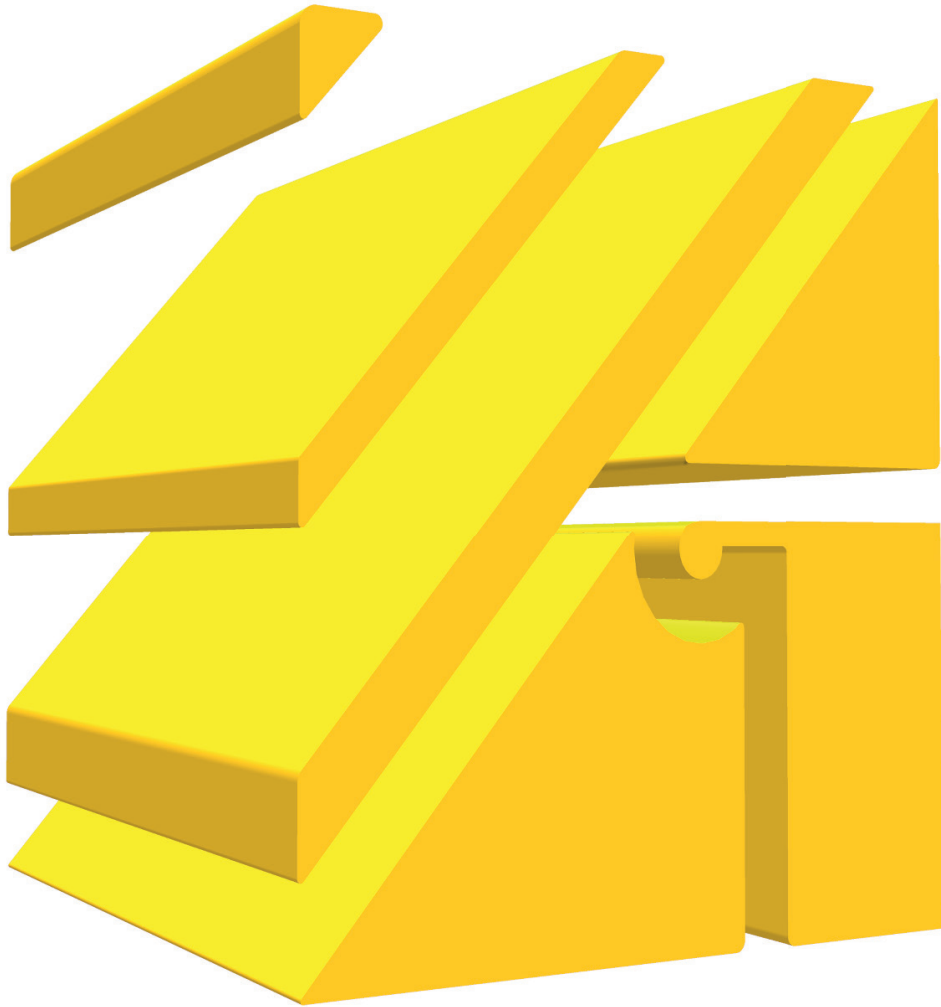


ArchReSci 24

Architecture - Research - Science



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ArchReSci 24

Architecture-Research-Science

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Composition and breaking
Stanisław GANCARZ

On the cover: Logo of the ArchReSci 24 conference, prepared by Alicja Hoyenski

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Wrocław University of Science and Technology Publishing House
Wybrzeże Wyspiańskiego 27, 50-370 Wrocław
<http://www.oficyna.pwr.edu.pl>
e-mail: oficwyd@pwr.edu.pl
zamawianie.ksiazek@pwr.edu.pl

ISBN 978-83-7493-265-3
https://doi.org/10.37190/ArchReSci_2024-EN

Print and binding: beta-druk, www.betadruk.pl

About Us

The aim of the ArchReSci (Architecture-Research-Science) conference series is to present the latest methods, techniques and ways of conducting research not only in the broadly defined discipline of architecture and urban planning, but also in related disciplines: heritage conservation, socio-economic geography and spatial management, but also all the other disciplines, whose adepts deal with the subjects of: the city, architecture and monuments.

The conference is methodological in nature and is intended to reflect on new methods and techniques of research, theoretical and experimental exploration, as well as the integration of known methods from different areas of scientific research into the analysis and design of the constructed environment. ArchReSci will provide an opportunity to present the results of analyses and inquiries conducted using new research techniques. An important goal of the meetings is also the exchange of ideas and experiences between the scientific communities in Poland and abroad and the promotion of new ways of conducting research on architecture and urban planning.

The organizers are very open to the proposal of issues raised in the speeches and discussions, proposing several thematic areas, related to: quantitative and qualitative research methods, statistical and correlative research, multi-criteria analysis and "research by design". Also invited to participate in the conference are those involved in: the use of artificial intelligence (AI) in research, programming and design, 3D modeling and scanning, virtual reality (VR), IT tools and other new methods used in architecture and urban planning research.

Place: Faculty of Architecture of University of Science and Technology, Bolesława Prusa Street, 53/55

Patronage: His Magnificence the Rector of Wrocław University of Science and Technology, Arkadiusz Wójs, Prof.
Dean of the Faculty of Architecture of Wrocław University of Science and Technology, Barbara Gronostajska, Prof.
Vice-Dean of the Faculty of Architecture of Wrocław University of Science and Technology, Joanna Jabłońska, Assoc. Prof.

Conference subjects: theory of contemporary and historical architecture, urban planning, landscaping, conservation, aesthetics, construction, the use of digital methods and interdisciplinary research, etc.

Media coverage: scientific journal *Architectus*

Formula: hybrid-stationary session and online meetings (Zoom)

Language: Polish, English

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Tomasz Ważny, Prof. (Toruń)
Sebastian Wróblewski, Assoc. Prof. (Wrocław)

Program

18 April 2024 (on-line)

- 10:00 Welcome participants and start of the presentation
- 10:10 dr hab. inż. arch. Bogna Ludwig
Attica – an Architectural Term. Comparative Explorations in the Era of Remote Availability of Printed Archival Sources
- 10:30 mgr inż. arch. Szymon Kowalski
Immersive visualization methods for historical architecture
- 10:50 dr inż. arch. Rafał Karnicki
Author's use of free 3D modelling software in renovation practice
- 11:10 dr inż. Łukasz Bednarz, dr inż. arch. Alicja Hoyenski, mgr inż. arch. Gabriela Wojciechowska
Research and conservation of historic vaults
- 11:30 prof. dr hab. Ewa Łużyniecka
Dating methods used during stratigraphic studies of medieval architecture
- 11:50 dr inż. arch. Małgorzata Doroz-Turek
Modern documentation of monuments and architectural research on the example of the Church of St. James and the Dominican Fathers' monastery in Sandomierz
- 12:10 prof. dr hab. Małgorzata Chorowska
Interdisciplinary research on castles in the context of the digital catalogue of castles and fortified manors of Silesia
- 12:30 prof. dr hab. inż. arch. Aleksander Piwek
The main entrance to the Cistercian church in Oliva
- 12:50 mgr inż. arch. Franciszek Hackemer
The portal from Olbin Abbey – an attempt at recomposition in a digital 3D environment
- 13:10 dr hab. inż. arch. Anna Bojęś-Białasik, dr Marcin Szyma, mgr archeologii Monika Łyczak
Gothic church in Witów – research and interpretations

13:30–13:50 Break for discussion

- 13:50 dr inż. arch. Ewa Netczuk-Pol, mgr inż. arch. Łukasz Netczuk
Reconstruction of the facade and tower of the church of the Exaltation of the Holy Cross in Kostomłoty according to the design by Karl Friedrich Schinkel against the background of his other projects as an example of the reconstruction of a baroque church in the spirit of neo-Gothic
- 14:10 dr inż. arch. Rafał Radziejewicz-Winnicki
The community center of the Jaszowiec holiday complex – Lost heritage of modernism
- 14:30 dr inż. arch. Anna Sulimowska
Analysis of the development potential of Upper Silesian water towers as elements of the cultural heritage of the industrial region
- 14:50 dr Daria Jagiełło
Torun waterworks - the history of the small complex of the former New Bielany pump station in the light of archives
- 15:10 dr inż. arch. Michał Kwasek
Tramway infrastructure – historical solutions and their continuation in modern times
- 15:30 dr inż. arch. Monika Neff
Residents of the jurydyka Ordynacka in Warsaw - socio-professional structure based on the Revision Protocol of 1792

15.50 Discussion and conclusion of the first day of proceedings

19 April 2024 (on-line)

- 9:00 Welcome participants and start of the presentation
9:10 mgr inż. arch. Magdalena Odziemek
Bezpieczny Kredyt 2% – what residential real estate market in Wrocław looked like after the government program
9:30 dr inż. arch. Magda Matuszewska, dr hab. inż. arch. Ewa Pruszewicz-Sipińska, dr hab. Agata Gawlak
Modeling as a Participatory Method in Designing Healthcare Architecture
9:50 dr Jakub Marszałkiewicz
Development of aircraft interior architecture over the years
10:10 mgr inż. arch. Magdalena Grzegorzewska
The importance of environmental and well-being requirements in the modernisation of turn of the XX and XXI centuries office buildings

10:30–10:50 Break

- 10:50 dr inż. Andrzej Borkowski
A blended approach on inquiry-based learning using the example of the interdisciplinary course of BIM in spatial management studies
11:10 mgr. inż. arch. Ewa Szymczyk
Compactness of Polish cities – methodologies and analysis
11:30 dr inż. Jerzy Ładysz
Concept of responsible spatial planning
11:50 dr inż. arch. Agnieszka Ptak-Wojciechowska
Using the Analytic Hierarchy Process (AHP) method to assess the quality of life of older people in cities in terms of architectural and urban aspects
12:10 mgr inż. arch. Dominika Kumorek
Modern methods of analyzing the acoustic conditions of outdoor spaces
12:30 dr hab. inż. arch., prof. PP Dominika Pazder
Determining areas of creativity - creative syntax as a tool for revitalizing the city center space in spatial and socio-economic terms
12:50 dr inż. arch. Bartosz Kaźmierczak
Sky View Factor method as an analytical tool in examining the compactness of urban interior

13:10–13:20 Break

- 13:20 mgr inż. arch. Iwona Krawiec
New cities and restituted cities. The issue of spatial and architectural transformations, the so-called “degraded cities” on the example of centers in the Masovian Voivodeship that regained city status in 2020–2024
13:50 mgr inż. arch. Marcelina Terelak, dr inż. arch. Jerzy Łątka, mgr inż. arch. Agata Jasiołek
Temporary housing in the context of conflict and assessment of the environmental benefits of the Styrofoam Housing System structure
14:10 Assoc. Prof. Ing. Volker Ziegler
Tales of transitions
14:30 dr inż. arch. Agata Pięt
The temporary use of space in contemporary cities
14:50 mgr inż. arch. Tomasz Dzieduszyński, mgr inż. arch. Olga Czeranowska-Panufnik
School Streets Implementation: A Machine Learning Perspective
15:10 dr inż. arch. Marta Rusnak, prof. Andrew Duchowski
Smart City Eye-Tracking. Technological Challenges
15:30 dr sztuki Piotr Drozdowicz
New “decorum” in contemporary architecture

15:50 Discussion and conclusion of the second day of proceedings

20 April 2024 (In-person, on-line)

Faculty of Architecture, Wrocław University of Science and Technology, bud. E-1

10:00 Welcome participants and start of the presentation

PANEL I

- 10:10 dr inż. arch. Małgorzata Petelenz
Poles on Route 66. Architectural and cultural context
- 10:30 dr inż. arch. Ewa Angoneze-Grela
How to deal with information overload? Method of analyzing representative features using verifiers – an example of application in the analysis of half-timbered construction of Pomeranian emigrants in Brazil
- 10:50 prof. dr hab. inż. arch. Piotr Marciniak
Methodology of conservation works, including the study of displacements and monitoring of the actual work of the structure on the example of the wooden church in Domachowo
- 11:10 dr hab., prof. UMK Ulrich Schaaf
The significance of church account books for research into the building history on the example of the records of the Church of Peace in Jawor
- 11:30 dr inż. arch. Joanna Ways
The use of mixed interdisciplinary research methods in the analysis and creation of conservation directives for local plans on the example of the Old Town in Warsaw
- 11:50 prof. Wojciech Bonenberg
Application of the geo-urban-centric method in the diagnosis of urbanization processes
- 12:10 prof. dr hab. inż. arch. Maciej Motak
Application of microhistory in the research in architecture and urban sciences

