

Henry van de Velde research group PhD Colloquium

Sara Eloy Mariana Moura (orgs.)

Programme

Presentation / Activity	Speaker	Time
Registration & Welcoming words		08.30 - 09.00
Opening Lecture	Nele Dexter	09.00 - 10.00
Coffee Break		10.00 - 10:30
Sustainable scenography: applying circular design strategies to temporary exhibitions	Ilse Lindenbergh	10.30 - 11.00
Toward a Methodology for assessing the perception of space in interior architecture using 3D digital tools: project overview and ongoing scoping review	Jiaming Ye	11.00 - 11.30
Developing new pop-up habitat models through circular design by means of computational design and robotic production	Atousa Aslami Nezhad	11.30 - 12.00
Unravelling spatial networks: evaluating the role of circulation systems in building conversions	Zena Ndiaye	12.00 - 12.30
Open Up! Empirical Study of Floorslab Adaptations During Building Conversion	Robbe Pacquée	12.30 - 13.00
Lunch break		13.00 - 14.00
Construction and design flaws at the Pharmaceutical Institute (1885– 1892): first reflections on the acceptance process of the Trasenster Institutes at the University of Liège	Astrid Schreurs	14.00 - 14.30
Contested heritage in Antwerp: an introduction to the case of the Institute of Tropical Medicine.	Elise Enthoven	14.30 - 15.00
Suburbs of Bombay (1920s-40s): spaces of resistance and subversion	Excy Hansda	15.00 - 15:30
Under the radar: self-organized renovation practices among distressed homeowners in Flanders	llke Kerkhofs	15.30 - 16.00
Benefiting from the outdoor environment	Cézanne Watthy	16.00 - 16.30
The impact of digitalisation on real estate market dynamics	Aishuak Kerimzhanova	16.30 - 17.00

Contents

1. Ilse Lindenbergh Sustainable scenography: applying circular design strategies to temporary exhibitions	3
2. Jiaming Ye Toward a Methodology for assessing the perception of space in interior architecture using 3D digital tools: project overview and ongoing scoping review	4
3. Atousa Aslami Nezhad Developing new pop-up habitat models through circular design by means of computational design and robotic production	5
4. Zena Ndiaye Unravelling spatial networks: evaluating the role of circulation systems in building conversions	6
5. Robbe Pacquée Open Up! Empirical Study of Floorslab Adaptations During Building Conversion	7
6. Astrid Schreurs Construction and design flaws at the Pharmaceutical Institute (1885–1892): first reflections on the acceptance process of the Trasenster Institutes at the University of Liège	8
7. Elise Enthoven Contested heritage in Antwerp: an introduction to the case of the Institute of Tropical Medicine.	9
8. Excy Hansda Suburbs of Bombay (1920s-40s): spaces of resistance and subversion	10
9. Ilke Kerkhofs Under the radar: self-organized renovation practices among distressed homeowners in Flanders	11
10. Aishuak Kerimzhanova The impact of digitalisation on real estate market dynamics	12
11. Cézanne Watthy Benefiting from the outdoor environment	13

Sustainable scenography: applying circular design strategies to temporary exhibitions

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Abstract: In the search for sustainable development, museums have recently shown a great willingness to adapt and improve their policies and institutional workings. However, of growing concern is the huge waste pile that stems from their practices. The Culture, Climate and Environmental Responsibility Annual Report by Julie's Bicycle, a non-profit organisation for climate action in England, highlights that "energy" constitutes the most significant source of emissions, accounting for 54% of the total environmental impact, followed by "waste" at 28% (Julie's Bicycle, 2024). Addressing waste management in museums presents a complex challenge. A significant proportion is believed to arise from temporary exhibitions due to their short life cycle. Although the concept of circularity is an interesting direction to limit the negative environmental impact of exhibitions, it is scarcely researched. The proposed research question is: "How can museums apply circular design strategies to the scenography of temporary exhibitions, focusing on limiting their waste production?".

Promising insights were found during a literature review and analysis of the international scene. Regarding current research concerning sustainable exhibition design, three directions can be characterised: Life Cycle Assessments (LCA) and waste audits, exchanging scenography on sharing and second-hand platforms, or reusable scenography by design. Firstly, LCA evaluates the environmental impact of exhibitions. While it does not eliminate emissions, it increases transparency and enables better understanding. Secondly, external organisations provide a service to rent and share scenography and other exhibition materials or sell them second-hand at a reduced price. Although the initiative is post-use and proves to be challenging, this practice is seen more frequently. Lastly, a more fundamental approach is integrating circularity in exhibition design, such as designing modular scenography fitted for adaptation or reusing internal structures with updated finishing layers.

