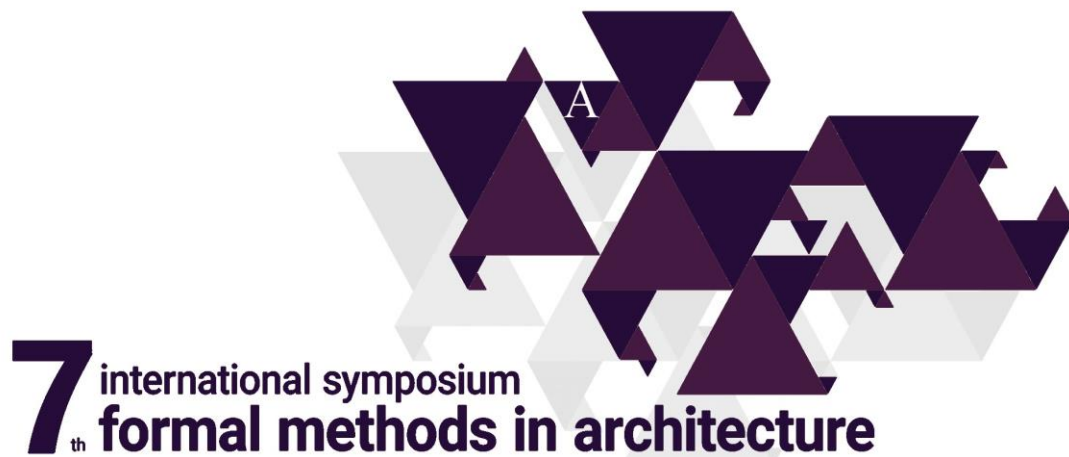# 7th International Symposium
Formal Methods in Architecture
Porto 2024

INTRODUCTION

The Formal Methods in Architecture (FMA) series began in 2011 and it is a biennial international symposium initially held at ESAP-Escola Superior Artística do Porto (Arts University School of Oporto), in Portugal. In 2022 the 6FMA was held at UDC-Universidad de A Coruña (University of A Coruña), in Galicia (Spain). The 7th edition will take place in Porto, at the headquarters of the Northern Regional Section of the Order of Architects.

PURPOSE

The main purpose of this symposium is a contribution to the debate in the fields of Architecture and Urbanism (A&U) on the application of new formal methods to emerging societal and technical problems. Formal methods will be focused on methodological advances based on new developments coming from collaborative work with Mathematics and Computer Sciences which enables several different grades of abstraction and formalization. From the millennial geometry to current shape grammars, several formal approaches to A&U are welcome to be presented. The aim of the symposium is to discuss, disseminate and promote the use of formal methods in the creation of new explicit languages for problem-solving in Architecture and Urbanism. We will discuss current problems in the field and the potentials and drawbacks of the use of formal methods to address them. These problems range from production, sustainability, representation, communication, heritage among others, never ceasing to see Architecture and Urbanism as technological activities and well as artistic ones.

Call for abstracts

The 7th International Symposium on Formal Methods in Architecture will be held at the Northern Regional Section of the Order of Architects, in Porto (Portugal), between the 3rd and the 6th of December 2024. The symposium will focus on scientific fields whose areas of application use methodologies that stem from the mathematical and computer sciences, especially those that have witnessed recent developments. The call for abstracts will open next **15th of January (2024)** and it will be closed at the **3rd of June (2024)**. We welcome abstract submissions within this period!

SCIENTIFIC FIELDS

Abstracts can address the following topics:

1. Collection and low-level treatment of information, such as:
   o Tracking and mapping methods (video, GPS, WIFI, ISP, IoT, cellular phones);
   o Biometric sensing;
   o Surveying;
   o Photogrammetry and 3D scan (drones, photo, laser);
   o Machine Learning;
   o Computer vision.
2. Semantic organization of information, such as:
   o GIS-Geographic Information Systems;
   o BIM-Building Information Model;
   o IFC-Industry Foundation Classes;
   o Ontologies for the built environment.
3. Representation, visualization and interaction, such as:
   o CAD and BIM;
   o Renderings and animated motion
   o Mixed Realities (Virtual, Augmented);
   o Human-computer interaction.
4. Formal Theories and Analysis Methodologies, such as:
   o Space Syntax and Visibility Graph Analysis;
   o SCAVA-Space Configuration, Accessibility and Visibility Analysis;
   o Agent-based analysis;
   o Rule Checkers.
5. Architectural design automation, such as:
   o Parametricism;
   o Generative design;
   o Shape grammars;
   o Processing;
   o Advanced reasoning artificial intelligence tools.
6. Automated manufacturing and construction, such as:
   o CAM;
   o Scale models;
   o 3-4-5D BIM;
   o Automated manufacturing.
7. Active management of the built environment, such as:
   o Participatory urbanism;
   o Participatory architecture;
   o Smart buildings;