12:30–13:00 Break – information, guest speech

- 13:00 dr hab. inż. arch. Jadwiga Urbanik, dr Ryszard Wójtowicz, dr hab. Jerzy Ilkosz
CMP (Conservation Management Plan) – a new standard of monuments protection
- 13:20 Prof. dr hab. inż. arch. Magdalena Żmudzińska-Nowak, Prof. arch., PhD Assunta Pelliccio
Lazio Region Paper Mills vs. Upper Silesia brownfields: cultural heritage of post-industrial architecture as a subject of research, projects and international exchange of experience
- 13:40 dr Emilia Dziewiecka
The Role of the Architectural Comparative Studies for the Nomination of the European Paper Mills for the Inscription on UNESCO World Heritage List
- 14:00 dr hab. inż. prof. PW Anna Maria Wierzbicka
Stories of Place: The Impact of Narrative Methodology on Experience in Architectural Research and Design
- 14:20 dr hab. Klaudia Stala
On contemporary requirements for procedure of design activities within an archaeological reserve
- 14:40 prof. Jerzy Uścińowicz
The sacred in the ruins - the problem of interpretive fillings
- 15:00 dr inż. arch. Jakub Turbasa
The Chapel of the Last Farewell and Seven Joys of Mary Wayside Shrines – contemporary architectural interventions in the context of the historic Basilica Minor of St. Nicholas sanctuary complex in Rychwałd
- 15:20 dr hab. Agata Gawlak, dr inż. arch. Piotr Springer
Correlations and statistical analyzes in the study of user preferences in architectural design
- 15:40 dr hab. inż. arch. Bogusław Podhalański
Research methodology for the project of the National Pantheon in Krakow
- 16:00 dr inż. arch. Agnieszka Adamska-Idzikowska
The adaptation of historic castles and palaces of the Lower Silesian Voivodeship into contemporary hotels
- 16:20 mgr sztuki Piotr Kajzer
City palace in the landscape of Bielsko and Biała
- 16:40 Doctoral student Somayah Afshariadz
Investigating the Elements Affecting the Stability of Seljukian Dome Constructions: A Case Study of Isfahan's Jameh Mosque

PANEL II

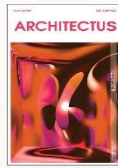
- 10:10 dr hab. inż. arch. Magdalena Baborska-Narożny, dr inż. Konrad Lewacki, mgr inż. arch. Marta Smektała
Summer in the city (without air conditioning) – map of night cooling potential and Wrocław's heat island
- 10:30 mgr inż. arch. Agata Woźniczka, prof. Barbara Widera
Resilient public spaces – multifunctional urban infrastructure as an opportunity for climate change mitigation
- 10:50 Cansu Iraz Seyrek Şık
Environmental Benefits of Vertical Green Façades
- 11:10 dr hab. inż. arch. Marcin Brzezicki
Phase method in simulation of variable elements in daylight regulation
- 11:30 Prof. Dr.-Ing. hab. M.A. Christiane Weber, Dipl.-Ing. Benjamin Schmid
Potential and challenges of retro-digitisation for construction heritage
- 11:50 dr. phil. Johannes Dahm
Empirical research meets Geocriticism: Interdisciplinary perspectives on the current perception of the remaining wilhelminian-style-architecture in France and Poland
- 12:10 dr inż. arch. Aleksandra Marcinów, Małgorzata Biegańska, inż. Bianka Kowalska, inż. Daniil Hardzetski, inż. Hubert Baran
Knowledge base of historical tenement facades for machine learning algorithms

12.30–13:00 Break – information, guest speech

- 13:00 dr inż. arch. Barbara Świt-Jankowska
Digital twin – a modern concept of museology
- 13:20 mgr inż. arch. Karolina Wójtowicz
Virtual reality for cultural heritage how 3D models, VR and gaming technology extend the reality
- 13:40 mgr inż. arch. Karol Argasiński
Opportunities for standardization of digital Heritage BIM-based survey processes to preserve cultural heritage
- 14:00 dr inż. arch. Agnieszka Rumieź
Interpretation of a functional program of a building in the light of planar graph theory
- 14:20 dr inż. arch. Anna Stefańska, mgr inż. arch. Małgorzata Kurcjuś
Selected aspects of using artificial intelligence in architectural design
- 14:40 mgr inż. arch. Ewa Tokarska-Gołębiewska
Agent-based modelling and its potential in architectural and urban design
- 15:00 dr inż. arch. Anna Stefańska, inż. arch. Maja Sutkowska
Comparative Analysis of Minimizing Carbon Footprint in Expansion: Classical Technology versus Natural Materials
- 15:20 mgr. inż. arch. Aleksandra Kręt-Grzeškowiak
Multiple life cycles of structural timber or effective incineration? Life Cycle Assessment in case of single-family housing
- 15:40 dr inż. Inna Abramiuk
Assessing women's sense of safety in public spaces on the campus of the University of Zielona Gora (case study)
- 16:00 mgr inż. arch. Szymon Kiciński
Common perception of beauty in architecture
- 16:20 mgr inż. Paweł Mierosławski
Vanishing types of buildings and structures of railway technical facilities

17:00 Ending

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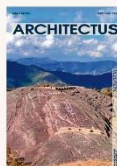
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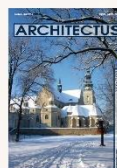
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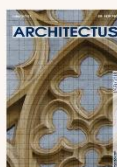
Issue 4(56)/2018



Issue 3(55)/2018



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Abstracts

Abramiuk I.

Assessing women's sense of safety in public spaces on the campus of the University of Zielona Gora (case study)

Methods: survey research, statistical analysis

Over the past decade, the global scientific and urban planning arena has focused on the issue of safety and security for women in open spaces in large cities and towns. This issue occupies a significant place in the sphere of interest of sociologists and urban planners, who seek to develop strategies to improve the living conditions of women in public settings. Worries about the possibility of assault, harassment, and acts of violence negatively affect women's ability to enjoy public experiences, thereby enriching their participation in society. Research in the field of environmental psychology has confirmed the existence of a significant correlation between the characteristics of public space and women's perception of psychological safety.

It is also worth noting that colleges and universities play an important role in shaping the urban structure and forming public space. Their contribution contributes to the formation of distinct and autonomous communities, characterized by unique features. The educational activities of academic institutions have a significant impact on the formation of social relations and the strengthening of local communities, which has important implications for aspects related to the safety and well-being of women in the public space of a university campus.

This study aims to analyze the level of the sense of security among women participating in the educational process at the University of Zielona Gora (Zielona Gora), covering both female students and teachers. The choice of this area of research is justified by the fact that the campus of this particular university is an open space and accessible to residents and visitors of the surrounding area, which poses security challenges for the academic community. The assessment will provide an opportunity to create campus spaces that take into account the needs of women and create public space facilities that are more humane and logically organized.

Adamska-Idzikowska A.

The adaptation of historic castles and palaces of the Lower Silesian Voivodeship into contemporary hotels

Methods: analysis of source materials, field research, photographic and illustrative inventory, detailed case studies, interviews with owners and employees of surveyed hotels, surveys, quantitative and qualitative research, comparative analysis, critical analysis, synthesis.

The subject of the paper are castles and palaces, entered into the register of monuments and located in the Lower Silesian Voivodeship, that have been adapted into contemporary hotels. The considerations cover entire residential premises, including supplementary and farm buildings, as well as the surrounding parks and gardens. The studies encompass all castles and palaces converted into hotels in the specified area. The time criterion was the operation of the hotel during the case studies period, i.e., the years 2019–2022. The oldest building discussed dates back to the 16th century, while the newest one dates to the early 20th century. The projects included in the research sample were launched between 1996 and 2014.

Depending on the stage of the work, appropriate research methods were adopted. Among the most important were the analysis of source materials (contemporary and historical) and interviews with owners and employees of the surveyed hotels. Comparative, critical, and synthesis analyses were conducted to draw conclusions. The research involved visits to each venture, enabling the collection of numerous photographs. A series of analyses were conducted related to general and detailed typology criteria, the process and scope of adaptation, the location of individual functional zones, land development, main strengths of the projects, and a synthesis of selected hotel features.

It has been proven that the existing adaptations of castles and palaces listed in the monument register and located in the Lower Silesian Voivodeship into hotels are examples of valuable architectural efforts aimed at the reuse of historical buildings along with their surroundings. They contribute to the creation of unique, multifunctional enterprises tailored to the needs of contemporary guests.

Afshariadzad S.

Investigating the Elements Affecting the Stability of Seljukian Dome Constructions: A Case Study of Isfahan's Jameh Mosque

Methods: analysis of source materials, case study, descriptive-analytical, field studies

Exploring the intricate challenges inherent in dome and vault construction, this research delves into the construction methods and structural stability of these architectural marvels. Focused specifically on the historical context of dome construction in Iran, the study places a spotlight on the distinctive domes of Nizam al-Mulk and Taj al-Mulk within the Jameh Mosque of Isfahan. The Renaissance-era techniques employed in dome construction in Isfahan serve as a valuable lens through

which this research seeks to extract insights and practical lessons applicable to broader sustainable engineering practices. By laying the groundwork for a thorough investigation, the study addresses the delicate balance between preserving cultural heritage and embracing sustainable engineering in historical and contemporary environments. The research's core objective is to scrutinize the structural stability and construction methodologies of diverse domes from the Seljuk period. Leveraging library resources, documents, and employing a descriptive-analytical method complemented by field studies, the study sheds light on the significance of using stable materials like stone, sarooj, and gypsum. It underscores the importance of construction techniques involving quadrilateral structures, the strategic use of arches with force transmission on four pillars, and variations in dome size and thickness as pivotal factors contributing to the structural stability and sustainability of the examined domes.

Angoneze-Grela E.

How to deal with information overload? Method of analyzing representative features using verifiers – an example of application in the analysis of half-timbered construction of Pomeranian emigrants in Brazil

Methods: verifiers, infographics, maps, geolocation of objects

In the age of information, collecting data seems to be an easier task than its subsequent processing. Too much information leads to mental overload, which makes it difficult to make decisions, focus attention and logical reasoning. The wave of information can make it difficult to distinguish important content from less important content, resulting in disinformation and cognitive chaos. To counteract this problem, a trend has emerged called „information beauty”. Aesthetic visualization of data through infographics, charts and clear maps not only presents information, but also makes it easier to understand. Data visualization enables comprehensive analysis and facilitates drawing subtle, non-obvious conclusions.

“The beauty of information” also works well in the analysis of architectural resources. Architectural objects in one area often differ in many respects, are built in different periods and are subject to modifications over time. This problem of information overload became visible during the analysis of half-timbered buildings erected by 19th-century Pomeranian emigrants in southern Brazil. The features of the analyzed architectural resource were not easily legible at first glance, and the conventional method of description could lead to hasty and incorrect conclusions. In order to solve this challenge, an original method of analyzing representative features using verifiers was constructed. The use of infographics, maps, geolocation of objects and taking into account the time of their creation allowed for organizing the data and understanding the nature of changes taking place in the analyzed area. The aim of the speech is to present this method and the results obtained from its use.

Bednarz Ł., Hoyenski A., Wojciechowska G.

Research and conservation of historic vaults

Methods: laser scanning, photogrammetry, material analysis

The presentation focuses on issues related to the research and conservation of historic vaults, taking into account the analysis of their technical condition. The identification of structural problems is essential for the development of a correct conservation strategy to preserve the architectural heritage and maintain its integrity for future generations. The paper presents research methods such as visual inspection, measurements using laser scanning and photogrammetry, and material analysis to diagnose damage. It then discusses the conservation work required to maintain the authenticity and durability of historic vaults. Monitoring of the condition of the vault is recommended in order to evaluate the structural and architectural conservation solutions applied.

Bojęś-Białasik A., Szymba M., Łyczak M.

Gothic church in Witów – research and interpretations

Methods: historical-stylistic analysis, archaeological and anthropological research

In 2021 and 2022, an emergency archaeological and architectural research was carried out in the parish church of St. Trinity, located in the Lesser Poland village of Witów (Koszyce commune). The small brick church, picturesquely situated on a hill, has the features of Gothic architecture – which is indirectly confirmed by poor historical sources – unfortunately distorted by erroneous conservation activities. The research work was carried out due to the dampness of the walls and the cracks that appeared locally in their structure. They became an opportunity to undertake the first interdisciplinary research into the church, which brought very interesting and promising results. Preliminary research results indicate that the church - both in formal and technological terms – represents features typical of the Lesser Poland architecture of the King Kazimierz Wielki workshops. The slender, subtle proportions of the body – especially the presbytery framed by prominent buttresses – the regular Polish brick bond used in the construction of walls, built of large-sized bricks and carefully jointed, as well as the stone architectural detail are the attributes of this small but extremely interesting temple. Research on one of the crypts under the church brought unexpected results: the discovery of a well-preserved, naturally mummified body of a man – probably one of the village owners,

a government official and a dignitary from the late 18th century. Due to the very rare finds of this type, the burial in the Witów church should be considered an exceptional and unique case in Małopolska.