In the second and ongoing phase of the research, an online survey will be sent out to selected museums in Belgium and the Netherlands to gain more insight into the perception of sustainable exhibition design and policies. This will be the baseline for qualitative, practice-oriented research, closely working with the three actors mentioned. Engaging them in case studies during data analysis and validating the findings increases their motivation to participate and knowledge of the topic. This PhD aspires to advise museum professionals in implementing circular design strategies in producing exhibitions, thus supporting their sustainable transition.

Julie's Bicycle. (2024). Culture, Climate and Environmental Responsibility: Annual Report 2023-2024.

Keywords: Waste management; Circular design strategies; exhibition design; sustainable scenography

Toward a Methodology for assessing the perception of space in interior architecture using 3D digital tools: project overview and ongoing scoping review

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Abstract: The built environment influences occupants' satisfaction and well-being through the way they perceive space. When architectural solutions fail to meet the stakeholders' needs, dissatisfaction can arise, potentially leading to costly and time-consuming reconstruction. Addressing how indoor environments can better satisfy users is a social challenge. Therefore, the study aims to develop a methodology for digitally assessing users' spatial perception of interior architecture, ensuring practical application during the design process to promote user-centric architectural design. The research comprises subjective analysis through questionnaires and observation, and objective analysis through biometric sensors. It will begin by classifying indoor environmental characteristics (e.g., geometry, light, acoustics) and linking them to methods for spatial perception assessment. After, we will identify 3D digital tools to assess the perception of space by its users. Finally, we will pilot the testbed and assessment methods with end users and design experts. The development of the proposed tool will have a significant impact on the scientific community and the design sector because of its practical applicability and will have a social impact by promoting user-centered architectural design.

At this stage, the research is focusing on conducting a scoping review to provide an overview of the existing literature on the board topic of assessment of space perception in the field of interior architecture by using 3D digital tools. By mapping the key concepts, methods, and tools employed in the field, the scoping review will identify research gaps to lay the groundwork for the later development of a methodology to 3D digitally assess users' spatial perceptions of interior architecture and to apply it practically throughout the design process, with the ultimate goal of promoting user-centered architectural design.

Keywords: Interior Architecture; User satisfaction; Space perception; Advanced Visual Technology; Scoping Review

Developing new pop-up habitat models through circular design by means of computational design and robotic production

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Abstract: This research seeks to develop new enveloping models for pop-up habitats by computationally designing and robotically producing and operating structures that meet user requirements within specific contexts. The study will focus first on a case study in the Middle East, with the goal of identifying requirements and expanding the scope towards including Mars as the second location. It will build up on Design-to-Robotic-Production-Assembly and -Operation (D2RPA&O) [1] and material science [2] and structural engineering research [3] developed at TU Delft and UAntwerp in order to respond to post-disaster and emergency challenges and future habitations on Mars.

A key deliverable of this research is a novel design methodology which entails:

(i)design criteria as an input in order to meet the requirements for robotic production and assembly, thus it requires material science and innovation as well as intertwined structural design and mechanics knowledge;

(ii)process and approach as development measures from design to manufacture, assembly and use;

(iii)design, materiality and structural performance evaluation.

1. Bier, H. (Ed.). (2018). Robotic Building (1st ed.). Springer International Publishing.

2. Ingold, L., & Rinke, M. (Eds.). (2015). Sergio Musmeci's search for new forms of concrete structures.

Proceedings of the 5th International Conference on Construction History.

3. Voormann, F. (2012). Before steel: the introduction of structural iron and its consequences. From Rinke, M., Schwartz, J. (eds.). Steel Construction, 5(2), 134–136.https://doi.org/10.1002/stco.201290013

Unravelling spatial networks: evaluating the role of circulation systems in building conversions

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Abstract: The demolition and construction of buildings has a significant impact on our environment, accounting for 10% of global greenhouse gas emissions in 2023. This necessitates urgent action to adopt more sustainable practices within the construction industry. The reuse of buildings has emerged as a vital strategy, maximising embodied carbon savings while minimising the energy and transportation impacts associated with reprocessing. Circulation systems (i.e. stairs, lifts, corridors, cores and shafts) play a pivotal role in enabling adaptive reuse, functioning as spatial networks that determine a building's capacity to adapt. Rather than serving as neutral infrastructure, these elements structure movement, access, and spatial hierarchies, thereby enabling or constraining future change. Through an evidence-based analysis of converted buildings, this study investigates how the configuration of circulation networks influences long-term adaptability, open-ended reuse and programmatic transformation. Ultimately, the research aims to inform adaptive reuse practices and the design of new buildings, demonstrating how robust circulation systems can support a more sustainable built environment.

