiative on:

### Autonomous Systems Design

Fueled by the progress of artificial intelligence, autonomous systems become more and more integral parts of many Internet-of-Things (IoT) and Cyber-Physical Systems (CPS) applications, such as automated driving, robotics, avionics, industrial automation, and smart systems in general.

Autonomous systems are self-governed and self-adaptive systems that are designed to operate in an open and evolving environment, which is not completely defined at design time. This poses a unique challenge to the design and verification of dependable autonomous systems. The DATE Special Initiative on Autonomous Systems Design will include peer-reviewed papers, special sessions and interactive sessions addressing these challenges.

More details and a specific call for contributions can be found online:

[www.date-conference.org/asd](http://www.date-conference.org/asd)

**Selma Saidi and Rolf Ernst**



## TOPIC AREAS FOR SUBMISSION

Within the scope of the conference, the main areas of interest are organised in the following tracks. Submissions can be made to any of the track topics. For detailed descriptions of the topics, please refer to the DATE website:

[www.date-conference.com](http://www.date-conference.com)

**Track D: Design Methods and Tools** addresses design automation, design tools and hardware architectures for electronic and embedded systems. The emphasis is on methods, algorithms, and tools related to the use of computers in designing complete systems. The track focus includes significant improvements on existing design methods and tools as well as forward-looking approaches to model and design future system architectures, design flows, and environments.

**This track is organised in the following topics:**

- D1** System Specification and Modelling
- D2** System-Level Design Methodologies and High-Level-Synthesis
- D3** System Simulation and Validation
- DT4** Design and Test for Analog and Mixed-Signal Circuits and Systems, and MEMS
- DT5** Design and Test of Hardware Security Primitives
- DT6** Design and Test of Secure Systems
- D7** Formal Methods and Verification
- D8** Network-on-Chip and on-chip communication
- D9** Architectural and Microarchitectural Design
- D10** Low-power, Energy-efficient and Thermal-aware Design
- D11** Approximate Computing
- D12** Reconfigurable Systems
- D13** Logical and Physical Analysis and Design
- D14** Emerging Design Technologies for Future Computing
- D15** Emerging Design Technologies for Future Memories

**Track A: Application Design** is devoted to the presentation and discussion of design experiences with a high degree of industrial relevance, real-world implementations, and applications of specific design and test methodologies.

Contributions should illustrate innovative or record-breaking designs, which will provide viable solutions in tomorrow's silicon, embedded systems, and large-scale systems. In topic A8, there is the opportunity to submit 2-page papers that expose industrial research and practice.

**This track is organised in the following topics:**

- A1** Power-efficient and Sustainable Computing
- A2** Smart Cities, Internet of Everything, Industry 4.0
- A3** Automotive Systems and Smart Energy Systems
- A4** Augmented Living and Personalized Healthcare
- A5** Secure Systems, Circuits, and Architectures
- A6** Self-adaptive and Context-aware Systems
- A7** Applications of Emerging Technologies
- A8** Industrial Experiences Brief Papers

**Track T: Test and Dependability** covers all test, design-for-test, reliability, and design-for-robustness issues, at system-, chip-, circuit-, and device-level for both analogue and digital electronics. Topics of interest also include diagnosis, failure mode analysis, debug and post-silicon validation challenges, and test or fault injection methods addressing system security.

**This track is organised in the following topics:**

- T1** Modelling and Mitigation of Defects, Faults, Variability, and Reliability
- T2** Test Generation, Test Architectures, Design for Test, and Diagnosis
- T3** Dependability and System-Level Test
- DT4** Design and Test for Analogue and Mixed-Signal Circuits and Systems, and MEMS
- DT5** Design and Test of Hardware Security Primitives
- DT6** Design and Test of Secure Systems

**Track E: Embedded Systems Design** is devoted to the modelling, analysis, design and deployment of embedded software or embedded/cyber-physical systems. Areas of interest include methods, tools, methodologies and development environments. Emphasis will also be on model-based design and verification, embedded software platforms, software compilation and integration, real-time systems, cyber-physical systems, networked systems, and dependable systems.