Bonenberg W.

Application of the geo-urban-centric method in the diagnosis of urbanization processes

Methods: urbanization, geo-urban-centric methods, functional-spatial diagnosis

The original geo-urban-centric method, developed at the Institute of Architecture and Urban Planning of Poznan University of Technology, allows for reliable monitoring of urbanization processes. The method has been implemented in the Poznań Metropolitan Area. The innovation of the method is that it makes extensive use of the Internet (Internet Search Engine) and artificial intelligence (Artificial Intelligence) in the analysis of the area's competitive potential, assessments of natural and landscape values, socio-cultural and economic resources. All these elements have a significant impact on the spatial layout of the Poznań Metropolitan Area.

The geo-urban-centric method resulted in:

- a reliable basis for determining the extent of the spatial impact of various types of exogenous and endogenous functions in the Poznań Metropolitan Area,
- diagnosis of the diversification of service functions of metropolitan character,
- comparison of actual urbanization processes with planned intentions recorded in the studies of conditions and directions of development of municipalities included in the Poznań Metropolitan Area,
- analysis of spatial and functional competitiveness in individual structural units of the Poznań Metropolitan Area (precincts and municipalities).

Brzezicki M.

Phase method in simulation of variable elements in daylight regulation

Methods : simulation using the Radiance computational engine

Daylight is the healthiest type of light that is available for indoor lighting. The primary method currently available for studying daylight is a simulation of illuminance conducted on an annual basis using a calculation engine named Radiance. This is one of the few design tools in architecture that provides the designer with robust, numerical results. This method effectively allows the comparison of different scenarios for the placement of openings through which light enters a room. However, the method has some limitations, as it does not allow testing of variable systems, such as those whose geometry is modified (e.g., users pull rollers or adjust blinds during the day). In 2018, a „phase method” was developed to simulate daylight in the presence of variable shading devices. It involves calculating illuminance values for the whole year, for different scenarios, such as for open and closed blinds, and then - using an appropriate algorithm or formula - compiling these values at specific hours of the year. In the presented paper, the author presents the basic assumptions of the phase method and gives examples of calculations carried out for the southern façade of an office building located in Wrocław. As a result of the use of variable shading elements, a significant improvement in the visual comfort of office spaces can be achieved.

Chorowska M.

Interdisciplinary research on castles in the context of the digital catalogue of castles and fortified manors of Silesia

Methods: classical, aerial LiDAR (Light Detection and Ranging) scanning, ALS (Airborne Laser Scanning) data, NMT (National Mapping and Topographic) and NMPT (National Mapping and Photogrammetric Technologies) data

The aim of the digital catalogue is to collect and share the results of interdisciplinary research on Silesian castles and fortified manors carried out for over 60 years by scientists from various centres. In particular, these will include inventories, photogrammetry, chronological research and attempts to date selected objects and their digital reconstructions. The catalogue will be available in the form of a website, a lexicon of the most important Silesian castles will be published in print and three e-books will be prepared to describe the defensive seats from the Duchies of Świdnica, Ziębice and Nysa.

Dahm J.

Empirical research meets Geocriticism: Interdisciplinary perspectives on the current perception of the remaining wilhelminian-style-architecture in France and Poland

Methods: interviews, case study, theoretical and methodological considerations, geocriticism approach

The aim of this contribution is to present an interdisciplinary approach that will be applied within the scope of a study that focusses on the contemporary perception of the architectural and the urban planning heritage of the Wilhelmine Period. The focus here is on the urban expansions in Strasbourg and Poznan with their eclectic and historicist (revival)

architectures that have been realized by the end of the 19th and the beginning of the 20th century under German administration. Interviews on the current perception of this complex cultural heritage were conducted in both cities in a comparative perspective. These interviews/corpora are analyzed against the background of an interdisciplinary approach. The analyses are first and foremost carried out from a discourse linguistic perspective. Concepts such as interdiscursivity, dialogism and linguistic polyphony are applied. In terms of both theoretical and methodological considerations, promising concepts and notions that have been developed in more or less neighboring paradigms are also integrated in the approach. The consideration of the heuristic potential of the concept “phantom borders” proves to be very useful for the analysis; both cities, Strasbourg and Poznan, are situated in so-called “phantom spaces”. Moreover, the study will also include a geocriticism approach and consider spatial imaginations about the architecture in question shaped by literature.

Doroz-Turek M.

Modern documentation of monuments and architectural research on the example of the Church of St. James and the Dominican Fathers' monastery in Sandomierz

Methods: analysis of written and iconographic sources, laser scanning, photogrammetry, digital humanities.

Architectural research gained a new dimension and importance when modern measurement technologies became a tool for documenting monuments. In fact, the time has come to document monuments anew and therefore conduct new scientific research. And so, from around 2016, scientists again began to study the church of St. James together with the remains of the former monastery of the Dominican Fathers in Sandomierz, using the latest methods and technologies. Everything, of course, is based on a traditionally conducted query of written, iconographic and cartographic sources, research of the current research results carried out using the traditional method and in situ research. With this presentation, the author wants to show the effects of recent interdisciplinary research and her own – architectural research based on documentation from laser scanning and photogrammetry made by Andrzej Golembnik, as well as the effects of two research projects carried out under the POB Heritage grant (special edition: digital humanities) financed by the Jagiellonian University in the interdisciplinary research team: Justyna Kamińska (leader), Małgorzata Doroz-Turek, Andrzej Golembnik and Kamil Rabiega.

Drozdowicz P.

New “decorum” in contemporary architecture

Methods: quantitative and qualitative analysis of aesthetic and artistic values

New decorum in contemporary architecture. Diagnosis of the phenomenon of contemporary elements serving as architectural decorations and contemporary decorative types and motifs on the example of Poznań's architecture from recent decades.

Presentation of research on the nature of basic research based on the obtained documentation of decoration elements in contemporary architecture, their description and quantitative and qualitative analysis from an aesthetic and artistic perspective. Reflections on the aesthetics of architecture lie between two poles: rich ornamentation, synonymous with baroque or rococo, and minimalism, emptiness (empty wall), which is one of the basic features of modernism and postmodernism. This is accompanied by the question whether the idea of an empty wall is still valid and how it is implemented in architecture today. What is it with the eternal need for decorum, does it still have its expression today? Architectural and public space is a field of struggle for many cultural, aesthetic and social tendencies. Regardless of contemporary aesthetic conventions in architecture, objects are annexed by large-format advertising graphics, such as murals. This raises the question about the place of art in architecture. The analysis of the state of decorativeness in contemporary architecture justifies the search for arguments for new relations between art and architecture.

Dzieduszyński T., Czeranowska-Panufnik O.

School Streets Implementation: A Machine Learning Perspective

Methods: application of generative adversarial neural networks, comparative analysis, case studies

This study explores the application of generative adversarial neural networks in the implementation of school street closures, a concept aimed at improving safety and reducing traffic around schools. The research analyzes various school street closure programs worldwide and identifies common challenges. Based on an analysis of 51 successful school street closure programs and a proposed urban feature extraction method, a supervised machine learning model was developed to facilitate the selection of the potential school street candidates. Despite certain limitations, such as the inability to represent all spatial contexts and small-scale urban details, the system can propose a meaningful definition of a school street closure zone. This research contributes to the limited academic literature on school streets and play streets, providing a new perspective on urban traffic regulation.

Dziewiecka E.**The Role of the Architectural Comparative Studies for the Nomination of the European Paper Mills for the Inscription on UNESCO World Heritage List**

Methods: historical-stylistic analyses

The comparative analysis of architectural features characteristic of the selected European paper mills from the era of hand-made paper, constitutes a substantial contribution to the preparation of the serial nomination to the inscription on the UNESCO World Heritage List under the category of the cultural heritage. The project currently covers six traditional paper mills located in five European countries, which date back to the period between first half of the 16th c. and first half of the 19th c. These are the paper mills in Capellades (Spain), Duszniki Zdrój (Poland), Homburg (Germany), Niederzwönitz (Germany), Pescia (Italy) and Velké Losiny (Czech Republic). In spite of a substantial chronological distance as far as the time of their erection is concerned, their architectural form is characterised by some common features, strictly determined by the specific needs connected with the process of traditional hand papermaking. At the same time, the comparative analysis reveals individual architectural features of the respective mills, resulting mainly from the influence of the local building traditions and geographic location. Both common and individual architectural features of the European paper mills from the era of handmade paper, contribute to the outstanding universal value of these architectural monuments considered as a group which predestinated them to the serial inscription on the UNESCO World Heritage List.

Gawlak A., Springer P.**Correlations and statistical analyzes in the study of user preferences in architectural design**

Methods: statistical analysis

I am qualified to talk about the physical properties of hospital space not because I am an architect, but because I have spent the last three years there as a patient [M. Graves]. These words clearly emphasize the importance of participation in design, among others. hospitals and the selection of research methods that catalyze participation processes. The article presents examples of the use of statistical methods in research conducted in the discipline of architecture and urban planning, regarding the participation of users of health care buildings in the design of their modernization. The inference was made based on the participation of two important user groups: pediatric patients in the emergency room and medical staff in selected hospital facilities. The article discusses selected methods enabling the assessment of the correlation between important socio-demographic factors and the spectrum of functional and spatial preferences of end users, such as: Mann–Whitney *U*-test, Spearman's rank correlation, Kruskal–Wallis ANOVA test and stepwise regression models.

The methods used made it possible to assess preferences regarding the designed space, as well as the willingness to participate in participatory research (in the case of staff).

As a result, it was shown that selected statistical methods can be an effective tool in assessing the spatial needs of users at the stage of programming and investment design.

Grzegorzewska M.**The importance of environmental and well-being requirements in the modernisation of turn of the XX and XXI centuries office buildings**

Methods: environmental, Social, and Governance (ESG) studies, well-being assessments, ESG reporting

In recent years, there has been a significant decrease in the volume of available office rental space on the market. Some buildings are undergoing modernisation programmes, while others are being demolished and replaced with new constructions.

The changing climate and the global pandemic have accelerated the progressive changes in work models that have redefined the requirements for office buildings. Occupants seek cost-effective and environmentally friendly spaces that address the challenge of improving energy efficiency. Additionally, they require flexible spaces that provide opportunities for group work while also responding to the individual needs of each occupant. Buildings constructed at the turn of the 20th and 21st centuries are no longer competitive due to increasing environmental and wellbeing requirements. These factors are of high importance to potential occupants, particularly in light of ESG reporting.

It is rare to come across a new office building that has not been certified by a multi-criteria rating system such as BREEAM, LEED or WELL. However, the creators of these systems have long anticipated the evaluation of existing buildings, which provides an excellent tool to support the modernisation process.

Research indicates that smart modernisation of an office building can be less environmentally damaging than demolition and new construction, which leaves a significant carbon footprint that negatively impacts the environment.

The purpose of this paper is to demonstrate the significance of environmental requirements and occupant wellbeing in the modernisation of turn-of-the-century office buildings. To achieve this goal, a comprehensive strategy will be presented, using examples of successful implementation, and the key elements of this strategy will be highlighted.

Hackemer F.

The portal from Olbin Abbey - an attempt at recomposition in a digital 3D environment

Methods: 3D modeling, historical-stylistic modeling

The presentation is intended to summarise research into the portal from the Romanesque abbey of St. Vincent on Olbin, currently embedded in the wall of the Church of St. Mary Magdalene in Wrocław. This object has been subjected to numerous transformations during its history and has as a result lost its original appearance. The portal and the associated tympanum and archivolt bands were photogrammetrically surveyed. The 3D digital models created in this way were then compared with each other. Based on the conclusions drawn from this comparison, an attempt was made to propose a reconstruction of the portal in its original form.

Jagiello D.

Torun waterworks – the history of the small complex of the former New Bielany pump station in the light of archives

Methods: archival analysis

The most significant changes in Toruń's urban water supply and sewage system occurred at the turn of the 20th century. The significant development of the city and a marked increase in population led to measures aimed at building new water intakes.