Keywords: Adaptability; building reuse; sustainability; circulation systems; topology

Open up! Understanding floor slab adaptations during building conversion

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Abstract: Floor slabs contain the largest portion of a building's embodied carbon while determining the building's functionality and, consequently, its capacity to allow other functions. In efforts to reduce the environmental impact of the construction industry, new flooring systems are being developed, often focusing on lean design and low-carbon materials. At the same time, the adaptive reuse of existing structures offers a key strategy to extend the functional lifetime of buildings. Floor slab adaptations mark a vital strategy in many such building transformations and adaptations, for example, to implement new staircases, atriums, or technical shafts. Today, these adaptations are not systematically understood, leaving adaptability neglected in the development of new flooring systems. This paper presents an empirical analysis of 510 adapted floor slabs in 27 converted buildings using an automated graph modelling method. For each slab, the study analyses its typology, precise geometry, materials, embodied carbon, and the adaptations made during conversion. The analysis combines the physical changes with the architectural motivation behind them, their spatial and functional impact. To the authors' knowledge, this study is the first of its kind, offering systematic insights into floor slab adaptations. The results show the granular friction posed by different structural systems and identify regular patterns of change that could potentially be implemented in the development of longer-lasting and better-adaptable flooring systems.

Construction and design flaws at the Pharmaceutical Institute (1885-1892). First reflections on the reception process of the Trasenster Institutes at the University of Liège

Astrid Schreurs 6*

Supervisors: Philippe Sosnowska & Claudine Houbart (University of Liège); Inge Bertels (University of Antwerp)

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Abstract: My doctoral thesis project, titled "Building the University at the End of the 19th Century. A Holistic Analysis of the Trasenster Institutes (1880–1889) of Lambert-Henri Noppius in Liège" (working title), lies at the intersection of architectural history, construction history, and building archaeology. It aims to explore the processes behind the construction of monumental buildings in 19th-century Belgium through a case study of six scientific institutes built in Liège between 1880 and 1889, based on the designs of architect Lambert-Henri Noppius (1827–1889).The doctoral project is being conducted under a co-tutelle arrangement, supervised by Prof. Philippe Sosnowska and Prof. Claudine Houbart at the University of Liège (Faculty of Architecture, AAP Research Unit, DIVA Laboratory), and Prof. Inge Bertels at the University of Antwerp (Faculty of Design Sciences, Henry van de Velde Research Group). The research, which started at the end of January 2025, is funded by the Fonds pour la Recherche en Sciences Humaines (FRESH) of the FNRS.

This contribution presents the initial research findings related to the Pharmaceutical Institute, focusing specifically on the acceptance of works and the early years of use. The challenges encountered between 1885 and 1892 illustrate how administrative decisions, legal frameworks, and technical expertise shaped the functionality and governance of university buildings.

Despite being newly constructed, the building exhibited major structural and functional issues, including defective roofing, insufficient ventilation, and a damaged heating system. Archival records highlight construction flaws, inadequate site supervision, the use of misunderstood technologies, and a lack of maintenance. However, the resolution process was complicated by conflicts of interest and unclear responsibilities, as various stakeholders (mainly the City Government and the Ministry of Public Works) sought to shift blame. These difficulties not only affected the research and teaching conditions within the laboratories but also influenced the construction and acceptance protocols of later university institutes.

First, the doctoral thesis project will be presented briefly, then the Pharmaceutical Institute will be introduced. The presentation will then delve into the early problems encountered by the occupants, starting with the roof leaking (1885-1889), then the insufficient ventilation system (1892), to finish with the damaged heating system (1892).

Keywords: Public building management; Acceptance of works; Roofing; Ventilation; Heating.

