Sharing Ground: Propinquity

AIARG Conference 2021
All Ireland Architectural Research Group
10th Annual Conference
Ulster University, Belfast 21st/22nd January

Pentagram's interpretation of Michael Sorkin's
'Two Hundred Fifty Things an Architect Should Know' (Credit Pentagram)

'…Fling the emptiness out of your arms to broaden the spaces we breathe:
maybe that the birds will feel the extended air in more fervent flight'

The First Elegy, Duino Elegies, first published 1923, Rainer Maria Rilke

Sharing Ground: Propinquity

AIARG Conference 2021
All Ireland Architectural Research Group
10th Annual Conference
Ulster University, Belfast 21st/22nd January

'…Fling the emptiness out of your arms to broaden the spaces we breathe:
maybe that the birds will feel the extended air in more fervent flight'

The First Elegy, Duino Elegies, first published 1923, Rainer Maria Rilke

Sharing Ground: Propinquity

The All Ireland Architecture Research Group (AIARG) comprises members of the eight schools of architecture in Ireland, and professionals interested in architecture research and in disseminating theirwork to extend the reach of their enquiry and search.

AIARG is in the process of incubating a coherent culture of architecture on the island of Ireland.

AIARG 10th annual conference 21st – 22nd January 2021 is hosted by the Belfast School of Architecture and the Built Environment, Ulster University.

Help and assistance from colleagues in the School and special thanks to the panel chairs:

Emmett Scanlon

Professor Aoife Wiberg

David Coyles

Professor Paul Clarke

Associate head of School, Martina Murphy

Special thanks to Joan Copjec for the keynote address.

The conference is a special tribute to Michael Sorkin i.m.

Keynote presentation sponsored by ARdMackel Architects.

Contents

Panel 2: Climate Change

Chair: Professor Aoife Houlihan Wiberg

Panel 3: Policy, Politics and Agency 2

Chair: Dr David Coyles

Panel 4: Materials, Means and Media

Chair: Paul Clarke

Panel 5: Education as Environment

Chair: Dr Martina Murphy

Sharing Ground: Propinquity

AIARG Conference 2021
All Ireland Architectural Research Group
10th Annual Conference
Ulster University, Belfast 21st/22nd January

'…Fling the emptiness out of your arms to broaden the spaces we breathe:
maybe that the birds will feel the extended air in more fervent flight'

The First Elegy, Duino Elegies, first published 1923, Rainer Maria Rilke

'…your fierce rhapsody
floated above Belfast like
an archangel in the sky
staring down from a cloud
at iron, rope, red brick,
factory and back yard

through smoky rain, dropping
tears of infinite grief
and promising some relief;
your skipping, fluent song
tripped from a nimble tongue
until the music stopped.

Still life goes on. Out there
pebbles 'clock' on the shore,
discordant details thrive
in the chaos where we live
and a true note can be heard:
the voice of a blackbird,'

A True Note, i.m. Ciaran Carson, Derek Mahon, Washing Up, Gallery Books, 2020

In their 1999 publication, 'Giving Ground: the politics of propinquity', editors Michael Sorkin and Joan Copjec invited a range of theorists and writers to reflect on matters including the importance of indeterminacy and the relationship between democratic social relations and spatial propinquity. The space of 'nearness' which supports ongoing conversation, for neighbourliness and a generosity of kinship, so crucial to the making of neighbourhood is also the space that was, in large part, the scene of so many deaths in the current pandemic.

The annual conference of the All-Ireland Architecture Research Group (AIARG) promotes innovative academic and practice-based research as well as the pedagogy and progress of architecture in its fullest sense, and in January 2021 for the 10th annual conference, we welcome contributions from researchers, practitioners, theoreticians and pedagogues of architecture, and from those of other disciplines working within and around the interests of architecture. We invited, and have received, papers under the theme of 'Sharing Ground:

Propinquity' to consider the impact, contribution and responsibilities of architecture, across a range of topics that include but not limited to a sequence of panel discussions: Politics, Policy and Agency; Climate Change; Materials, Means and Media, and Education as Environment. The proceedings will be disseminated through Building Material, the journal of the Architectural Association of Ireland and the All-Ireland Architecture Research Group and will be threaded into the structure of the research clusters of Ulster University's architecture research group whose members will lead each conference session.

Ciarán Mackel

Panel 1

Friday 22nd January 2020
10.30am – 12.30pm

Policy, Politics and Agency 1

Chair: Emmett Scanlon

Alessandra Como + Luisa Smeragliuolo Perrotta (Salerno, Italy), Porocity: the rediscovery of porosity as a character of the architecture of the city

Dr Saul Golden, Kieran Carlin + Professor Gerry Leavey (Belfast, Ireland), Urban universities as catalysts for regeneration strategies to benefit communities

Miriam Fitzpatrick (Dublin, Ireland), Propinquity and the Social Life of the City

Dr Gul Kacmaz Erk (Belfast, Ireland), Active Urbanism: clubbing in Berlin's adapted buildings

Colm O'Brien (Cork, Ireland), Public Space and the Elderly

POROCITY: the Rediscovery of porosity as a character of the architecture of the city

From our homes we have watched the Coronavirus entering into the social and urban fabric of cities. Urban space, public space, together with the community, all seemed to have become enemies. Probably after this emergency some types of spaces will be rethought from an organizational - functional point of view. But what will become of the city and of its built heritage? Which characters of the city can be explored today to build possible answers? "Porous as this stone is Architecture" is the famous phrase that Benjamin used to describe Naples. Here the tuff stone with its material characteristic becomes emblematic of a way of living the space of the city.