The subject of the study is the complex of buildings of the former water intake from the 2nd decade of the 20th century, which includes the pump station, the engine room building (historically connected by an underground corridor) and the utility building, along with the accompanying infrastructure. Despite its subordinate importance to the main complex (the so-called "Old Bielany"), the capacity of the two pumps driven by electric motors with which the station was equipped, in theory, allowed it to supply the city with water on its own.

The primary purpose of the paper is to present the history of the complex, recognized on the basis of the surviving archives. These materials, supplemented by the results of an architectural analysis of the buildings, made it possible to establish that the complex has mostly maintained its historical character – in particular, the actual building of the pump station, which is a practically untransformed object, preserved in its original form, with, although not preserved, documented equipment.

The above reconnaissance and the photo documentation made in 2022 become even more valuable as a year later the complex was adapted for the Copernican Integration Center of the Nicolaus Copernicus University in Toruń.

Kajzer P.

City palace in the landscape of Bielsko and Biała

Methods: historical-stylistic analysis

The article comes from the urban architecture of the 19th and 20th centuries in Bielsko and Biała – cities divided by the Biała River. Today, the city has been united for almost seventy years. Observing monument architecture of Bielsko and Biała, we can discover some dissonance. Both of these towns are connected by many bridges, which are crossed by the river separating them, in fact two entities of the land - Galicia and Austrian Silesia (in the years 1772–1918). This did not mean that the flow of residents and employees who were in both cities was limited, it is known that Bielsko operated as "Little Vienna", was in much better economic condition. The influence of many factors, one of them was the imperial railway leading from Vienna to the Bielski Kaiser-Bahnhof. Such a good transport line allows for the flow of Viennese architects and builders who, due to Bielsko's priority and its location, are willing to stay in this city and create entire construction consortium.

Architects, builders, and, after them, wealthy manufacturers, lived in the center of both cities, building city palaces for this purpose, embedded in compact urban development or free-standing. The topic discussed is irrelevant, related to the violation, many of these buildings became tenement houses, converted into many smaller flats. This article shows their original function, which has a chance to survive in these days.

Karnicki R.

Author's use of free 3D modelling software in renovation practice

Methods: utilization of free, open-source software

To effectively use photogrammetric techniques, one often needs spatial modelling tools. This can be achieved through a simple CAD software implementation that allows the embedding of flattened orthophoto plans of typical buildings, on which the design plane can be easily defined. However, documentation preparation can become increasingly complicated for monuments with irregular topography, and non-planar and highly eroded wall faces. The correct spatial orientation of inventoried relics and their conservation interpretation often requires the proficient use of advanced spatial modelling software.

In this context, the author will use the example of the reconstruction of the gates of the Srebrna Góra Fortress to discuss the workflow and the results obtained. The presented practice demonstrates that it is possible to effectively use free open-source software to support cooperation between the designer, construction manager, and contractor.

Kaźmierczak B.

Sky View Factor method – as an analytical tool in examining the compactness of urban interiors

Methods: SVF (Sky View Factor)

Physiognomic studies of urban interiors usually involve visual analysis performed in an intuitive manner. There are, of course, standards for this type of research that determine the types of elements of the space seen and the way they are recorded. Such analyzes fall within the mainstream of descriptive research, which is often criticized for their subjectivity and lack of comparability. To increase objectivity, expert assessments are replaced by research performed by the group and the results are presented in a statistical form. Therefore, there is a real need to use research methods based on normative and quantifiable principles. One of such methods may be SVF (Sky View Factor), the use of which allows to obtain measurable results. It can serve as a simple tool in examining the compactness of an urban interior, which will be presented in a future text.

Kiciński Sz.

Common perception of beauty in architecture

Methods: Neuroaesthetics, identification, and analysis of activity in various areas of the cerebral cortex during the perception of art

According to the observations of Vitruvius, author of the ancient treatise “Ten Books on Architecture”, the value of an architectural work is determined by its three constitutive features: durability, usefulness and beauty. This view, shared and developed by Renaissance theorists (Alberti, Palladio), seems to remain valid today. While durability and usefulness are strictly measurable and objective features, depending directly on the properties of materials and the way they are organized in space, beauty seems to be an intangible entity, depending rather on the individual judgment of the viewer, motivated, however, by a very specific structure of the observed object, which affects the mind and emotions. The aim of the article is to reflect on the concept of beauty, which, as mentioned, should cover two areas: philosophical and material. The first one is related to man’s subjective judgment of beauty and attempts to explain it, using the tools of axiology and epistemology and analysing the influence of cultural factors. It is based on the works of David Hume, Immanuel Kant, Władysław Tatarkiewicz and Roger Scruton. The second area of analysis concerns the physical features of the observed object and examines their impact on perception processes taking place in brain. This modern, interdisciplinary reflection on the neurobiological nature of aesthetic experiences belongs to the disciplines of cognitive science and is called neuroaesthetics. The research includes the identification and analysis of the activity of various areas of the cerebral cortex during the perception of art; it explains the physiology of emotional processes such as delight, admiration and pleasure, identified with the experience of beauty. Therefore, it is an objectifying and precise approach. To sum up, the work will discuss two areas of theoretical exploration, focused on explaining the nature of beauty. It has a reviewing and ordering scope and is a preparation for further experimental research.

Kowalski Sz.

Immersive visualization methods for historical architecture

Methods: immersive visualization methods: Virtual Reality (VR) and Augmented Reality (AR)

This article focuses on the applications of immersive visualization methods, such as virtual reality (VR) and augmented reality (AR), in the context of historical architecture. It presents various approaches to creating immersive experiences by developing distinct virtual reality environments using goggles and CAVE systems.

Different digital inventory methods, including laser scanning, traditional photogrammetry, and drone usage, are introduced to construct a foundational 3D model of the object under study. The inventories thus generated, in the form of a point cloud and textured mesh models, have been refined and showcased in an immersive environment to facilitate an interactive exploration of the depicted historic architectural object. Potential new opportunities for such applications are also outlined.

The publication also provides a glimpse into the future, exploring potential trajectories for immersive technologies and their impact on the evolution of the discipline of architecture. Furthermore, it discusses the potential application of these technologies in the context of historic architecture. The research presented in this paper received funding from the project “Laboratory of Digitisation and Visualization of Architecture” conducted at the Faculty of Architecture, Gdansk University of Technology.

Krawiec I.

New cities and restituted cities. The issue of spatial and architectural transformations, the so-called “degraded cities” on the example of centers in the Masovian Voivodeship that regained city status in 2020–2024

Methods: historical-urbanistic and architectural analysis

According to the regulation of the Council of Ministers of July 27, 2023 regarding “determining the boundaries of certain communes and cities, granting certain towns the status of a city, changing the name of the commune and the seat of the commune authorities”, on January 1, 2024, as many as 34 towns in the area were granted the status of a city in Poland.

These included, among others: 8 towns in the province Łódź Voivodeship, 3 each from the Lublin Voivodeship and the Kuyavian-Pomeranian Voivodeship and as many as 11 centers from the Masovian Voivodeship. All these “new towns” were once formally cities, but over the centuries, because of reforms and administrative decisions, they lost their city rights and were degraded to the status of settlements (e.g., the urban reform in the Kingdom of Poland in 1869-70). In Poland, the problem of degraded and restored cities has a special dimension, including due to the extremely large scale of the phenomenon (over 800 cases compared to 1,013 centers currently having the status of a city).

Although this issue has been the subject of interest of many researchers so far, the research they conducted focused mainly on formal, legal, economic, and statistical aspects, while in her research the speaker emphasizes the analysis of the phenomenon from a historical, urban, and architectural perspective. The presentation will summarize current research on the impact that these decisions had on the spatial development, historical urban layouts, and buildings of selected centers in the Masovian Voivodeship that regained city rights in 2020–24. During the presentation, the issue of the city-forming potential of centers that have not yet regained city status, but which still retain their urban character will also be discussed. In the face of the huge scale of the phenomenon of restitution of “degraded cities”, it seems justified to undertake a broader discussion on their importance in the context of the development of the network of Polish cities and the protection of their heritage.

Kręt-Grześkowiak A.

Multiple life cycles of structural timber or effective incineration? Life Cycle Assessment in case of single-family housing

Methods: prospective life cycle assessment of wood, considering shared socio-economic pathways in various future scenarios spanning a period of 250 years

Given the urgent need to reduce environmental impact, particularly the construction sector’s significant contribution of up to 37%, ongoing intensive research focuses on End-of-Life (EoL) scenarios for building materials. While assessments of material’s initial environmental impact rely on internationally recognized databases like the Ecoinvent or environmental product declarations, detailed context-specific data remains limited. There’s a distinct lack of systematic approaches, especially in circular strategies that quantify and qualify reusable building materials.

While some case studies assess the reuse and recycling of building elements at their EOL based on observation and qualitative expert assessments, challenges arise when considering multiple lifecycles. Publications focusing on secondary lifecycles often lack sensitivity analysis regarding variations caused by factors such as maintenance, material quality, or processing losses. Moreover, building elements are characterized by long lifespans, and circular scenarios evaluated for these elements extend far into the future, introducing uncertainty into the assessment process.

To address these challenges, we present the findings of a study on structural timber designed for single-family house application, conducted within the Circle Bank project in collaboration with the University of Southern Denmark. A prospective Life Cycle Assessment incorporating Shared Socioeconomic Pathways, encompassing various lifecycle scenarios spanning 250 years, was conducted. The designed circular approaches relied on systemic data provided by the Danish industrial collaborator, Jjensen. Additionally, structural calculations were performed to assess the quality of reclaimed wood, determine its necessary cross-section and spacing, and specify required metal anchors. The study emphasized the necessity for holistic assessment of load-bearing elements, adjoining structures, and underscored the importance of extending service life.

Kumorek D.

Modern methods of analyzing the acoustic conditions of outdoor spaces

Methods: real measurements, analysis of sound and vibration data, psychoacoustic evaluation

Sound is an inherent element of every space and reflect its visual character. Its reception and interpretation depend on objective parameters, but also on the individual predispositions, experiences, and associations of the recipient. Sound is a feature of the landscape conditioned by place and time, depended to the dynamics of spatial, social, and cultural changes. It becomes particularly burdensome in highly urbanized areas, where it takes the form of long-lasting noise, significantly affecting the mental and physical condition of society. Research on the issue of sound, complex by nature, is based on interdisciplinarity and cooperation between related fields of science. Therefore, it is so important that the acoustic aspect of the space of humans functioning is systematically researched, verified, and improved in the context of noise protection, which limit the negative impact of noise on the human body, care for subjective impressions based on psychoacoustic assessment, and maintaining sound identity of the place, which is a characteristic layer of its landscape.

The aim of the paper is to present the possibilities of using modern methods for analyzing the acoustic conditions of outdoor spaces, which, due to the reliability of the results and their holistic assessment, can be effective tools for verifying and improving the acoustic quality of the environment.

The subject of the presentation is a review and analysis of modern research methods that are used to determine and evaluate the existing acoustic conditions of outdoor spaces, including: methods of sound measurements; analytical methods based on software for analyzing data from sound and vibration measurements, as well as methods for conducting psychoacoustic assessment.

Kwasek M.

Tramway infrastructure - historical solutions and their continuation in modern times

Methods : historical-formal analysis

The expanding areas of 19th-century European cities made it necessary to improve transportation in them. Horse-drawn carriage lines began to be used in the agglomerations, and in time developments in technology made it possible to replace them with more efficient electric vehicles. The power supply came primarily from overhead traction, which, strung out in urban areas, was initially quite controversial. This discussion examines its historical solutions and those closer to modern times. Tramway traction was originally made using decorative cast-iron poles or small brackets attached to walls. These decorative solutions, intended to mitigate public resistance to the introduction of new urban infrastructure, were simplified over time. The change in form was also associated with a modification of the material, and this contributed to the introduction of more favorable structural solutions. The effects of these improvements can be seen in the urban spaces of many European cities. Few examples of historical infrastructure elements of this type are still preserved. In order to protect them, it is necessary to register them as cultural heritage and develop conservation strategies that will support the preservation and promotion of these unique historical traces in today's urban landscape.

Ludwig B.