Contested Built Heritage in Antwerp: Researching the Colonial Impact on Construction Practices through Material and Actor Networks

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Abstract: This research investigates the influence of colonial exploitation in Congo on the built environment in Belgium, focusing on historical building sites in Antwerp that reflect the country's colonial past. Previous studies have often explored how Belgium used architecture as a tool to express colonialism in Congo, which has left a significant gap in investigating how colonial ideologies are also embedded in architecture in Belgium. By combining the fields of construction history and contested heritage, this research examines selected sites in Antwerp, characterized by their discordant values among different societal groups. Using a case study analysis based on archival research and site analysis, the study explores material and actor networks to uncover how colonial resources and collaborations shaped these sites. Interviews are also conducted with members of Congolese communities, who offer both experiential and professional knowledge. New perspectives from the case study analysis and interviews are discussed with heritage agencies to create decolonial approaches in heritage practices. This results in a nuanced understanding of contested heritage sites in Antwerp and a tangible outcome that benefits underrepresented groups.

Keywords: Construction history; Contested heritage; Architectural history; Colonialism

Suburbs of Bombay (1920s-40s): spaces of resistance and subversion

Excy Hansda^{8*}

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Abstract: The early twentieth century Bombay (now Mumbai) saw the urban expansion of Bombay Island City Island and the suburbanization of Salsette Island (north of Bombay) to accommodate the native middle classes. This paper investigates the microhistory of the suburbs of Bombay from the perspective of towns, villages and neighbourhoods rather than looking at it as an expansion of the island city, thereby reversing the suburban gaze. Focused on neighbourhoods of Bandra, Khar and Juhu (suburban towns in Bombay), the paper demonstrates the suburbs as a space of resistance against the colonial/municipal state, where the middle classes claimed their dwellings and public spaces and fashioned new identitiessometimes as a cosmopolitan civil society and sometimes as religion or caste-based Contrary to the literature that sees suburbs as a space of segregated groups. colonial/municipal power with the natives as passive subjects, a middle-out analysis of previously unexplored archives suggests the middle-class suburbs not as spaces of marginalization but as spaces of subversion and resistance. Large and formal resistance includes petitions by the middle classes to question and protest the municipal schemes and byelaws and delegations requesting/demanding amenities like temples and playgrounds. In contrast, small resistance includes collaboration amongst various groups and individual efforts to shape their dwellings by "bending the rules" by using unauthorized structures, not following bylaws and others.

The chief purpose of the paper is twofold: first, to make a case for Indian agency in the coproduction of suburbanization and suburban dwellings, and second, to argue the role of the middle class's social and spatial cultures in the suburbs in order to fashioned identities to claim the suburbs. to empower communities and promote spatial justice.

Keywords: Architectural Drawings; Research by Design; Participatory Research; Community Empowerment; Spatial Practices.

Under the radar: self-organized renovation practices among distressed homeowners in Flanders

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Abstract: While adequate and affordable housing is a fundamental right, quantitative and qualitative scarcity does not guarantee this for low-income quintiles. Against this backdrop, this study focuses on 'distressed buyers' and 'distressed homeowners' on the Flemish housing market, which has made ownership a focal point in past and current policies. However, at least 4%, or 119,000 households, are confronted with inadequate housing quality and major renovation needs despite their ownership and have little or no possibility to thoroughly change their housing situation. As a result, Self-organized or do-it-yourself renovations might be the only option for them, but the scale, approach and impact remain largely invisible in available quantitative research and datasets. The project therefore aims to apply qualitative research methods through a case study on the Rupel region to uncover the renovation efforts of the distressed homeowners. Given the institutional context in which these informal renovation practices take place, the friction with ongoing workings and policy initiatives as well as reciprocal thresholds, will be identified. Lastly, it will explore how the architect in particular has an enabling role to play, in order to formulate policy recommendations that contribute to a more inclusive housing policy.

Keywords: Distressed homeowners; Do-it-yourself renovation; Role architect

The impact of digitalisation on real estate market dynamics

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Supervisors: Lara Schrijver (university of Antwerp); Theo Dounas (Heriot-Watt University), Eleni Papadonikolaki (TU Delft)

¹⁰ QuiVal Project, funded by the EU Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant, Faculty of Design Sciences, University of Antwerp, Belgium.
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Abstract: Digital technologies have the potential to fundamentally transform the built environment and real estate industry by enabling more secure, transparent, and efficient processes. Among them, blockchain technology holds great promise in changing market dynamics through cryptographically secure transactions that reduce costs and minimize reliance on intermediaries. Consequently, blockchain offers new mechanisms for accountability and fraud prevention.