**This track is organised in the following topics:**

- E1** Embedded Software Architecture, Compilers and Tool Chains
- E2** Real-time, Dependable and Privacy-Enhanced Systems
- E3** Machine Learning Solutions for Embedded and Cyber-Physical Systems
- E4** Design Methodologies for Machine Learning Architectures
- E5** Design Modelling and Verification for Embedded and Cyber-Physical Systems

## COMMITTEES

A full list of the Executive and Programme Committee members is available on the DATE website.

## SPONSORS

The event is sponsored by the European Design and Automation Association, the Electronic System Design Alliance, the IEEE Council on Electronic Design Automation, the ACM Special Interest Group on Design Automation, and the Russian Academy of Sciences.

In cooperation with IEEE Computer Society Test Technology Technical Council (TTTC), IEEE Solid-State Circuits Society (SSCS) and IEEE Computer Society (IEEE CS).

## SUBMISSION INSTRUCTIONS

All manuscripts for any technical topic of the D, A, T, and E tracks must be submitted for review electronically, following the instructions on the conference website:

[www.date-conference.com/submission-instructions](http://www.date-conference.com/submission-instructions)

The accepted file format is PDF. Any other format and manuscripts received in hard-copy form will not be processed.

Papers can be submitted for either formal oral presentation or interactive presentation. Oral presentations require novel and complete research work supported by experimental results. Interactive presentations are expected to articulate emerging and future design, verification, or test problems including work-in-progress and identify open problems that merit innovative future research.

» Submissions must not exceed 6 pages in length for oral presentation papers and 4 pages in length for interactive presentation papers. Submission in topic A8 (Industrial Experiences Brief Papers) cannot exceed 2 pages in length and must be industrial-centric on both the content and the majority of authors' affiliations.

» WARNING: It is not possible to modify the list of authors and the order once the paper is submitted and the deadline is expired and if the paper is accepted, this information will be the one used for the final publication.

All submitted papers should be formatted as close as possible to the final format: letter sheets, double column, single-spaced, Times or equivalent font of minimum 10pt. Paper templates are available on the DATE website for your convenience. To permit blind review, submissions must not include the author names, however prior work should be referenced in full, in a way that the reference is available without disclosing it is from the same authors. Any submission that is not in line with the above rules will be discarded. Accepted papers not complying to the above-mentioned formatting instructions will not be included in the conference proceedings.

All papers will be evaluated with regard to their suitability for the conference, originality, and technical soundness. The Programme Committee reserves the right to reorient oral presentation papers to interactive presentation and vice versa, to obtain the most suitable presentation format.

» Submissions simultaneously under review or accepted by another conference, symposium, or journal will be rejected. Submitted manuscripts must not present material that has been previously published in other indexed research databases (e.g. arXiv), not to compromise the blind review process.



## CAMERA-READY AND PRESENTATION

Authors of accepted papers will prepare the camera-ready version of the paper, adhering to the IEEE Proceedings format and will be checked through PDF eXpress. A recorded video presentation of the paper is also required, according to guidelines that will be made available.

## REGISTRATION RULE FOR ALL ACCEPTED PAPERS

It is mandatory that at least one author of each accepted paper attends the session and presents the work. Please note that each paper shall be accompanied by at least one full conference registration at the speaker rate (i.e., two speaker registrations are needed for two accepted papers, e.g. from the main author or a co-author of the paper). An author per paper is expected to attend the session where the paper is discussed, otherwise the paper will be deleted from the proceedings afterwards (despite full payment at the speaker rate).

## DATE TUTORIALS

DATE 2022 tutorials are designed to provide audiences with introduction to important topics in the DATE technical areas as well as hands-on tutorials on design automation tools. Early career professionals as well as graduate students will benefit from the introductory knowledge about these important topics and tools. Mid-career professionals can use the tutorials to extend their horizons. We welcome proposals for tutorial presentations in the DATE technical areas. Proposals should be submitted before 1 October 2021 (AoE), via the DATE submission website. For more information, please contact:

**Francisco Cazorla**,  
[tutorials@date-conference.com](mailto:tutorials@date-conference.com)

Kindly note that DATE 2022 Tutorials will be held in a virtual format only.