Attica – an Architectural Term. Comparative Explorations in the Era of Remote Availability of Printed Archival Sources

Methods: comparative, terminological

Architectural terms, as well as expressions in other fields, are sometimes strictly specialized names, while others permeate common use, sometimes changing their meaning. They arise from borrowings or associations, built on the basis of formal, functional or structural similarities. Tracing the terminological changes in the interrelated works in several European languages provides a contribution to the study of the genesis of architectural solutions and their spread. The terms, the scope of their use, translations, as well as the timing and ways of replacing them with new terms testify to the understanding of the meaning of their genesis, form, function and construction by the authors of architectural works and their commentators. In particular, the most valuable are the illustrated treatises and sample books, which clearly show what architectural solutions they discuss. Wide, remote access to treatises, architectural dictionaries and language dictionaries enables and accelerates research on selected terminology.

One such name is "attica", which, in a meaning similar to that currently adopted in most countries, appeared relatively late, in the 17th century, and in many languages it did not become widespread until the 19th century. It replaced several other terms. The establishment of a sequence of synonymous and close in meaning names indicates a partially independent awareness in neighboring European countries of the ancient genesis of the creations later referred to as the attic. In the sixteenth century, a gradual departure from Latin loanwords was visible in favor of their translations in various languages, and then the adoption of the Italian, or rather Venetian, name. At the beginning of the 17th century in France, the term attic (atique, later attique) appeared for a structure placed above the cornice in triumphal arches, and then in palace architecture. At the end of the eighteenth century, the name began to be adopted in other languages, confirmed by the authority of the French academy.

Ładysz J.

Concept of responsible spatial planning

Methods: systematization of knowledge, assessment of experiences from urban planning practice regarding the responsibility of individual entities for the consequences of decisions on land use

Spatial planning involves searching for the optimal functional and spatial structure, land use in accordance with the principles of spatial order and sustainable development, and minimizing land-use conflicts. The spatial planning system is constantly being modified to meet increasing challenges in a rapidly changing environment and growing problems. One of them is responsibility for decisions on land use. This kind of responsibility is not clearly assigned and is interpreted in various ways. The subject of spatial planning are public authorities at three levels of spatial planning: municipal self-government, regional self-government, and national government. Planning documents at all levels should be prepared by urban planners who represent a profession currently deregulated in Poland. The modern spatial planning system is characterized by discretion and freedom in making decisions on land use. Operational spatial planning is implemented at the municipal level, by shaping and conducting spatial policy, as the municipalities' own task. Supervision over the spatial policy pursued by the municipal self-government is carried out exclusively within the scope of compliance of the

municipal spatial planning acts adopted with the applicable law. Decisions of municipal self-governments regarding changes in land use are protected in accordance with the constitutional principle of self-governance. At the same time, the literature on the subject increasingly draws attention to the institutional weakness of most municipal self-governments in performing such an important task from the point of view of the public interest. This concerns, for example, rural communes, most of them do not employ professionals with specialized education in architecture and urban design or spatial planning. The presented theoretical concept of responsible spatial planning is an attempt to systematize knowledge, evaluate experiences from urban planning practice regarding the responsibility of particular entities for the effects of land-use decisions, as well as indicate directions for improving responsibility in the spatial planning system.

Łużyniecka E.

Dating methods used during stratigraphic studies of medieval architecture

The paper will present the author's experience in the use of dating methods of sacred architecture. **Electrical resistivity tests, GPR, dendrochronology, petrographic studies, dating of lime mortars by means of ¹⁴C carbon decomposition analysis, laboratory studies of chemical composition, microscopic and petrographic studies, instrumental tests (IR, TAR, X-RAY) will be discussed.** These methods are developed after the stratigraphy of the building has been developed, made with the use of digital inventory methods (scan, photogrammetry, point clouds).

Marciniak P.

Methodology of conservation works, including the study of displacements and monitoring of the actual work of the structure on the example of the wooden church in Domachowo

Methods: static-dynamic measurements, numerical modeling

St. Michael's Church in Domachowo is an interesting example of a wooden church, with a complex architectural shape and structural structure. The deformation of the internal skeleton and the degradation of the connections of the wooden elements reduced the structure's ability to properly support external loads. The results of the measurements show significant deviation of the church structure and its elements. Given the complexity of the building's structure, continuous dynamic monitoring of the displacement of the wooden elements, as well as a customized approach to static analysis, proved indispensable. The results of the experimental and numerical analyses made it possible to determine the safety condition of the building and develop a conservation program for repairing and strengthening the church's structure.

The surprisingly extensive scope of the work, resulting in large part from the discovery of previously unknown polychromes and the poor condition of the church's structural elements, raised a number of questions about the methodology to be followed during the conservation and construction work, as well as the role of experimental research in architecture and monument restoration.

The purpose of the presentation is to discuss experimental methods for analyzing the actual work of the structural structure based on static-dynamic measurements and numerical modeling, aiming to detect the weakest structural elements.

On a broader level, it is also an attempt to develop a methodology of diagnostic treatment of historical wooden objects with complex construction and problematic technical condition, taking into account the transdisciplinary nature of the work carried out. It was also the intention of the authors to introduce new methods, techniques and research tools to the broader issue of cultural heritage protection.

Marcinów A., Biegańska M., Kowalska B., Hardzetski D., Baran H.

Knowledge base of historical tenement facades for machine learning algorithms

Methods: application of artificial intelligence (AI)

In recent years, the development of artificial intelligence (AI) has introduced new possibilities in the field of architecture. In the realm of compositional analysis and recognition of architectural details, AI can have a significant impact, supporting historical-architectural research, the valorization of historic buildings, and designing in accordance with historical context. However, effective utilization of AI in the analysis of architectural objects requires a robust database. Especially neural network-based algorithms necessitate a large volume of data for training and obtaining satisfactory results.

This presentation will discuss methodological and technical issues related to creating a database of photographs of tenement facades from the 19th and early 20th centuries. A portion of the dataset will be manually annotated by experts to create a dataset for training a model for automatic segmentation of tenement facades. By applying advanced image processing and machine learning, the model will be capable of autonomously recognizing parts of the photo depicting various architectural elements.

The presentation will include a comparative analysis of the gathered data with publicly available datasets and demonstrations of the operation of selected solutions using specific facades of historic tenements as examples. The effectiveness of classical approaches will be compared with the latest methods for the developed dataset. The research enables the creation of a tool for automated analysis of historical tenement facades, expediting the process of documentation and conservation of architectural heritage.

Marszałkiewicz J.Development of aircraft interior architecture over the years

Methods: literature studies, analysis of aesthetic-ergonomic values.

The paper discusses the rarely discussed topic of aircraft interiors as an element of architecture. It describes the development of aircraft interior architecture from the pioneering times at the turn of the 19th and 20th centuries (and even earlier) to the latest solutions from the 21st century. There, everywhere, because humans have worked, are working and will work with their ergonomics, possibilities and limitations.

Architecture and aviation are seemingly very different areas of knowledge. Architecture is static and aviation is dynamic. However, there are some similarities between them based mainly on human ergonomics. Regardless of whether we are talking about a single-family house, a passenger plane or a space station - there are people living and working everywhere, with their own capabilities and limitations. For this reason, the design of vehicle interiors and, more broadly, means of transport, is largely done by architects, but they specialize in their fields. Polish literature contains publications on the architecture of land vehicles (especially cars, sometimes trains) and vessels. However, there are no studies describing the architecture of aircraft interiors.

Matuszewska M., Pruszevicz-Sipińska E., Gawlak A.Modeling as a Participatory Method in Designing Healthcare Architecture

Methods: physical, computer, and operational simulations

The article discusses the importance of modeling and prototyping space at various scales and investment stages, particularly in healthcare architecture. It showcases examples of physical, computer, and operational simulations to illustrate the practicality of this approach. The article centers on a novel research instrument that involves geriatric patients in the evaluation and design

phases of hospital development. This tool is a tangible model that captures the user's personal impressions and spatial experiences while considering the unique requirements and limitations of geriatric patients in terms of perception and communication. The developed model seeks to gather qualitative data as part of the pre-design research for constructing new hospitals or updating existing ones. It streamlines the design process and enables the creation of spaces that cater to the needs of geriatric patients.

Mierosławski P.Vanishing types of buildings and structures of railway technical facilities

Methods: Literature studies, analysis of aesthetic-functional values

The railway, which has existed for two centuries, has developed a number of specialized buildings and structures. They include, among others: buildings and structures used to supply water and fuel to formerly used steam locomotives, technical support buildings, crossing and crossing linemen's guards, or facilities related to train traffic, such as signal boxes and traffic posts.

Some of these types of objects can only be found on railway roads.

Changes occurring in the rail transport technologies used in the past and the ongoing modernization of railway lines result in the decommissioning, change of purpose or liquidation of unnecessary facilities.

The author will describe specific types of railway facilities found in Poland. It will indicate selected national examples of conservation protection or attempts made to find new uses for this type of objects.

Motak M.Application of microhistory in the research in architecture and urban sciences

Methods: microhistorical

The paper discusses the opportunities of application of microhistory as a research method in studies concerning architecture and urban sciences. Microhistory is a type of historical writing. It was evaluated in the 1970s, mostly by Italian scientists, and is often associated with Giovanni Levi. It has been applied in research, especially historical, for nearly 50 years. The method relies on keeping individual element of narration while attempting the generalisation as well. It is supposed that particular cases, experiences and situations might be fundamental for understanding and presenting phenomena in more general way while each of them may individually contain valuable data and observations. The method does not belong to the group of most popular research methods in architecture and urban sciences or rather it is not declared officially in the research. However, one should note it is possible and also possibly recommendable to apply microhistory in the discipline of architecture and urban sciences; moreover, microhistory is sometimes partly applied in the discipline – even not being entirely planned. The paper presents the basic assumptions of microhistory, the chances of its application in the research in architecture and urban sciences, both contemporary and (especially) historical, and selected examples of application in the research on Krakow architecture and planning.

Netczuk-Pol E.

Reconstruction of the facade and tower of the church of the Exaltation of the Holy Cross in Kostomłoty according to the design by Karl Friedrich Schinkel against the background of his other projects as an example of the reconstruction of a baroque church in the spirit of neo-Gothic

Methods: analysis of iconographic sources

Kostomłoty is currently a small village in the Lower Silesian Voivodeship near Wrocław. The most valuable monument of the settlement is the parish church of the Exaltation of the Holy Cross, located in the center on the western side of the market square, whose original patron was Saint. Gotard (Gothard, Godehard), bishop of Hildesheim, canonized in 1131. Due to the sparse iconographic materials of the church from before 1900 and the lack of extensive research, it is difficult to determine the exact changes that took place in the building. The Gothic structure of the church was built in the mid-14th century. In the mid-16th century, it was renovated and expanded with a Renaissance porch. In the Baroque period, the tower received a new spire. A query in foreign archives conducted by the authors revealed a plan for the reconstruction of the church from 1818, signed by Karl Friedrich Schinkel. It is one of the most valuable preserved iconographic materials that have not yet been included in historical studies. among others in a comprehensive guide to K.F. projects and buildings Schinkel by A. Bernhard. In 1818–1819, based on the design of K.F. Schinkel, a new tower with staircase annexes was built on the foundations of the old one in the spirit of neo-Gothic, creating a kind of “westerwork”. A detailed comparative analysis of the design and iconography of the historical tower from 1898-1909 shows that this project was almost entirely completed.

Schinkel's designs for the reconstruction of existing buildings received significantly less attention than the designs for new buildings. This work, as a contribution to this topic, sheds some light on the project of the neo-Gothic reconstruction of the baroque church and its implementation against the background of other neo-Gothic tower massifs designed by the same architect.

Odziemek M.

Bezpieczny Kredyt 2% - what residential real estate market in Wrocław looked like after the government program

Methods: analysis of advertisements placed on the most popular online portal for apartment sales

“Bezpieczny Kredyt 2%” – a government program binding since the 1st of July 2023 – was supposed to be a solution for problems related to high interest rates and the reduced availability of mortgage credit among Poles. Its aim was to help Poles buy their first own property, thanks to the possibility of obtaining a loan on preferential terms.

In the first year of its validity, the program was supposed to have no amount limits – unlike in subsequent years, but it nevertheless led to a “race”; of people who wanted to use it, which resulted in the use of almost the entire budget for 2024 and most of 2025 already at the end of 2023. At that time, the acceptance of further applications was suspended, and the future of the program became questionable. By then, “Bezpieczny Kredyt 2%” had helped or even enabled the purchase of their first apartment or house for over 40,000 people who individually benefited from very beneficial conditions. However, looking more broadly, the program left a destabilized real estate market with a dangerously disturbed balance of demand and supply, which led to the degradation of the negotiating position of buyers towards developers to a minimum. As a consequence, current buyers have a very limited choice of properties, the prices of which are much higher than before the program was introduced. In Wrocław, the third city in Poland in terms of population, the number of apartments sold in 2023 was approximately 7,800, while about 5.5 thousand new apartments were put into use. At the same time, the average price per square meter increased about 20% year to year.