- o Smart cities;
- o Life cycle management;
- o 6-7D BIM;
- o Facilities Management;
- o Flow and crowd management.
8. Formal Methods in teaching architecture, such as:
    - o Teaching methodologies;
    - o Learning experiences and digital training;
    - o Spatial reasoning through visual programming and coding.

TARGET AUDIENCE
This symposium is addressed to:
- Architects
- Urban planners
- Landscape designers
- Civil engineers
- Computer Scientists
- Students of these fields

ABSTRACTS SUBMISSION
Abstracts must be submitted here until the **3**rd **of June**), with no more than 500 words.

REVIEW PROCESS
Abstracts will be submitted to a double-blind peer review process and will be validated and accepted by the 7FMA Chairs. Reviewers will be chosen among the members of the Scientific Committee. All accepted abstracts will enable their presentation at the 7FMA and further development into full papers that will be submitted for revision (under an identical process mentioned to the abstracts). Accepted final papers will be published in the book of Proceedings.

BOOK OF ABSTRACTS
All accepted abstracts will be invited to be developed into papers to be presented at the 7FMA.
The 7FMA will have a book of abstracts ready to the symposium days.

PAPERS PUBLICATION IN BOOK FORMAT
The FMA series had published books of proceedings since it's 3rd edition. Published volumes:
In 2018 "*Formal Methods in Architecture and Urbanism*" by Cambridge Scholars Publishing (3FMA)
In 2019 "*Formal Methods in Architecture and Urbanism – volume II*" by Cambridge Scholars Publishing (4FMA)
In 2019, Springer published the book "*Formal Methods in Architecture. Proceedings of the 5th International Symposium on Formal Methods in Architecture (5FMA), Lisbon 2020*", within the series "Advances in Sciences, Technology & Innovation".
In 2020 Springer released the book "*Formal Methods in Architecture. Proceedings of the 6th International Symposium on Formal Methods in Architecture (6FMA), A Coruña 2022*, within the series "Digital Innovations in Architecture, Engineering and Construction".

The Book of Proceedings of 7FMA will also be publish by Springer in 2025.

SYMPOSIUM PAPERS PRESENTATION LANGUAGE
The 7FMA will use English as main language for presentations and debates. Some assistance in the workshops may also use other languages.

AGREEMENTS
After final papers are accepted, we are required to obtain agreements and warranties from all the participants in the symposium, regarding:
- The authors agree with shared copyright of papers presented in the 7th International Symposium Formal Methods in Architecture (7FMA). Acceptance includes giving permission to publish the paper(s) in the conference proceedings, published in paper and/or electronically.
- Each author warrants that the paper is his/her author's original work. If excerpts from copyrighted works, figures, diagrams, photographs, trademarks or other any other materials are included, the author must obtain written permission from the copyright owners and credit the sources in the manuscript.
- The author also warrants that the paper describes genuine research or review work, contains no defamatory or unlawful statements and does not infringe the rights of others. The organization of the 7FMA may assign any or all its rights and obligations under this agreement.
- If the work was prepared jointly, the author agrees to inform co-authors of the terms of the agreement and to sign on their behalf.
- All the participants agree in giving permission to the organization of the 7FMA to publicize and publish all the photos, voice and image recordings taken during the symposium activities.

When submitting the final paper, you will have to confirm your agreement by signing and returning the agreement documents.

CHAIRS
Avelino Oliveira (OA)
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David Leite Viana (CIAUD-UPT)
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MORE INFORMATION
Any question must be addressed to the Organizing Committee, using the following email: formalmethods2024@gmail.com

WEBSITE AND SOCIAL MEDIA
https://formalmethodsinarchitecture2024.com/ (7FMA)
http://www.archformalmethods.eu/ (all the FMAs)
https://facebook.com/events/opoarch/
https://twitter.com/formal_methods