This research investigates how blockchain implementation is transforming the real estate industry and is affecting both traditional (economic) and non-traditional (social, environmental, experiential) values. Additionally, the study explores models of fractional ownership through crowdfunding to democratise real estate investment by providing an opportunity for younger generations. Finally, at its core, the paper seeks to understand the evolving role of trust in decentralised systems, and how this development redefines governance, ownership and trading.

To achieve these objectives, the following mixed-methods approach is used: firstly, a comprehensive literature review is presented to determine what has been done already and to identify research gaps; secondly, to analyse the concept of trust and how it changes with blockchain implementation, a survey is conducted to understand this shift; and lastly, an Ethereum-based blockchain platform for real estate transactions is developed and tested.

The findings aim to support the broader adoption of blockchain technology in the real estate industry, offering a practical framework for policymakers, investors, and public administrators.

Keywords: Digital technology, Blockchain, Decentralization, Trust, Real Estate Value

Benefiting from the outdoor environment The outdoors is not the same for everyone: beyond the four-zone model in care architecture

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Abstract: In care environments, the importance of contact with the outdoors is recognised as beneficial to the physical ¹ & mental ² health and well-being of end-users. Therefore, Bengtsson, a researcher in the field of environmental psychology, developed a four-zone spatial model to analyse the degree of contact with the outdoor environment for residents at residential care facilities. From visual contact with the outside world from within the building (zone 1), to access to transitional spaces like patios or balconies (zone 2), physical presence in the outdoor space on the site such as gardens (zone 3), and finally access to the wider public environment, including nearby parks or shops.³ Later, zone 0 was added to describe indoor spaces without contact with the outside world.⁴

With the four-zone model in mind, I began my fieldwork in a residential care facility. The model offers a clear frame of reference, a conceptual "mental section view" for understanding the relationship between residents and the outdoor space. However, during fieldwork the limitations of the model became apparent. Residents appear to experience the zones differently from how they are defined in theory, and spaces cannot be strictly assigned to a single zone. Moreover, the meaning of 'outside' differs fundamentally from resident to resident.

This PhD research investigates the borders of interior architecture in focusing on the indooroutdoor relationships, starting from the knowledge that the outdoor remains an important aspect of the indoor experience. Particular attention is paid to how residents in care environments use, avoid, or reinterpret both indoor and outdoor spaces. For example, what is classified as a transition zone (zone 2) may feel completely 'inside' to a resident if the view is limited. For another resident, a corridor with windows can become 'outside' simply because they can see the sky and that is enough for them. The perceived experience of contact with the outside world therefore appears to be much more layered, subjective and relational than the spatial zoning suggests.

Moreover, 'contact with the outside' seems to be more than a purely physical experience. For some residents, it also has a mental dimension, one that is remembered or imagined. The idea of 'outside' can lie in a conversation about their former home, concerns about family members, or even the opera house they used to visit, etc. Such interpretations of the 'outside' lie beyond the scope of the model, yet they seem to play a crucial role in residents' everyday experience.

These initial findings show that the four-zone model is a good starting point, but refinement and reconsideration are needed from an interior architectural perspective, one that does not end at the physical boundaries of the interior, but includes mental, symbolic, and experienced forms of 'outside'. It shows that the outdoors is an essential element of the indoors, and that interior architecture should also include the outdoor to a certain extent to the inside. 1. Papalia, R., et al. "The Role of Physical Activity and Rehabilitation." Journal of Clinical Medicine 9 (2020): 1401. https://doi.org/10.3390/jcm9051401.

2. Buckley, R. C., et al. "Bringing Outdoor Therapies into Mainstream Mental Health." Frontiers in Public Health 6 (2018): 119. https://doi.org/10.3389/fpubh.2018.00119.

3.Bengtsson, Anna. From Experiences of the Outdoors to the Design of Healthcare Environments: A Phenomenological Case Study at Nursing Homes. Doctoral thesis, Swedish University of Agricultural Sciences, 2015. https://www.researchgate.net/publication/277277725.

4. Liljegren, Madeleine, Anna Bengtsson, Göran Lindahl, and Helle Wijk. 2022. "Health Promoting Qualities in Outdoor Environments at Residential Care Facilities for Older Adults – A Research Approach." The Evolving Scholar | ARCH22: Enabling Health, Care and Well-Being through Design Research, August 22–24, Delft/Rotterdam, The Netherlands. https://doi.org/10.24404/6238aa0344f1a88d870a2b38.

Keywords: indoor-outdoor relationship, care environments, spatial perception, user experience