What exactly was the situation in this city after the introduction of the “Bezpieczny Kredyt 2%” program? How did apartment sales and their prices grow, and what apartments were most likely to be chosen by buyers and where they were located? I will answer these and other questions thanks to the analysis of advertisements placed on the most popular online apartment sales portal.

Pazder D.

Determining areas of creativity – creative syntax as a tool for revitalizing the city center space in spatial and socio-economic terms

Methods: creative areas method – creative syntax

Designation of creative syntax as a tool for revitalizing downtown area in spatial and socio-economic aspects. The research addresses issues related to the role of creativity in revitalizing downtown areas. The author attempts to identify the relationship between creativity and spatial and social development. The key element of the work is the study of the importance of designated creative syntax with the use of the author's adopted method. The examination is conducted in order to identify their role in the context of stimulating social activity, revitalizing downtown space, as well as providing a basis for developing the innovative idea of the economy of experiences. The research focuses on the spatial and semantic layer of creation of the high-quality and attractive downtown public spaces. The research used a multi-criteria, author's research method, capturing the addressed issues in spatial-compositional, semantic-perceptual, as well as socio-economic aspects.

Petelenz M.

Poles on Route 66. Architectural and cultural context

Methods: multistage qualitative visual research method

Route 66 – the Mother Road of America – still resonates in Polish perception of US history, culture, and architecture. The research team employed an innovative research method, organized as multi-stage qualitative visual research method. The study tour organized in 2018 aimed at exploring the cultural significance of Route 66, taken from the perspective of architecture, prepared photographic documentation on site. The photographs were accompanied by sketches drawn during the study. During the final stage of the project, the team employed visual analysis to understand the cultural significance of roadside architecture alongside Route 66 and its meaning for well-being (SDG 3) and sustainable communities (SDG 11). The research results reflected the Polish perception of Route 66 and the user's characteristics in the context of Bauman's personality types of modern man. The study showed that the genius loci along Route 66 is based on fragmented architectural structures, randomness of forms and the dominant natural landscape.

Pięt A.

The temporary use of space in contemporary cities

Methods: comparative analysis

Contemporary cities face many challenges, including environmental and demographic ones. The process of urban sprawl can also be observed, despite the fact that there are unused spaces within the cities. There is less and less undeveloped areas in city centers, which leads to their increasingly intensive use. Cities should have the ability to be flexible and quickly adapt to new situations. Currently, it is noticed that some transformations of urban space are introduced in a bottom-up manner, because traditional design methods do not keep up with the needs resulting from the appearance of new technologies in cities, including new means of transportation such as scooters and electric bicycles.

In cities, the temporary use of space is becoming more and more popular, as a response to the current needs of their users. Temporary solutions are flexible and consistent with the principles of circularity in cities. Temporary use includes tactical activities during which a temporary change of function takes place in public spaces (most often initiated by users). It can lead to permanent transformation as a result of changing the way the local community thinks about a given place. Commercial temporary use of space can be also distinguished, as an attempt to find an appropriate function. Temporary development may become an element of a planned strategy while a given area is "waiting" for a new function.

The introduction of temporary use of space may be a form of research method to check whether a given function is suitable for a given area. The above issues will be discussed using selected examples.

Piwek A.

The main entrance to the Cistercian church in Oliva

Methods: historical-stylistic analysis, on-site research.

Located in the facade of the monastic Oliva church, the main entrance contains a large stone portal. It was created in 1688 with the foundation of Abbot Michał Antoni Hacki. Located between two octagonal staircases, it is the result of later construction activities. The last work on it was done in the 20th century. The portal was preceded by older works made of bricks and stone blocks. The oldest of these dates back to the mid-14th century. Since then, the portal's closest surroundings have also changed. It was related not only to the artistic decoration of the west wall but also to the nearest architecture.

Podhalański B.

Research methodology for the National Pantheon project in Krakow

Methods: Interdisciplinary, architectural, archaeological, mycological

The project of the National Pantheon in Krakow is one of the more complicated and lengthy processes of preparing architectural and construction documentation, allowing to obtain a building permit, as well as in the future – the implementation of the entire project. It consists of two separate, but substantively related design tasks. These are: adaptation of the existing crypts under the Church of Saints Peter and Paul in Cracow for the purposes of the National Pantheon, and construction of a didactic and exhibition part, also serving exhibition purposes, including relics of 12th–17th century tenements discovered during archaeological exploration, as well as a large number of artifacts. The methodology of the work includes the necessary archaeological, architectural, mycological and many other studies, resulting from the progress of the work. The leading role is played by archaeological research, mainly due to the location of the Pantheon, i.e., the area of the so-called Okul and the scientifically justified necessity of exploration, allowing to complement the archaeological work carried out in the 1960s under the direction of Prof. Radwański. The research and design process, which lasted more than 11 years, during which numerous material traces of activities carried out over many centuries

– from Neolithic settlement, medieval brewing, goldsmithing – to later construction activities were discovered, explored and inventoried, is carried out according to modern methods, adequate for archaeological and architectural research. Teams of experienced researchers from the universities involved in the project are led by individuals who are professors of the same, acting in a coordinated manner, using modern technical solutions, conducting ongoing recording and conservation of the discovered artifacts, as well as documenting the progress of the work, according to accepted standards. The results of the research are used to make rational, from the point of view of a holistic approach to design solutions to the maximum extent possible to secure the discoveries made, as well as their future exposition, and making them available to visitors. The exposition is intended to provide information supplementing the knowledge of visitors to the Pantheon not only in strictly scientific terms, but also in popular science and information, supplementing and expanding the scope of necessarily brief mentions of people whose sarcophagi are located in the already completed part, which includes the crypts that have been renovated and adapted to the public.

Ptak-Wojciechowska A.

Using the Analytic Hierarchy Process (AHP) method to assess the quality of life of older people in cities in terms of architectural and urban aspects

Methods : Analytic Hierarchy Process (AHP)

Cities should ensure a high quality of life for all residents. Despite ongoing demographic changes, the urban fabric does not sufficiently respond to the spatial needs of seniors. Moreover, there is a lack of scientific assessment instruments that could be used to support the assessment of the city's architectural and urban aspects and, consequently, to improve them. Although popular city rankings can be used to develop urban policy, their results are often incorrectly interpreted by recipients. The use of multi-criteria decision support methods can facilitate the process of comparing city areas, increase the transparency of evaluation and involve various stakeholders in the evaluation process. Machine learning can be an interesting extension to commonly used statistical methods. The article, the latest methods in research on the urban quality of life of seniors on the example of a multi-criteria analysis of five housing estates in the city of Poznań, were presented. The use of the Analytic Hierarchy Process (AHP) method as part of an original tool for measuring the perceptual assessment of older residents and the expert assessment of architects and urban planners in terms of functional and spatial aspects was discussed. The effectiveness of the AHP method has been proven, and the results can be used to support city authorities, designers and researchers. Moreover, the directions of development of this research using machine learning methods are presented.

Radziejewicz-Winnicki R.

The community center of the Jaszowiec holiday complex – Lost heritage of modernism

Methods: preliminary studies, source queries, on-site work

The aim of the paper is to present the fate of the Community Center which is an integral part of the extensive architectural complex in Ustroń Jaszowiec. The investment, completed in the 1960s, was a model example of a holiday district until privatization transformations, which contributed to the loss of the integrity of the complex. The avant-garde facility of the Center, combining service, cultural and commercial functions, had outstanding architectural and compositional values. In the 1990s, it was privatized and then accidentally adapted for residential purposes, which led to the decomposition and partial devastation of the facility. Paradoxically, by getting rid of the “unnecessary” facility, the commune lost the possibility of efficient functioning of the entire holiday district. The discussion taking place in the architectural, administrative and development circles ignores this fact and attributes the poor condition of the estate to other factors. The example of a lost architectural pearl is a pretext for a polemic about the current situation of the entire complex, its chances for the future and methods of protecting this valuable heritage of modernism.

Rumieź A.

Interpretation of a functional program of a building in the light of planar graph theory

Methods: graphic analysis of data on the adjacency matrix of individual rooms

The paper shows the possibilities offered by structuring information about the intended functional connections between the rooms of the designed building. The author perceives this structure as a dual graph to a plane graph. Such a graphical analysis of the data about the adjacency matrix of rooms has great potential for the process of rationalizing design decisions in the work of an architect. Treating the functional system of a building as a discrete structure with connections, i.e. as a graph, is a natural practice (although most often unconscious) in architectural practice. However, thinking about such a structure of connections as a graph dual to a certain plane graph provides additional opportunities for a deeper understanding of this ambiguous relationship between the functional system of the building and its plan. Moreover, imposing appropriate restrictions on the configuration of the edges of the graph for which a dual graph has been defined (the spatial plan of the building) allows for obtaining an optimal building plan pattern, which is the result of a priori defined connections between individual rooms. The potential of such graphical analysis was previously recognized in research

works dating back to the 1960s (P.H. Levin). Recent decades have also brought the possibility of computer simulations and thus oriented further work in this field. Basically, apart from strictly mathematical theorems, two research paths can be distinguished in this area: conventional search and evolutionary methods. Nevertheless, hybrid methods - combining the work of genetic algorithms and expert evaluation of results seem to be the most promising direction for further research.

Rusnak M., Duchowski A.

Smart City Eye-Tracking. Technological Challenges

Methods: Utilization of eye-trackers (ET)

Eye-tracking, aimed at understanding how to design spaces that are friendly for residents and tourists, emerges as a promising alternative to traditional research on the perception of urban and architectural spaces. Understanding what is crucial for residents and how they perceive proposed changes is essential for the development of sustainable, crisis-resistant smart cities. Currently, the use of eye-trackers (ET) in conjunction with other Internet of Things devices (smartwatches, clothing and jewelry with biosensors, smart tattoos) in urban spaces is not fully realized. Data on visual reactions can support the determination of criteria in areas such as health, traffic safety, wayfinding, marketing, tourism, heritage preservation, and other interdisciplinary issues. Despite years of scientific research, researchers aiming to conduct studies in urban spaces rather than laboratories face numerous technological challenges. Based on our experiences, we present the needs for improving portable ET. We focus on the form and function accompanying available devices, and explain why weight, materials, appearance, and individualized design for ET mounting are crucial. We analyze safety issues, such as optical filters, disinfection, and resilience to falls, as well as service accessibility. We also describe requirements for studies conducted under various lighting conditions, from full sunlight to nighttime research. The aim of this article is to provide a list of elements that will help in the future development of a smart city-dedicated ET, meeting the specific needs of this environment.

Schaaf U.

The significance of church account books for research into the building history on the example of the records of the Church of Peace in Jawor

Methods: study of written sources

In the State Archive in Wrocław, in the Legnica Branch, a resource of documents entitled "Akta Kościoła Pokoju" (Records of the Church of Peace) has survived. It consists of several groups comprising a total of approximately 900 individual files covering the period from the establishment of the Jawor Evangelical parish in the mid-seventeenth century to the mid-twentieth century. The 'Financial Affairs' group of documents in this resource contains in turn account books covering, with few exceptions, the period from 1655 to 1930.

This unique source base gave rise to a detailed analysis of the hitherto unexamined account books in terms of the history of the construction of both the Church of Peace itself and the other buildings erected on Peace Square from the mid-17th century onwards.

This analysis brought to light a great deal of valuable information supplementing the architectural survey of the existing material substance. The books contain, for example, detailed information on the expenditure of building materials (wood, stone, bricks, straw, clay, etc.) and the craftsmen who processed them (carpenters, bricklayers, cobblers, carpenters, painters, etc.). In many cases, the lists of expenses allowed the construction and repair of various buildings to be dated, including such work of which no trace survives in the material substance found.

The paper plans to present the significance of this research on selected examples of the construction, extension and repair of the Peace Church itself in the second half of the 17th century.

Seyrek C.I.Ş.

