ABOUT THE CONFERENCE

The official language of the Conference is English.

The Conference's mission is:

1. to illuminate the wide spectrum of important roles of geometry in everyday living and work and to explore new aspects of its multidisciplinarity/transdisciplinarity,
2. to synthesise both technological, medical and artistic aspects of geometry, by addressing current challenges in these fields, including production, sustainability, health improvement, design, representation, communication, and legacy of humanity (heritage),
3. to facilitate exchange and generation of both geometry-wise and complementary knowledge through live scientific multidisciplinary/transdisciplinary communication – meeting so successfully the Past and the Future in a synergic way, and
4. to examine the gap that inevitably exists between a triplet defined by: fundamental theory, scientific endeavours and everyday human needs, that is, practical applications – especially having in mind a proliferation of digital technologies that allow increasingly intelligent tasks to be delegated to automated tools and have immense potential to increase productivity in the whole.

To do so, our aim is to contribute to the discussion of geometry in various domains whether it is directly or indirectly involved in, such as: architecture and urbanism, mechanical, civil, transportation engineering, arts, archaeology, spatial planning, forensics, medicine/dentistry, psychology, anthropology, ergonomy, informatics, education etc. – from various aspects, especially pointing out the possibilities of application of new methods to emerging various human needs throughout technical, medical and social issues – supported by cutting-edge technology and complex methods (CAD, BiM, medical-wise imaging, engineering-wise sensoring, photogrammetry, geo(infor)matics, artificial intelligence and others). Methodological advances based on recent geometry-wise developments in collaboration with mathematics, mechanical engineering and computer science, that are applicable to disciplines mentioned above – at different levels of abstraction and formalisation will also be encouraged.

Welcomed Professionals:

- Architects
- Urbanists
- Mechanical Engineers
- Civil Engineers
- Transportation Engineers

- Artists
- Archaeologists
- Spatial Planners
- Forensic Scientists
- Medics/Dentists
- Psychologists
- Anthropologists
- Astronomers
- Ergonomists
- Computer Scientists
- Educators
- Mathematicians

MAIN CONFERENCE TOPICS AND SUBTOPICS CONCERNING CHALLENGES OF GEOMETRY AND GRAPHICS IN THIS ERA INCLUDE BUT ARE NOT LIMITED TO:

1. **Theoretical Geometry and Graphics**

- **Projections, Transformations, Deformations, Topology, etc.**
- **Graphs, Complex Systems, Mechanisms, and Finite Elements, etc.**
- **Fractal Geometry, Curves and Surfaces, Developable Surfaces and Unfoldings, Polyhedra, Discretisation, etc.**
- **Spatial Analysis**
  (Space Syntax, Visibility Graph Analysis, Space Configuration, Accessibility and Visibility Analysis (SCAVA), Agent-Based Analysis, Rule Checkers, etc.)
- **Design Automation**
  (Parametricism, Generative Design, Shape Grammars, Processing, etc.)
- **History of Geometry, Engineering Graphics, and Computer Graphics**
- **Artificial Intelligence in Fundamental Scientific Development of Geometry and Graphics**

2. **Forward Engineering: Computer-Aided Design, Computational Design and Information Modelling**

- **Building Information Modelling**

- **Direct/Explicit Modelling and Assembly Modelling**
- **Parametric and Algorithmic Design**
- **Performance-Based, Construction-Aware, Fabrication-Aware Design, etc.**
- **Structural Design**
- **Ergonomy and Mass Customisation in Industrial, Product Design, etc.**
- **Design strategies and biomimicry**
- **Advances in Engineering Graphics**
- **Artificial Intelligence in Computer-Aided Design and Drafting Development**

3. **Reverse Engineering: Information Acquisition/Abstraction/Reviewing**

- **Geo(infor)matics/GIS, Remote Sensing, and GIS-BIM Integration**
  (Collection of Spatial Information: Image-Based and Range-Based Spatial Data Acquisition, including tracking and mapping methods (GPS, RTK, WiFi, video, ISP, IoT, cellular phones), etc.;
  Semantic Organisation of Spatial Information: including Geographic Information Systems – GIS, Building Information Models – BIM, Industry Foundation Classes – IFC, Ontologies for the built environment, Spatial/Urban Planning, Traffic Modelling, Pedestrian/Migration Patterns Modelling, etc.)
- **Digital Reconstruction of Physical/Heritage Entities of Different Scales**
  (Acquired Spatial Data Acquisition and Registration for: Digital Model/Shadow/Twin Creating, Digital Elevation Modelling, City/Heritage Modelling, etc.;
  Features Extraction and Semantic Segmentation/Enrichment of Physical/Heritage Entities of Different Scales, etc.)
- **Observing, Surveying, Measuring, Monitoring, Archiving and Maintaining Physical/Heritage Entities of Different Scales**
  (Including Large – Archeology-, Urban-, Traffic-Related, etc. and Extremely Large – Cosmic/Astronomy-Related, etc.)
- **Participatory Geometry and Graphics in Forensic Biometrics, Forensic Ballistics, Forensic Archaeology, Crime Patterns Identification, Trace Evidence, etc.**
- **Participatory Geometry and Graphics in Computed Tomography and Imaging**
  (In Forensics, Archaeology, Medicine, Dentistry, etc.)
- **Artificial Intelligence in Reverse Engineering Approaches Development**

4. **Visualisation, Animation, Simulation and Gaming**

- **Material Appearance Modelling and Geometry- and Topology-wise Texture Mapping**
- **Geometry-Wise Rendering Bottlenecks Regarding Reflection, Transparency and Refraction**

- **Immersive Technologies and Human-Computer interaction – Virtual Reality and Augmented Reality**
- **Engineering Animation**
  (Animated Motion In Aerospace, Automotive, Manufacturing, Construction Industries, AECO Sector, Robotics, etc.)
- **User Behaviour Patterns Analysis, Fluid Dynamics Analysis, and Kinematic/Sound/Structural/Thermal/Ballistic Analysis**
- **Military/Disaster/Driving/Flying/Nautical Simulation and Structural Degradation Simulation**
- **Pedestrian-/Vehicle-/Fluid-/Sound-/Thermal-/Ballistic-Flow Simulation**
- **Artificial Intelligence in Visualisation, Animation, Simulation and Gaming Development**

5. **Digital Prototyping and Automated Manufacturing**

- **Virtual and Physical Prototyping, etc.**
  (Geometry-Wise Demands and Constraints)
- **Mass Production and Digital Fabrication**
  (In Aerospace, Automotive, Manufacturing, Construction Industries, AECO Sector, Robotics, etc.)

6. **Education in Geometry and Graphics**

- **Perceptive Factors Influencing Spatial Ability Development**
- **Cognitive Factors Influencing Spatial Reasoning Activation**
- **Development of Spatial Reasoning Through Visual Programming and Coding**
- **Innovative Didactic-Methodical Concepts of Teaching Geometry and Graphics**
- **Strategies of Online Education and Digital Training**
- **Artificial Intelligence in Education**