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### General information

**Assoc. Prof. Krystyna Januskiewicz PhD, Eng. Of Architecture**  
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### Fields of Research

The main field of my research is architecture and its design as an area of knowledge and skills integrally related to the history, theory and practice i.e. digital technology in architectural design and an experimental exploration of topological and computational geometry, robotics orchestration; environmentally sensitive architecture; structural engineering complex geometry; new technologies and materials; theory and history of contemporary architecture.

### Research work

221 articles, papers, chapters in Edited Volumes, 3 books

Author book titled: "On designing Architecture in the Age of Digital Tools. Current status and development prospects". This is the first in Poland compendium of knowledge regarding the theory and history of architecture created in co-operation with digital technologies. And also, this is the first in Poland presentation of the achievements of Buckminster Fuller (1895-1983) in the context of modern information technologies, scientific research and increasing awareness of the need to protect the Planet Earth, what makes a significant contribution to the state of research in the world. This book provides research tools necessary for architectural theory, extending its cognitive range, and sets a new approach.

Bridge structures are a secondary field of my interest and of my research studies. The results of these studies were included in two books published by the Publishing House of Cracow University of Technology (2005 and 2012), one of which was awarded by the Minister of Infrastructure. The test results which were presented in these books proved to be extremely useful, especially for the design of bridges, since these books were published during the reconstruction of the national transport infrastructure supported by the EU funds.

A subject of my research is architecture and its design as an area of knowledge and skills integrally related to the history, theory and practice. This subject is further defined by digital technology CAD/CAM/CAE being involved in its development. It is not only about forms of complex geometry which require specific material and construction solutions. However, new geometrical forms and ecological concerns triggered the search for new materials and new structural solutions. Following Fuller's idea, my attention is directed towards those areas that concern the designing of eco-efficient architecture, where digital processes are miming natural formation and adaptation. My current research also includes a building envelope as building envelope as the physical separator between

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the conditioned and unconditioned environment of a building. It is the key element of building that determines the quality and controls the indoor conditions irrespective of transient outdoor conditions. With the use of parametric and multi-criteria optimization digital tools, the building envelopes can be designed to respond to various requirements. Methods, techniques and strategies currently used in this field are now in the center my interest. The subject of designing the architecture which is sensitive both to the environment and sustainable development has often been discussed in my current research papers and articles.

My future work will primarily focus on the built environment - on climate change adopted architecture and building structures. Global climate change is expected to pose increasing challenges for cities in the following decades, placing greater stress and impacts on multiple social and biophysical systems, including population health, coastal development, urban infrastructure, energy demand, and water supplies. In the past decade, there has been growing evidence that activities to mitigate climate change can have beneficial impacts on public health as a result of changes to environmental pollutants and health-related behaviors. Understanding the interrelation between these impacts and the built environment put forth to architects and engineers to develop innovative materials, components and systems, with the goal of designing to building envelopes more active i.e. responsive, adaptive, as well as protective to variable and extreme climate conditions. My future research will be concentrated on building envelopes which are active to both internal and external conditions, and which should act as a protector of human health.