Environmental Benefits of Vertical Green Façades

Methods: quantitative analysis of air purification efficiency, literature review

Vertical green façades are alternatives of green areas in terms of air purification and heat island reduction in the dense urban environments. Many studies show that vertical greenery decreases the buildings' surface temperature and provide insulation through changing climatic conditions. Since these façades are living systems, and their performance is dependent on many variables, it is necessary to evaluate them individually. The aim of this study is evaluating the environmental benefits of vertical green façades. The quantitative performance analysis in terms of contribution to the air purification and thermal performance of two different types of vertical green façade systems located in Poland, is performed for summer and winter periods with in-situ measurements. Then the results obtained through these case studies are compared with the ones based on literature review. The study shows that factors such as façade orientation, design details of the system, surroundings in the urban environment and changing environmental conditions affects their performance. Although there are differences between the results obtained from analysis of these two different types, the

study proves the positive contributions of both of vertical green façade systems to the energy efficiency of the building and the urban environment.

Smektała M., Lewacki K., Baborska-Narożny M.

Summer in the city (without air conditioning) – map of night cooling potential and Wrocław's heat island

Methods: mapping differences in thermal profiles, analysis of environmental and economic aspects

“Densifying cities” development cities leads to an urban heat island effect, where absorbed and re-emitted solar radiation causes higher temperatures in urbanized areas than in natural landscape. Therefore, extreme periods of heat are much more burdensome for city dwellers, where high temperatures in apartments may threaten their lives and health. Many households use air conditioning to lower the temperature. However, high energy consumption deepens the global warming process, which causes particularly negative consequences for the social group hit by energy poverty.

In Wrocław, the average annual temperature is the highest among large cities in Poland. In 2019, the City Council adopted the Municipal Adaptation Plan to Climate Change, which primarily assumes the development of the so-called blue-green infrastructure. In order to ensure the comfort of individual residents, in addition to creating a city-scale strategy, it is important to take actions that combine the urban and architectural-technical context. Many existing facilities have limited ability to introduce technical modifications to the entire building. Due to technical limitations and reducing energy consumption, the proposed solutions should be passive. One of such proposals is using the potential of night cooling as an alternative to air conditioning. Apartments are exposed to the heat island effect to varying degrees. Correlating apartment features and specific locations in Wrocław allows for a more accurate understanding and mapping differences in apartments' thermal profiles. The research aims to create a knowledge base that will support the process of planning and designing buildings resistant to overheating, ensuring a healthy living environment for residents of urban areas, while taking into account sustainable environmental and economic aspects.

Stala K.

On contemporary requirements for procedure of design activities within an archaeological reserve

Methods: analysis of archaeological and conservation values

Designing architecture directly in the area of archaeological heritage, where both immovable relics preserved on the surface and the system of cultural layers and the surrounding landscape are protected, is not only a creative challenge, but also a scientific and conservation one. A special example of such action is a project being developed in the area of an archaeological reserve as part of the protection and exhibition of archaeological heritage. Completing the project requires interdisciplinary knowledge, hence it is important that the design team includes archaeologists and conservators as consultants, and that the designer has solid knowledge in the field of conservation design. The topic of this article is to present the latest trends in the design process in archaeological reserves. Since archaeological sites are often closely connected to their surroundings, the project should also take into account the issue of protecting both the cultural landscape and the natural environment. The current standards of such activities differ from those in the mid- and even late 20th century and are still in the phase of change and development. This is due to the extensive analytical research carried out at the beginning of the new century on existing pavilions and archaeological shelters and the results of these studies, which in many cases indicated the ineffectiveness and sometimes even harmfulness of the constructed objects towards protected relics, which in turn resulted in the need to verify the existing requirements.

Stefańska A., Kurcusz M.

Selected aspects of using artificial intelligence in architectural design

Methods: utilization of artificial intelligence algorithms for generative design, parametric modeling, and decision-making

Integrating artificial intelligence (AI) into architectural design processes marks a transformative paradigm shift in the discipline. This paper delves into selected aspects that define and shape the relationship between AI and architectural design. One aspect is using algorithms to support the creative process, accelerating the ability to shape finished visual and aesthetic solutions. Parametric modeling is another focal point, highlighting the dynamic relationship between design parameters and their influence on architectural form.

The use of AI includes the application of generative design algorithms, in which AI systems analyze huge data sets and generate innovative design solutions based on predefined constraints. This speeds up the early stages of design and fosters a symbiotic relationship between human creativity and machine intelligence. The use of AI algorithms helps architects make informed choices related to energy efficiency, material selection, and overall design sustainability. This facilitates a holistic and informed architectural design approach consistent with contemporary environmental and social considerations.

The study uses AI algorithms in architectural design and decision-making to enhance creativity, efficiency, and sustainability in architectural endeavors. The article analyzes current capabilities and programs that use AI algorithms in architectural and multi-discipline design. This article concludes with conclusions and reflections on the ethical dimension of

AI in architectural design, emphasizing the importance of responsible use, transparency, and preserving human agency. The article serves as a signpost for using AI and presents possibilities for assisting the architectural design process.

Stefańska A., Sutkowska M.

Comparative Analysis of Minimizing Carbon Footprint in Expansion: Classical Technology versus Natural Materials

Methods: comparative analysis

In the paradigm of classical technologies, concrete, steel, ceramics, and wood are the primary building materials. While known for their structural integrity, their manufacturing processes are costly to the environment, especially regarding ever-tightening guidelines related to using, among other things, the carbon footprint that buildings emit. The possibility of using green technologies, using natural materials such as bamboo, rammed earth, and straw bales, is still considered inferior in quality and insulation or load-bearing performance.

This study conducts a comparative analysis to assess the potential for minimizing the carbon footprint of building renovations and expansions using classic and green technologies. Delving into architecture, civil engineering and environmental science, the goal is to quantify the life-cycle carbon footprint for each approach and identify areas for improvement on a selected case study of building expansion for educational purposes. Economic implications are central to the adaptation of selected building technologies. The analysis of the selected case operates practical insights into challenges and opportunities, using natural materials, following environmental parameters, and designing according to sustainability guidelines.

The research provides a comprehensive understanding of the comparative environmental and economic impacts of minimizing the carbon footprint. Highlighting the trade-offs and synergies between classical technology and natural materials, it offers a nuanced guide for decision-makers in the construction industry, contributing to the sustainability discourse.

Sulimowska A.

Analysis of the development potential of Upper Silesian water towers as elements of the cultural heritage of the industrial region

Methods: statistical, so-called multidimensional comparative analysis

The subject of the presentation is an attempt to propose a research procedure to determine the development potential of Upper Silesian water towers. The purpose is to find out the level of investment attractiveness of water towers in terms of the possibility of their adaptation to new functions. The reason for taking such action is based on the need to preserve and protect the industrial heritage of the region. The guidelines of the European Strategy for the Promotion of Industrial Heritage, state that adaptation is the only effective method of saving and preserving valuable post-industrial buildings. The research was conducted at the border of architecture and economic sciences. They considered the overall value of cultural heritage, understood not only in terms of cultural values, but also economic values, as a starting point. One method of statistical analysis, the so-called multidimensional comparative analysis, was used to assess the development potential of water towers.

Szymczyk E.

Compactness of Polish cities - methodologies and analysis

Methods: Compactness analysis of the city, from morphological indicators to computer models, using data from the CORINE Land Cover (CLC) program for the area of Poland

Urban patterns are receiving increased attention in European and North American literature, with a particular focus on quantitative methods (Reis, Silva and Pinho, 2016). Spatial indicators are used to monitor the evolution of individual cities' spatial organization over time, enabling the analysis and comparison of spatial-temporal patterns of urban sprawl and densification. This project examines the dynamics of urban compactness in Poland, guided by three research questions:

- 1) What are the methods for analyzing compactness?
- 2) What is the relationship between city size and city compactness?
- 3) How does compactness change over time?

The study evaluates various methodologies for analyzing urban compactness, from morphological indices to computational models, and assesses their applicability in the Polish context. Using a selected method, the project analyzes compactness across different city sizes, revealing patterns and correlations. The insights gained will inform tailored urban policies, essential for sustainable planning.

The data for urban spatial metrics is based on land use data from the CORINE Land Cover (CLC) for the area of Poland. CLC is one of the most important sources of land use and landscape dynamics data from a European perspective. By examining historical CLC data, the study examines how compactness in Polish cities has evolved over time, aiding in understanding adaptability to changing socio-economic and environmental contexts.

The research comprehensively reviews compactness methodologies, offers insights into city-size relationships, and provides a dynamic perspective on urban development. These outcomes inform evidence-based decision-making for resilient and adaptive urban spaces in Poland.

Świt-Jankowska B.

Digital twin – modern concept of museology

Methods: application of virtual reality (VR) and augmented reality (AR).

The article discusses the innovative use of technology in the protection of monuments, focusing mainly on the role of the “digital twin” in the context of a modern museum in a monument. It examines the ways in which advanced virtual reality (VR) and augmented reality (AR) solutions can contribute to the preservation of cultural heritage.

The article discusses specific examples of the use of digital twins as an element that increases exhibition possibilities, allowing virtual exploration or reconstruction of a work of art, and focuses on the benefits and challenges they bring to various user groups. The process of creating a 3D model using various inventory techniques was also shown on the example of activities undertaken by Faculty of Architecture PUT at the National Museum. Adam Mickiewicz in Śmiełów and analyzed how the use of modern techniques can contribute to revolutionizing the way visitors perceive the museum and contribute to greater interest in the protection of cultural heritage.

The conclusion highlights the development prospects in the context of the concept of “museum in a monument” as an innovative form of presenting cultural heritage. A contemporary museum in a monument should combine tradition with modernity, and a “digital twin” can constitute a bridge between the past and the present, creating unique and attractive experiences for visitors.

Terelak M., Łątka J., Jasiołek A.

Temporary housing in the context of conflict and assessment of the environmental benefits of the Styrofoam Housing System structure

Methods: Analysis of the life cycle – Life Cycle Assessment (LCA)

Russia’s aggression against Ukraine prompted architects from around the world to undertake design efforts and help provide temporary housing. Thanks to international cooperation, a prototype housing unit designed by world-famous architect Shigeru Ban was built in Wrocław. The resulting structure, called Styrofoam Housing System (SHS), provides 36 m² of living space. The multiplicity of solutions implemented to help those affected by the crisis of temporary homelessness also has an impact on the environment due to the use of materials and the generation of waste. To verify the benefits of implementing the structure in mass production, it was performed a Life Cycle Assessment (LCA) study to assess the environmental impact of the polystyrene system compared to typical building technologies. Research was conducted on a representative section of an SHS external wall, the parameters of which were compared with walls with similar properties made with conventional technologies. Obtained results indicate that the parameters are similar to other environmentally friendly structures such as timber frame construction.

Tokarska-Gołębiowska E.

Agent-based modelling and its potential in architectural and urban design

Methods: Simulation with variable parameters

Nowadays, architects and urban planners face various problems in the processes of designing and revitalizing spaces. When looking for tools that may help solve them, it is worth paying attention to the emerging technological possibilities that may become future standards in design.

The potential associated with the use of agent-based simulations creates tools that provide completely different qualitative support in the design process. It becomes possible to test, through simulation, the impact of the built environment on spontaneously generated situations and users’ interactions with the entire socio-spatial environment. As part of the core activities of the SmartCityHub Scientific Club at the Wrocław University of Science and Technology, we explore the possibilities of giving agents human characteristics by translating the behavior of individuals into the language of agent simulations. Such action, applied on a large scale, would allow in advance to correctly designate sensitive areas where it would be appropriate to use “targeted therapy” (starting the revitalization process), as well as to compare the design proposals in terms of their impact on the users of the space (an additional aspect allowing the valorisation of various projects).

The use of agent-based simulations in planning urban processes enables repeated testing (including simulations with variable parameters) allowing selection of the most effective and optimal solution, without exposing oneself to possible damage – both in economic and social aspects.

Turbasa J.

The Chapel of the Last Farewell and Seven Joys of Mary Wayside Shrines – contemporary architectural interventions in the context of the historic Basilica Minor of St. Nicholas sanctuary complex in Rychwałd

Methods: religious-historical analysis

The projects of the Chapel of the Last Farewell and Seven Joys of Mary Wayside Shrines are contemporary works implemented in the immediate vicinity of the baroque complex of the sanctuary of Our Lady of Rychwałd. The aim of the article is to analyze the mentioned architectural implementations in the context of historical heritage. The research

focuses on the impact of historic architecture and urban planning on the choice of location, materials and the adopted solutions for new projects. The authors' motivations, theological references, as well as relations with the investor, the conservator of monuments, and the creators of icons and sculptures were analyzed. The article also raises issues related to the contemporary reinterpretation of historical forms, features and characteristic solutions of the region for the purposes of the mentioned projects.

Urbanik J., Wójtowicz R., Ilkosz J.