Today porosity can become significant to face the transformation of the city. Porosity draws an idea of urban space that goes beyond the public/private, indoor/outdoor, street/house dichotomy. The porous city conquers an intermediate dimension of public space with which we can build a new sociality that involves fewer people but builds more relationships among parts of the city. Courtyards, roofs, gardens and interstitial spaces - characteristic elements of the Mediterranean architecture - become the spaces of reconquest of a specific condition. The porous city builds a settlement logic in which the "intermediate" spaces of the city are highlighted in order to find different gradations of use of urban space to be explored also through differentiated solutions of economic and administrative uses and management.

This paper addresses the theme of urban porosity in the contemporary city from a theoretical point of view through the analysis of texts and through design projects visualized with collages and drawings. The aim of the paper is to contribute to a reflection on the potential role of architecture within the current emergency.

Alessandra Como, Luisa Smeragliuolo Perrotta

Urban universities as catalysts for public-private regeneration strategies to benefit more liveable and healthy inner-city communities

This paper examines the presence and influence of urban universities as catalysts for more beneficial impacts on their immediate city environments and communities. It focuses on planning and architectural contexts for projects proposed to transform the entirety of neighbourhoods surrounding, and led-by, Ulster University's £250 million Belfast campus expansion by 2022. With over £1 billion of combined public private funding earmarked for infrastructure, housing, tourism and commercial-creative sector investment over the next 15 years - not accounting for the current Coronavirus pandemic - unprecedented levels of what is termed comprehensive regeneration are putting adjacent conservation areas and heritage buildings under pressure for redevelopment.

The paper argues that no holistic development approach to decision-making, or understanding of current powers, exist for projects claimed as mechanisms for a culturally and economically vibrant Belfast City Centre, with tens of thousands of new residents by 2035. The paper thus sets out a methodology to trace and evaluate the collective impact of dynamic and differing proposals on local social, economic, and physical factors over time and across disciplines from the built environment to public health and social sciences. It will discuss findings from literature that frame methodologies to collect and connect primary data on base-line and changing KPIs associated with liveable, healthy and resilient communities.

The relevance of Ulster's expansion to the surrounding neighbourhoods will be examined for its key stakeholder role in debates about how investment should impact on immediate and future development. Discussions will be framed against local, institutional, and government level policy and future city targets and aspirations as set out in the City Council's Bolder Vision (2020) and the Stormont Executive's New Decade New Approach (2020) documents. The focus area surrounding Ulster University's Belfast campus will be the means to contribute relevant international lessons on liveable community policy and spatial governance.

Dr Saul M Golden, Mr Kieran Carlin, Professor Gerry Leavey

Propinquity and the Social Life Of The City

I am using this cartoon to represent two charged oppositional figures that dominated American city planning mid 20th century! On the left is the congenial character of the social urbane geographer, in dining attire, at home in any metropolitan environment; on the right- in more appropriate attire for fieldwork- is the cousin who prefers less dense terrain. One invokes the civilized city booster, alert to the promise of civilized, communal life in the concentrated setting of the city, in face-to-face conversation after twilight; the other is seen as its opposite; the dew on those rustic boots speaking of a desire for release, the prospect of 'getting away from it all', for a day's fieldwork in open countryside.

Peace is preferable to fearful plenty goes the morale of Aesop's story on the Town & Country mouse, which is a rather negative portrayal of the citiness that serves to heighten the tension between these two forces; one towards the center of action, the other towards escape. In patterns and choices of how we live post-Covid, the pair might also symbolize the dialectic of pro and anti-city types; the dogged city booster and the utopian de-centralist!

'Propinquity' was a phrase used by the subject of my research, urbanist and investigative journalist, William Hollingsworth Whyte. Whyte used the terms to describe the character of convivial public space. But for a session, I propose to use Propinquity because of its conjunction of meanings of nearness in space for social encounters as well as proximity in terms of geographical distribution of people to conjures up planning concepts of centrifugal and centripetal forces, which in turn, neatly classifies social space as socio-fugal and socio-petal used in proxemics. F for far flung fields and p for proxemics, p for propinquity!

Miriam Fitzpatrick

Activist Urbanism: Clubbing in Berlin's Adapted Buildings

Berlin has an established history of squatting. As early as the 1970s, urban activists, artists and ordinary people started moving in abandoned housing. They adapted uninhabited buildings as to their (communal or individual) dwelling needs both in the west and the east. Kreuzberg and Prenzlauer Berg had multiple squats.

With the emergence of techno music and subculture in reunited Berlin, this bottom-up movement spread to industrial buildings. Marginal groups adapted derelict buildings with minimal intervention for long-term underground guy partying. Warehouses, bunkers and power plants (turned into Berghain, KitKat, Tresor and other clubs) inspired, shaped and were shaped by the industrial beat of Berlin techno.