## DATE WORKSHOPS

DATE invites proposals for workshops on emerging research and application topics in design, application, test, and embedded systems. Topics that are not directly covered in the DATE technical programme, but represent new research directions with potential impact on future DATE technical areas are particularly welcome. For information and detailed descriptions on how to propose a workshop, please refer to the DATE website. Proposals should be submitted electronically by 1 October 2021 (AoE), via the DATE website. For more information, please contact:

**Hiren D. Patel and Alberto Bosio**,  
[workshops@date-conference.com](mailto:workshops@date-conference.com)

Kindly note that DATE 2022 Workshops will be held in a virtual format only.



## CAREER DEVELOPMENT | NETWORKING OPPORTUNITIES

DATE is a leading European event and a unique networking opportunity for young people, researchers, and industrial partners: three initiatives are planned to foster career development for PhD student and post-doc, to attract future PhD candidates and showcase research areas with new opening positions.

All these activities will be held online, to allow a broad worldwide participation, in a format offering the networking and connection opportunities.

## PHD FORUM

The PhD Forum is a poster session hosted by EDAA, ACM SIGDA, and IEEE CEDA for PhD students who have completed their PhD thesis within the last 12 months or who are close to complete their thesis work. It represents an excellent opportunity for them to get feedback on their research and for the industry to get a glance of the state of the art in system design and design automation. Proposals can be submitted via the DATE website until 15 November 2021 (AoE). For further information, please contact:

**Gabriela Nicolescu**,  
[phd-forum@date-conference.com](mailto:phd-forum@date-conference.com)

## YOUNG PEOPLE PROGRAM

The Young People Program is an initiative targeting PhD students with the goal of supporting their career development. Participants will have an opportunity to present themselves to potential employers from EDA and micro-electronics industries, possibly leading to interviews arranged during the DATE conference, if there is interest from company side. The initiative includes also activities to improve networking, seminars on how to present themselves effectively to HR representatives, and panels to stimulate discussion on how to publish effectively. PhD students should submit an application including their CV

and an abstract of their work via the DATE website until 15 November 2021 (AoE). For further information, please contact:

**Sara Vinco and Anton Klotz**,  
[young-people-program@date-conference.com](mailto:young-people-program@date-conference.com)

## UNIVERSITY FAIR

The University Fair is a forum for disseminating academic research activities. Its goal is twofold:

» to foster the transfer of mature academic work to a large audience of industrial parties. Interested research academics are invited to submit a 1-page abstract description of their pre-commercial research results and/or prototypes.

» to advertise new or upcoming research initiatives with new PhD/PostDoc open positions to a large audience of graduate students. Interested research academics are invited to submit a 1-page abstract description disseminating their new research plans.

Submission deadline is 15 November 2021 (AoE). For more information, please contact:

**Nele Mentens and Ioannis Sourdis**,  
[university-fair@date-conference.com](mailto:university-fair@date-conference.com)

## MULTI-PARTNER PROJECTS

DATE 2022 program will include a session dedicated to multi-partner innovative and/or highly-technological research projects addressing the DATE 2022 topics. This includes projects funded by EU schemes (Horizon Europe, EIC, H2020, ECSEL, PENTA, MSCA, COST, CleanSky, ...), nationally- and regionally-funded projects, projects funded by the European Space Agency, and collaborative research projects funded by industry. The session is an excellent opportunity to present projects' contributions to the reputable DATE community and increase the impact of dissemination and outreach activities.

Project Coordinators are invited to submit their contribution presenting the concepts, work in progress, or lessons learned from the project, either in the form of a full paper or a one page abstract. Submissions will be (not blind) peer-reviewed and must be submitted before 15 November 2021 (AoE) via the DATE website, and accepted ones will be published in the DATE 2022 proceedings.

For more information, please contact:

**Maksim Jenihhin**,  
[multipartner-projects@date-conference.com](mailto:multipartner-projects@date-conference.com)

Projects can also showcase their vision, activities and outcomes benefitting of DATE high visibility and networking assets, by exploiting the project sponsorship package; for more information please contact:

**K.I.T Group GmbH Dresden**,  
[date@kitdresden.de](mailto:date@kitdresden.de)