CMP (Conservation Management Plan) – a new standard of monuments protection

Methods : application “Keeping It Modern”

CMP (Conservation Management Plan) defines new standards for the protection of modernist monuments. It was developed for the first time in Poland in 2015 as part of a grant financed by The Getty Foundation as part of the “Keeping It Modern” program intended to protect unique modernist buildings in the world.

This plan should serve today and in the future as the main source of information when deciding on any changes planned to the building and adjacent areas. The document describes the history of the Centennial Hall, presents its undeniable architectural value, architectural analysis of the building, analysis of reconstruction and renovation works, conservation works, analysis of the building's structure and provides detailed conservation guidelines so that its future maintenance can be carried out systematically, methodically and carefully. The CMP, together with other documents resulting from Polish legal requirements, should constitute the basis for the future introduction of a uniform action plan for the entire area included in the UNESCO World Heritage List.

The Centennial Hall was designed by Max Berg and built between 1911 and 1913 in Wrocław. The Prussian victory over Napoleon in 1813 was the reason for the construction of the Centennial Hall, which was to be used for exhibitions, concerts and sports competitions, festivals and public meetings.

The Centennial Hall is not only a milestone of modern concrete architecture, but also one of the first modern buildings in Europe intended for the mass audience of new urban communities. At the time of its construction in 1913, the Hall was the largest reinforced concrete structure and contained the largest dome ever built. From the moment of its creation, it was an attraction of German Breslau, and from 1945 of Polish Wrocław.

Uściniowicz J.

The Sacred in the ruins – the problem of interpretive fillings

Methods: analysis of historical-symbolic and spiritual values

This paper presents “second life” of abandoned Christian temples. It focuses on searching for modern methods of saving the architecture of temples from ruination and profanation, while ensuring its dignified transformation. It presents selected examples of full or partial reconstructions of the ruins of temples and interconfessional conversions in the last quarter of a century in Poland. It also shows the process of transformation of spatial and functional structures as well as iconography of the temples, implemented throughout adaptation, modernization or extension. It covers problems in architectural conservation as well as essential ideological aspects of symbolical and liturgical nature.

Apart from a retrospective look at first post-war buildings of this type there are also latest author projects introduced. They exemplify a design method of a “non-invasive” approach to historical monuments, including respect for their historical values and adding new qualities at the same time.

These extremely different examples of the protection of temples from degradation, destruction, and sometimes desecration – through reconstruction, integration, adaptation and incorporation – have a common intentional basis. All of them seem to come from the same ideological premises. They also share a common main criterion – the protection of existing material values, but also the further development of spiritual values. In this process of protection and conservation, priority is given to spiritual values over material values. For spiritual values is where they see the search for the truth and the sense of their existence, the authentic protection of their past and present mission in the time and space of this world.

Ways J.

The use of mixed interdisciplinary research methods in the analysis and creation of conservation directives for local plans on the example of the Old Town in Warsaw

Methods: research of historical materials, field surveys, photography, and point cloud data from LIDAR systems, 3D modeling of the city, as well as the use of QGIS software for recording and presentation

The article presents methods of comprehensive study of multidisciplinary urban-scale inventories, analysis of the collected data, establishing a conservation strategy and formulating specific conservation guidelines for the Old Town area of Warsaw, a UNESCO World Heritage Site.

A combination of recent and traditional methods such as research of historical materials, field inventories, photography and point clouds from LIDAR system, 3d model of the city or QGIS software for recording and presentation was used.

An important aspect of the conducted research was the interdisciplinary cooperation of specialists from the fields of urban planning, high rise building issues, architecture, architectural and art history, archaeology, landscape architecture, greenery and cartography. The result of the conducted research is a multifaceted conservation directive made by order of the Mazovian Regional Conservator of Monuments for the purposes of the spatial policy of the city of Warsaw and the creation of local plans.

An example of the methods used for the purposes of the presented study can be used in making similar studies for other cities.

Weber Chr., Schmid B.

Potential and challenges of retro-digitisation for construction heritage

Methods: 3D scanning in structural light, 3D laser scanning, and photogrammetry

A range of established methods are currently available for the production of digital models to document, survey, or further develop buildings. Equipment and other technologies have been adopted from other disciplines, such as geodesy, and further developed specifically for the construction industry. These methods, therefore, have a very specific purpose and quickly reach their limits when they leave this primary area of application. As part of a research project funded by the German Research Foundation (DFG), an attempt was made to transfer known methods of retro-digitisation from architecture to smaller-scale objects to create digital twins. These small-scaled objects are so-called measurement models, a particular type of model mainly used in civil engineering in the 20th century to analyse, understand, and test load-bearing structures.

Among the non-destructive methods of reverse engineering that have been tested in the project are the structured light 3D scan, the 3D laser scan, and the photogrammetry. This contribution will discuss the applicability of the different methods, as well as their advantages and disadvantages, concerning complex technical objects. In a further step, the potential of the produced digital twins in different contexts, such as restoration, engineering, or architectural history, will be demonstrated. Finally, the long-term handling of the generated data and information, which is being discussed in the current research landscape, will be addressed.

Wierzbicka A.M.

Stories of Place: The Impact of Narrative Methodology on Experience in Architectural Research and Design

Methods: narrative

The narrative method was first described in humanities research by philosophers, and the structure of stories is based on the theory that assumes that designing spaces is related to restoring existing history. In the case of the narrative of a place, the event always precedes the narration. The presentation is an attempt to present research based on the application of this method. During the presentation, the Freedom Pavilion project in the Royal Baths will be presented, which was designed and built by the faculty and students of the Faculty of Architecture at the Warsaw University of Technology. The title of the pavilion is "We Stand for Peace in the World – Free Ukraine". The narrative method of invoking meanings through storytelling was used during the design process. The presentation will also demonstrate the method as an applied tool in scientific research, which was discovered during the development of a dissertation by Ms. Maria Arno. Her research focused on the revitalization of sacred objects and their transformation into other functions. The narrative method is also an excellent tool for architectural redesign. It was also used in a Christian chapel, where light is the main element of the narrative as a universal sacred hope. In conclusion, the presentation aims to draw attention to the narrative method, which can be widely used in both teaching and research in architectural design. Architecture, as one of the liberated arts, is not only associated with one aspect of life but encompasses all aspects of human life.

Woźniczka A., Widera B.

Resilient public spaces – multifunctional urban infrastructure as an opportunity for climate change mitigation

Methods: literature studies, research using the New European Bauhaus Compass, comparative analyses

Public spaces, once defined solely by formal design or functional purposes, are now increasingly characterized by their intended goals. The growing awareness of the climate crisis and the positive impact of nature exposure on quality of life have made addressing climate change a key objective in urban design. In this context, the authors of the article explore how these factors influence the creation of new types of public spaces. They propose definitions and outline the key features of these spaces.

The article focuses on contemporary, multifunctional hybrids that combine urban recreational spaces with infrastructure areas. These spaces serve as temporary retention reservoirs during heavy rainfall, contributing to the concept of the sponge city. Notable examples include urban water squares like Benthemplein in Rotterdam and Enghaveparken in Copenhagen. These spaces not only enhance the city's resilience to climate change but also support biodiversity while fulfilling various programmatic goals of the New European Bauhaus.

The main objective of the article is to assess whether the examples analyzed represent the emergence of a new typology of public spaces. The authors investigate how urban spaces, integrating recreation and climate mitigation functions, shape the typology of contemporary public spaces. Through literature studies, research using the New European Bauhaus Compass, and comparative analyses, the authors propose new possibilities for classifying public spaces. They introduce the concept of “watery urban squares” and provide characteristics for this emerging typology. The analyses conducted help identify the fundamental traits of these new residual public spaces in the 21st century and highlight the benefits of incorporating such hybrid spaces into the modern cityscape.

Wójtowicz K.

Virtual reality for cultural heritage how 3D models, VR and gaming technology extend the reality

Methods: 3D models, Virtual Reality (VR), and Augmented Reality (AR) gaming technology

At the conference, I will talk about methods of transferring cultural heritage to virtual reality, not only through the creation of so-called digital twins but also by depicting their spirit, history, communities, and how this contributes to their survival in current times. I will present the Virtual Peace Church Project in Świdnica, Virtual Tours created in Stave Churches in Norway, a 3D model of the altar in Kamieniec Ząbkowicki, Poland, and the reasons behind its creation. I will also discuss actions and additional products that we can create using modern technology to help understand the plans and structures of buildings, educate the audience in a more visual way than books, and assist monuments in generating income during times like the pandemic. I will showcase products such as the Virtual Tour on the VR Meta Quest platform, 3D printed models, and tactile maps, known as tyflomaps, which help people with disabilities experience cultural heritage. Additionally, I will highlight how we can emphasize the work of conservators who are responsible for preserving historical buildings and panoramas. I will discuss the methodology used in various stages of the projects, such as 3D modeling and photogrammetry, the software and equipment employed, and how technology from the gaming industry can advance and broaden our experience of reality. These techniques create a comprehensive image of the beauty of monuments, introducing them to a wider audience and even revealing their future.

Jaureguiberry A., Pignol-Mroczkowski A., Ziegler V.

Tales of transitions

Methods: debate-exhibition

Since 2020, a group of twelve individuals has formed the “TikTak Transitions” working group at the École nationale supérieure d’architecture de Strasbourg (ENSAS). We are reflecting on the ecological, environmental, and societal transitions affecting our planet in a transdisciplinary and inclusive manner that involves teachers, students, and administrative staff.

The goal is to better integrate these issues into the new pedagogical program and research axes of our lab, which is accredited by the French High Council for the Evaluation of Research and Higher Education (HCERES, 2023 accreditation wave).

An overview of the current situation was presented during the exhibition-debate days and round tables on “Pedagogies of Transitions” in 2021 at ENSAS. This was followed by a public exhibition of projects on “Strasbourg, Territories in Transitions” (www.strasbourg.archi.fr/culture/publications/strasbourg-territoires-en-transitions) and two thematic issues of Zap, the school magazine, in 2022 (Zap no. 5 and 6, www.strasbourg.archi.fr/publications). “Transitions” is now a major focus of our program. This contribution will demonstrate how the challenge of transitions is affecting teaching and research at our school of architecture. It will present major themes and works related to this topic.

Żmudzińska-Nowak M., Pelliccio A.

Lazio Region Paper Mills vs. Upper Silesia brownfields: cultural heritage of post-industrial architecture as a subject of research, projects and international exchange of experience

Methods: interdisciplinary research

In accordance with the goal of the conference, which is to present methods and techniques for research, we propose to present the international project “Lazio Region Paper Mills” conducted in 2020–2021 on research and protection of post-industrial heritage, expanding the proposed scope to include the aspect of international cooperation in the aspect of research, didactics, exchange of experience and social impact of the activities carried out. The presented project was led by the Faculty of Architecture of the Silesian University of Technology and the University of Cassino and Southern Lazio in Italy, and the other Italian partners of the project were the municipalities: Ceprano and Isola del Liri and the Apassiferrati local social association.

The subject of the study was the sites of former paper mills of the Liri River Valley in the Lazio region (Italy) – a valuable cultural heritage, requiring conservation and design intervention, as well as the activation of local authorities,

institutions and the community. The main objective of the international cooperation between our universities, which we started already in 2015, is research and teaching activities based on the exchange of experiences and good practices in the revitalization of objects and post-industrial areas, as well as the implementation of the results and their wide social impact.

The presentation includes a discussion of the general idea and objectives of the international activities, a detailed presentation of the title project including selected post-industrial sites of the Liri Valley as the subject of research, a description of the research and design process, and a discussion of the results and prospects for further cooperation.

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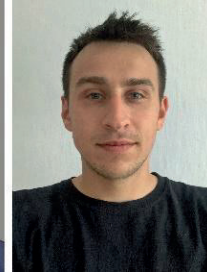
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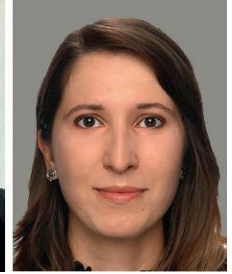
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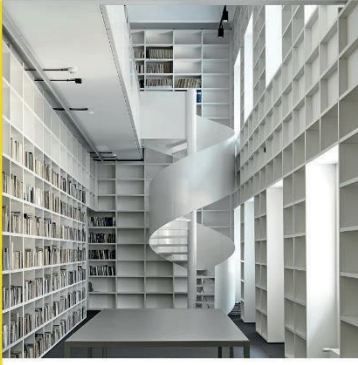


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can be obtained via mailorder:
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ISBN 978-83-7493-264-6