Some argue: if you throw a stone in Berlin, it will hit a DJ. Using audial and visual material, this presentation will bring to your attentionthe spaces of pleasure Berlin's DJs and VJs work in as well as their illegal adaptation process as part of grassroots urbanism. By squatting and adapting industrial buildings of the past for dancing and nightlife, Berlin clubbers on the one hand generated this new subculture, and on the other kept those buildings and the urban memory of a past time alive.

Dr Gul Kacmaz Erk

Public Space and the elderly

The elderly is the age group most affected by the recent crisis. The average age of mortality due to Covid 19 in the republic of Ireland is 83. People over the age of 65 were told to self-quarantine or cocoon, often in neighborhoods where they had no social structure in place to provide for their basic needs. We need to look at how public spaces and neighbourhoods can better cater to the most vulnerable groups in society.

How do we design cities to properly cater for the elderly? The consensus in urban planning before this crisis was inclusion and sharing. Housing for elderly should be an integrated partof the urban fabric, not closed off. Senior housing and care homes should be located in centres, sharing facilities and public space with other public functions, for example kindergartens. This is to create more diverse communities and increase inter-generational contact and to ensure the most amount of people have access to shared spaces.

Concurrently there has been a movement, predominantly in the US, in designing age-restricted communities. These are self governing and self-sustaining communities of people over an accepted age, usually 55. They are often placed on the peripheries of cities. All public functions are for residents only and people under 55, even family members, can only visit for a set number of days a year. Most businesses and social functions are run and operated by the residents themselves. In addition, dealing with elderly people who are housebound is a common part of life there so systems for delivering food groceries etc, are well developed. These types of communities have grown incredibly popular over the past decade as the so-called boomer generation enters their senior years.

What we need to ask ourselves now in the light of the current crisis is how can we design cities to be more resilient to the effects of pandemics on the elderly. Are age restricted communities actually more resilient and safe because they already have systems in place separating them from their surroundings? What can we learn from these two opposing theories and how can we design cities to better protect the elderly while still having every age group represented equally in the city? What can architecture or urban planning offer to solve this challenge?

Colm O'Brien

Panel 2

Friday 22nd January 2020
10.30am – 12.30pm

Climate Change

Chair: Professor Aoife Houlihan Wiberg

Anup Kumar Prasad (Bengaluru, India), Crucial factors influencing climate change: alternative dimension

Federica Appendino + Janet Hetman (Paris, France), Eco-neighbourhood in an historical city

Helena Fitzgerald (Limerick, Ireland), +CityXchange DPEB Innovation Labs – infrastructure for innovation

Martin Murray (Belfast, Ireland), Remaking our rural towns through energy conservation

Rebecca McConnell (Belfast, Ireland), 'A Wicked Problem'

Shane Colclough (Dublin, Belfast, Ireland), Investment into Irish low-energy social housing retrofit

Crucial factors influencing climate change – alternative dimension

It is a general understanding that the construction industry plays a significant role in influencing the environment. As per the United Nations Environment, Global status report 2019, Buildings and construction account for almost 40% of global final energy use and nearly 40% of energy-related CO2 emissions.

However, this was not always the case. Before the invention of mechanical heating and cooling, bio-climatic means were employ to achieve comfortability inside buildings. Such vernacular architecture evolved based on years of living practices, experimentation, and been tested by time. Studies indicate that climate responsive vernacular architecture uses less energy than contemporary architecture. Despite taking forward the environment-friendly passive techniques, the rapid Industrialisation and urbanization rigorously deviated the Building industry towards active techniques, which is not particularly responsive to the environment.

Today, active heating and cooling devices ensure indoor comfort but require extensive energy inputs. Several extensive analysis indicates, that the shift from passive to the active method could be propaganda designed by the capitalist. Furthermore, to compensate for the environmental dropping, the building industry is adopting various Green certifications, which has merely become a marketing gimmick favored by industrialists and capitalists. Hence, this paper begins with analyzing from pre-industrial architecture to modern architecture along with human comfort. The research extends to identify the root cause of environmental deterioration and categorizes it in both qualitative and quantitative ways. Further, propose constructive parameters for rectification.

Anup Kumar Prasad

Eco-neighborhood in historical city, allowing preservation and contemporary. The case study of Saint-Vincent-de-Paul district in Paris

Energy retrofit of ancient and heritage buildings appears as a great challenge for sustainable neighbourhoods. While recognized as a strategic measure to achieve sustainable development goals, since the historic built stock has a great potential for saving energy and reducing GHG emissions, retrofitting historic buildings in Europe is still very complex. In this context, the case of Paris is interesting and innovative, because of the strategies implemented to find a balance between urban heritage conservation, new buildings and sustainability goals. On this basis, this paper aims to contribute to this growing area of research by discussing the Saint-Vincent-de-Paul eco-neighborhood in Paris. An ancient hospital complex, characterized by an important and stratified architectural heritage asset, the project is intended to become the first carbon-neutral and resilient neighborhood of the city. The urban project aims to ensure a harmonious balance between the construction of the contemporary blocks and the preservation of the site's historic buildings, providing an ambitious environmental approach.

Indeed through this case study, the article examines questions about retrofit solutions applicable to built heritage and investigates their benefits and limitations. Our first results stress contradictions with three main environmental ambitions: energy efficiency, rainwater management and waste reduction. A cross-cutting reading is presented, by proposing an inter-sectoral dialogue, combining the academic and the practitioner point of view, as well as an inter-scalar approach, from the strategic urban scale to the building scale of Maternity Pinard. The case study underlines compatibilities and conflicts between the characteristics of the building and the technical strategy and solutions applied. Moreover, going into details of Maternity Pinard building allows to describe the relationship in which architectural heritage and energy behavior are chained together and juxtaposed.

Federica Appendino + Janet Hetman

+CityxChange DPEB Innovation Labs – Infrastructure for Innovation

+CityxChange[1] seeks to develop a structured approach to the implementation of Positive Energy Blocks[2] (PEBs) and Districts (PEDs) in seven European cities including Limerick. This paper describes a framework for the implementation of DPEB Innovation Labs, dedicated centres for digital innovation which are to enable and accelerate the clean energy transition. As both a physical space or network of spaces and a programme, DPEB Innovation Labs seed and grow a permeable culture for co-creation within a city, orchestrating community-led innovation processes and intitiating new collaborations as part of an Open Innovation 2.0 ecosystem.

This paper will first analyse Fab Labs and Living Labs to illuminate aspects of their operation which influenced the DPEB Innovation Lab framework. The evolution in thinking on collaborative governance structures and collaborative platforms will then be reviewed and the completed framework, which has a modular structure to support a dispersed network of Labs within and between the cities, is presented. Finally the expansion of the DPEB Innovation Lab to address broader societal challenges in the context of city transitions towards the UN SDGs is proposed.

Helena Fitzgerald

[1] EU Horizon 2020 Smart Cities and Communities Grant Agreement No.824260

https://cityxchange.eu/

[2] A PEB is a group of buildings – at least three in number with a minimum floor area – which cooperate around energy and which together, on an annual basis, produce more primary energy than they consume. Buildings in a PEB must have different uses e.g. residential and commercial, to take advantage of complementary patterns of energy consumption and to optimise local renewable energy production, consumption and storage. A DPEB refers to where the buildings in a PEB are distributed and not directly attached to each other. A Positive Energy District comprising a number of PEBs or DBEBs in a defined urban area. A series of PEDs can create a positive energy city.

Re-making our Rural Towns through Energy Conservation

The research is concerned with how community-based energy-saving initiatives can have a multipliereffect on carbon reductions. These potential initiatives lie across many facets of our country's energy use, albeit energy generation, transportation, agriculture and construction. However there is currently no cohesive image / conceptual context within which to set out and discuss these aims. The research proposes that this vacuum can be filled by integrating energy reductions directly into our communities and amplifying their importance. To put this in context, other more commercially concentrated entities, such as EirGrid, realise that brand context is critical. They recently advertised for advice to :-

> *'provide brand-positioning and strategy, brand-story, tone of voice, messaging, brand architecture, brand-naming, brand-design, graphic design, digital design, brand guidelines, brand-insights and recommendations, marketing and communication, brand review, brand-logo and identity, stakeholder engagement and brand-management.'*

In national energy terms we lack such clarity of message. However with a low density of population, strong rural traditions and excessive internal transportation costs, it is worth asking, if one solution, one brand, to our energy transformation needs, lies in the energy re-making of our traditional market towns and villages. Such re-making combines together key synergies of urban renewal and the protection of buildings which previous generations had invested with effort, hope and sequestered carbon; minimisation of transport needs and protection of urban hubs allowing transportation nodes to prosper; creating a greater sense of community through strong spacial context and propinquity.

It is only where energy concerns permeate the entire community planning ethos, will such positive feedback be achievable. This research paper explores how we might re-make our planning and urban design process so as to make such outcomes a probability, more than a possibility, and to indicate how only by increasing the energy integrity of our communities, can such initiatives become realities.

Martin Murray

A Wicked Problem

A Wicked Problem is a convoluted dilemma that proves impossible to solve. It can, however, be minimised, manipulated, disrupted and directed. Climate change is considered to be the most multifaceted crises of this generation, and it fits the identity of a wicked problem perfectly. One approach to tackle this problem, that will directly implicate architects, is employing design as a viable approach. Design in architecture is a creative yet structured and authoritative discipline. Design welcomes criticism, is fed with iterations, and hopes for continuous improvement.

The temporal aspect of the issues surround climate change is something a rigorous design approach could contest. Many of the issues surrounding the topic are only beginning to take a physical toll on society, and many around the world have not yet seen or experienced the harrowing consequences. Design welcomes this messiness, with an opportunity for wild ideas and speculation through a repetitious process; all essentials that can aid problem solving for the future where disputably science would lack. This paper aims to argue that climate issues can be challenged, or perhaps even improved, through the implementation of a multi-layered design strategy. This scheme will look at a series of problems in isolation. The multiple design solutions can act as a driving force for individual issues, assessing anddeveloping a provocational architectural design outcome. These designs will not be 'correct' or 'incorrect', rather they will be the optimal solution for a temporal approach to each specific issue due to impact society in the future. A multi-layered strategy will embrace the existential nature of design, exploring a communication of what can be discovered about each scenario through propositional schemes. Ultimately, if designing is the activity that aims to change existing scenarios into desirable ones, then design is a suitable strategy to research how things could be.

Rebecca McConnell

An Investigation into Irish Low-Energy Social Housing Retrofit

This paper addresses the question of why social housing providers have not adopted improved energy efficiency in Irish retrofit dwellings to date. The approach combines quantified financial, economic and societal benefits and stakeholder analysis. It is important given the urgent need for effective policy development in order to re-orient society and industry and enable the achievement of low-energy retrofit mandated by the EU. The Multiple Beneficiary Analysis (MBA) methodology has been developed and applied to a real Co. Wexford 12 unit scheme of social housing dwellings which has undergone a Deep Energy Retrofit (DER) to the near Zero Energy Building (nZEB) standard. By assigning the direct and indirect costs and benefits to the stakeholders of the Deep Energy Retrofit (DER), a clear picture of their financial gains (or losses) emerges.

The analysis covers the technical specifications, the actual costs of upgrading the dwellings to the low-energy standards, the direct and indirect financial and economic benefits which accrue over a 15-year period, and the financial perspectives of the involved stakeholders. The direct benefits include reduced energy consumption, reduced CO2 emissions, reduced maintenance costs and increased capital and rental value, while the indirect benefits include improved health and economic benefits. The stakeholders (beneficiaries) identified are landlord, tenant and Central Exchequer. A key finding from the analysis is that the stakeholder who benefits most (the tenant) makes no financial contribution to the higher standards, the Central Exchequer benefits significantly, yet the stakeholder who makes the upgrade decision (landlord) benefits least.

Given the significant benefits which accrue to the Central Exchequer, there is an opportunity for strategic investment by the government to unlock the benefits of low energy dwellings. This would simultaneously realise ongoing financial benefits, "seed" the capability within industry and crucially increase the knowledge and understanding of low energy dwellings which is necessary to enable the appropriate market valuations which are required if widespread adoption is to be achieved. The key finding is that despite the returns of circa twice the investment, and the urgent need to retrofit existing building stock, the required DER uptake is unlikely as the decision-makers are financially dis-incentivised.

Shane Colclough

Panel 3

Friday 22nd January 2020
1.30pm – 3.30pm

Policy, Politics and Agency 2

Chair: Dr David Coyles

Dr Ayoola + Amira Osman Akure, Nigeria + Pretoria, South Africa), Spatial Dimensions of Poverty in residential neighbourhoods

Gareth Brennan (Dublin, Ireland), Marino

Jack Lehane (Cork, Ireland), Towards post-occupancy applications for international participant based live projects

Shane Sugrue (Cambridge, England), Speculating on the New World City: from coercion to curation in Brisbane's West Village

Weiqi Chu (Ohio, U.S.), Discover the Power of Government: Capital Model Prison

Tebogo Ramatlo + Dr Alona Martinez Perez (Johannesburg, S Africa), Periphery

Spatial Dimensions of Poverty in Residential Neighbourhoods

An important type of neighbourhood for which a lot of information and understanding is often required is the poor urban neighbourhood. The global assessment of poor residential settlements undertaken by the UN-HABITAT shows that 828 million or 33% of the urban population of developing countries in Africa resides in slums. Such large concentrations of places in which inhabitants live in inequitable and life-threatening conditions impose enormous burden on government and the residents. Although physical conditions are the most visible dimensions of poverty, they are rarely used in explanatory theories of poverty and they neither form the basis of most theory of poverty. It is therefore necessary to account for how and which physical factors contribute to making the neighbourhood poor.

It is assumed that the physical characteristics of poor residential neighbourhoods are known and well studied in the literature on slums, (e.g. overcrowding, inadequate water supply, poor quality housing, no infrastructure, insecure tenure and obsolescence). However, the physical characteristics of poor neighbourhoods vary from context (place to place). Different qualities or characteristics define neighbourhoods in each place. Poor neighbourhoods in a city like South Africa or Nigeria and other parts of Africa cannot be likened to squatter settlements or slums as found in the inner cities in Europe or Latin American countries Information is therefore needed on the spatial dimensions of poverty in Africa, to formulate policies and developmental strategies in cities, especially residential neighbourhoods which form the bulk of cities. This study of poor neighbourhoods will provide empirical facts on the physical dimensions of poverty and necessary information on the extent, location, and conditions of poverty in two selected poor neighbourhoods in South Africa and Nigeria. The research will give recommendations that will help generate a city poverty profile that policymakers and government can use in answering questions about urban poverty and to identify appropriate responses.

Dr Ayoola, Amira Osman Akure

AIARG 2021 Ulster University Belfast

Marino

Marino, a suburb less than 3kms from Dublin City centre dates from the 1920's. The design followed the principles of the Garden City movement, as a reaction against the smoke-ridden industrial cities of the Victorian era.

Marino consists of circa 1300 houses, each with their own front & rear gardens. The "estate" is considered a maze by taxi and delivery-drivers unfamiliar with the area – like the Labyrinth, unless they tie a string to the entrance, they often find it hard to get out.

The shared and semi-public spaces of Marino have changed over time. Railings have been removed in many cases to be replaced by walls and hedges, appropriating front gardens and heightening the distinction between public and private. Front gardens have been under-used, other than to provide parking for residents' cars.

The proximity of the suburb to the city has made it a rat-run – both vehicular and bicycle traffic cutting through to avoid bottlenecks – the new bus-connects also proposes a designated bicycle route through Marino to allow busses move more freely along the main routes into the City.

However, Covid has changed the nature of how space in Marino is used. Front gardens have become more valued as residents, confined to their homes or their locality, have taken once more to sitting in their gardens to engage with their neighbours. There exists also an ongoing tension between residents and commuters, as the area has become increasingly populated with young children playing in the streets due to demographic changes over the past decade.

The shared spaces of Marino, a wonderfully considered estate in its original conception, need to be re-evaluated and re-imagined. As it nears its' centenary in the next 5 years, and in a post-Covid world, it seems appropriate to examine what has gone before and what could follow.

Gareth Brennan

Actions and Intentions: In Pursuit of Post-Occupancy Applications for Volunteer-Based Live Projects

International volunteer-based live projects, whereby architecture students are invited to participate in live projects abroad independent of university course structures, serve as representations of new emerging spatial agencies for architecture and education. However, due to the periodic and decentralised nature of these independent initiatives, there is limited understanding of the live projects' extended impacts on both the participants and the communities involved. In response to this knowledge gap which is identified as a barrier to the development of these live projects, this paper refers to post-occupancy evaluation (POE) practice; a device for offering formal insight into underrepresented temporal spaces. This paper reviews extant literature to establish POE's base rationale as understood through its formal historical roots, and charts relevances for its application in emerging architectural contexts; specifically volunteer-based live project education.

Following three diverse case study placements in Lebanon, Fiji and Nepal, the author contextualises these relevances against ongoing post-occupancy evaluation study of these projects. Progress in the study thus far is presented amidst continued remote data collection in the context of the pandemic. Significantly, this lays the groundwork for improving current applications of POE, towards future evaluation of volunteer-based live projects to inform organisations and communities alike.

Jack Lehane

Speculating on the New World City: from coercion to curation in Brisbane's West Village

This paper presents a case study of West Village, a controversial urban renewal scheme in Meanjin (Brisbane), state capital of Queensland, Australia. Brisbane has undergone a transformation in recent decades, with a proliferation of monumental developments and major events heralding the city's self-declared transition from 'big country town' to New World City. Critics claim that the New World City brand promotes a sanitised vision of Brisbane that overlooks important aspects of its history and culture, evoking a continuing project of colonial dispossession, while proponents welcome it as a departure from a dark, parochial past. This paper argues that the brand not only fuels gentrification and displacement but also poses a fundamental threat to democracy, suppressing divergent narratives of place by supplanting the discursive relations of the public sphere with the market relations of global finance. As in many contemporary cities, policy-makers in Brisbane encourage participation in a variety of forms as a means of involving citizens in shaping the urban environment. Community consultation and socially engaged art programmes are frequently prescribed elements in the planning process. However, these superficially empowering initiatives often serve to reproduce and reinforce the inequalities against which they are promoted, aiding the expansion of the property market and extending administrative control. Illustrating how such 'administered participation' emerges through the planning instruments and cultural policies of the New World City, the West Village story reveals an unsettling trend toward authoritarian governance set against a backdrop of Queensland's globally significant environmental disputes. This is facilitated – inadvertently or otherwise – by design professionals, whose aesthetic expertise helps to gloss the censorship of public discourse through a careful curation of public space. It is a case study of unshared ground in which critical voices are silenced in pursuit of a destructive economic consensus, calling attention to the political responsibilities of design expertise. This paper is conceived on unceded Jagera and Turrbal Countries. I acknowledge the traditionalowners of these lands, their elders past, present and emerging.

Shane Sugrue

Discover the Power of Government Tool-Uncover the History of the Capital Model Prison

The Beijing Prison, which is also known as the Capital Model Prison, was China's first new-style prison, and it functioned as a model of national prison reform after the Republic of China was established in 1912. Before it was built, China's prisons were generally viewed as places of punishment.

However, the new style prison sought to indoctrinate prisoners and it also allowed them to remain in contact with the outside world to some extent. In building the prison, the new government introduced new architectural
layouts, which incorporated European architectural features while retaining the characteristics of Chinese architecture. The Qing government built this prison to perpetuate its class rule, but the Republic of China government refined and adapted it with the intention of popularizing politics. It was a tool of the dictatorship, and therefore always worked in the service of the ruling class, although this did not necessarily rule out the possibility it could contribute to political and historical change. This research explores why this prison was built and the purposes it was intended to serve. It also considers its spatial layout, impact on society and culture and potential to serve as a model for a new generation of prisons in China. In particular, it shows how the establishment of Beijing Prison enabled the government to popularize new ideas in different periods: this highlights the prison's influence on society and culture, and underlines its exemplary symbolic significance.

Weiqi Chu

Periphery

This paper interrogates the existing spatial realities of Johannesburg as it was shaped by colonialism and how it may evolve in the future. Johannesburg is a major urban centre in South Africa and the Southern Region of Africa with increasing economic and spatial inequality. The thesis is premised on an understanding that economic inequality is related to spatial inequality. The planning of colonial cities, especially Johannesburg was based on achieving maximum control. The urban morphology was many times based on policies that organised people through race, class, and ethnicity. Its spatial planning was defined by separating citizens into different racial groups and economic classes. The rich white people located in the suburbs in the center and the poor black people located in townships at the periphery separated by wide natural and man-made buffers in-between. Living in Soweto short for (South Western Township) far from the city center was, and still is, frustrating. Growing up in the township has increased my awareness about the challenges of housing, economic development and social integration of townships and the city. I used to question why everything in Soweto was inadequate, vulnerable and "exposed". The limited personal spaces meant a lack of privacy. The small size and scale of the township houses meant that, as I child, I spent much of my time in the streets. The township houses werereferred to as NE51/9 (non- European housing designed in 1951,version 9).

The study will look at the various challenges faced by Johannesburg in relation to other cities in Africa and Europe based in the centre, thein-between and the periphery in terms of systems of governance and policies, and how they affect the diverse stakeholders in the built environment, those being government agencies, private sector, communities and individuals from the macro to micro level. The papers intention is to address the fragmentation and segregation caused by the inherited spatial structures. This will be done by studying the existing conditions and adopted strategies towards housing, employment opportunities, transport and public space. The inherited spatial realities are still evident today; these structural realities are restrictive, unsustainable, and disadvantage communities ecologically, economically and socially. The urban morphology of Johannesburg will be studied with a comparison analysis with other local and an international city which have similar patterns of spatial fragmentation in urban form due to colonial powers. The aim is to observe, compare and propose a defragmentation process towards the transformation of Johannesburg.

Tebogo Ramatlo + Dr Alona Martinez Perez

Panel 4

Friday 22nd January 2020
1.30pm – 3.30pm

Materials, Means and Media

Chair: Paul Clarke

Jake Malone (Dublin, Ireland), The Rudimentary Wall

Mark Shiel (London), RTÉ television centre in the organisational complex in 1960s Dublin

Patrick Brennan (Dublin, Ireland), Br1cks and M0rtar

Ryan Johnston (Belfast, Ireland), Digital Twins

Sarah Mannion (Dublin, Ireland), Interpreting Ground

The Rudimentary Wall

The rudimentary Wall is cast with the capacity for acting both the protagonist and antagonist in any urban drama. By default, Wall inevitably plays the noble defender of privatization; perpetual delineator of us and them, mine and yours, East and West. Despite our most optimistic projections of virtual Wall's character, reality Wall performs the last laugh as social choreographer. The architect, seeing him/herself as the casting agent of such plays, often attempts to give Wall a benign presence. However, Wall has its own ontology which, unless conceived for an empathetic urbanism, will only resort to that default role.

This paper examines how in the context of collective-housing models of the future, the balance of privacy and propinquity can be managed by an architecture of depth rather than division. By obscuring the dualities of object/subject and actor/observer, this challenges the notion of enclosure translating to exclusion. As noted by Heidegger (1954), 'a boundary is not that at which something stops but is that from which something begins its presencing'. Our experience of the built environment need not be based purely on the limitations of walls, but also on their potential for threshold spaces.

Intramural spaces are ambiguous domains by nature, and as such are neither quite of the interior nor the exterior. It is this 'conversational zone' (Meisenheimer, 1984) similar to Hejduk's 'neutral condition', where the most dramatic dialogue of interiors and exteriors can occur. The indeterminate void between 'die Wand' & 'die Mauer' is where there is the most potential for wonder (Weithal, 2011). In this instance, the 'poche' can directly translate as 'pockets' rather than solid mass. A semi-veiled double skin can create an internalized portico allowing a blurring of the public and private realm, facilitating better human engagement and scripting a more meaningful role for Wall.

Jake Malone

"RTÉ Television Centre and the 'organizational complex' in 1960s Dublin"

In this paper, I will outline a new analysis of the RTÉ Television Centre at Donnybrook in the southern inner suburbs of Dublin, which positions the Centre in architectural, urban, and media history alike, and in international comparative terms. Headquarters of Ireland's national broadcaster, and designed by Ronald Tallon, the Centre is an exemplar of high modernist architecture in Ireland, and was one of the first such buildings in Dublin, where it played a key role in the modernity and suburbanization of the city in the 1960s. For these reasons, the Centre has been frequently characterized in utopian terms in Ireland, though it has yet to be documented and studied in the detail it deserves. Presenting a slice of that larger project in this paper, I will interpret the site in relation to international (and especially American) trends in media and the built environment after World War Two. On the one hand, the Centre bears a strong resemblance to what Reinhold Martin identifies as "the organizational complex", a new blend of architecture, media, and corporate space for a postindustrial society "immersed in and constructed by data flows" – for example, the work of Eero Saarinen or Skidmore, Owings, and Merrill (SOM). On the other hand, drawing on the work of Lynn Spigel, I compare and contrast the Centre with CBS Television City in Los Angeles, an even more famous paradigm of modernist media architecture, but located in the very different architectural environment and geography of Southern California. Such reference points enable us to better assess the degree of innovation of RTÉ Television Centre, while recognizing its specificity – for example, much RTÉ television programming of the 1960s shows that Ireland was a much more rural society and relatively underdeveloped, at least by modernist criteria. In this way, I hope to argue in favor of approaches to architectural research which give due prominence to questions of media and representation, and which extrapolate from local contexts and issues to global ones.

Dr Mark Shiel

Br1cks and M0rtar

In Alan Butler's essay, 'The Real Implications of Virtual Worlds', Butler charts the very physical manifestations created by the production of seemingly incorporeal digital worlds and argues for the legitimacy of these digital worlds, citing their ability to offer "new modes of living, economies, and human experience".

Question; as these virtual worlds expand and evolve into a void left by the contraction of our physical environments and the ontological differences between the physical and the digital blur, what can the architects role be in going beyond the mere material implications of these virtual environments and becoming concerned with how these digital spaces are produced, experienced and shared?

This paper first describes the ways in which architectural knowledge has already been applied to the production of digital space, for numerous ends. This can be seen in singularly experienced video games like 'The Witness', where the architects input served to add to the believability of the spaces and their constructional and contextual histories. While in the VR experience 'I Am A Man', Derek Ham uses his spatial literacy and its emotive dimension in aid of a narrative describing the African American Civil Rights movement.

The differences in how digital environments and our physical built environments are designed and produced is then explored, investigating what is gained and lost in the translation of the 'physical' to the 'digital' and the possibilities for new types of interaction and new spatial relations that subvert Euclidean space, citing experiences like 'Portal', 'Superliminal' and 'AntiChamber'.

The paper concludes with a discussion on the very real social component to digital experiences and asks if the architect is well equipped to design spaces conducive to these different types of interaction and developing a new concept for shared space in these new spatial frontiers.

Patrick Brennan

Digital Twins

This paper explores the creation of 3d Digital Twin's for Connected & Autonomous Vehicles within an urban context. Using Geo science techniques for data conversion from vector format (in this case high density points) to raster format (pixels in an image), known as rasterization. Based on researchconducted by Connected Places Catapult via the Innovate UK Human Drive project.

Digital Twins can refer to virtual replicas of different aspects depending on the industry. For example, in Automotive it may refer to a car, in financial services it could refer to a person. The built environment sector considers it a 3-dimensional model of a real-world feature such as a building or bridge. Often connected with contextual information about the building such as name, address, or estimated energy usage. Brining it under the terms BIM (Building Information Modelling) (Better Information Management) or GeoBIM (BIM with a focus on both the asset and surrounding geography)

The creation of these modelsisstill a pain point that isshared by many industries including the billiondollar gaming industry. That has many tools to visualize and support simulation, but previously lacked extensive surveying capabilities often siloed within geo technical disciplines. The creative engines that drive many modern games through years of development and billions of investments, have delivered some of the most advanced and low-cost entry points to simulation and advanced customizable 3d visualization.

The methods explored in this paper use a multi-disciplinary approach from GIS, 3d modelling and game design to create 'accurate' Digital Twins more efficiently than the industry standard manual approach. It is hoped lessons from this paper will spark ideas from highlighting the potential of creative engines as tools for the architectural industry. To engage across industries and visualize complex problems such as new intelligent mobility solutions and Zero Emission targets.

Ryan Johnston

Interpreting Ground

This research will position the theme of 'Sharing Ground: Propinquity' in relation to architecture through the discipline's close association with the imagination. Interpreting 'ground' in this context as a concept with both tangible and intangible aspects, the capacity of the imagination as a place-making tool will be assessed in both senses of the term.

This stance will acknowledge how, in one way, 'ground' can be taken to represent tangible physical, virtual, or fictional places that can be shared in the most real sense possible – where people gain shared experiences through being in the same places, or through the consumption of common literature, images, games, and so forth. It will examine the role of the imagination in creating a sense of nearness, commonality or familiarity in the process and outputs of place-making, delving into other relevant disciplines to draw out this meaning: considering what various creative fields, including architecture, can contribute to each other through their processes, products and commonalities.

Further to this interpretation, 'ground' in its other sense will be taken to mean that which has already been 'covered' in each distinct discipline – intangible skills, knowledge and experience (particularly in relation toimaginative thinking) that are integral to certain disciplines, and yet are novel for, and can be useful to, other disciplines. This interpretation of the term will be examined with a view that practitioners of those disciplines considered in this research could potentially, by sharing (with others) ground already covered, enhance one another's disparate processes of creativity, and could perhaps adapt parts of those processes into their own practices.

This research position could encourage the use of mechanisms from those various forms of artistic expression considered to articulate and analyse its assertions, contextualised by select examples of place-making, with the possibility of expressing these at the conference through a medium such as experimental drawing, to accompany a presentation.

Sarah Mannion

Panel 5

Friday 22nd January 2020
3.30pm – 5.30pm

Education as Environment

Chair: Dr Martina Murphy

Courtney McIlkenny + Dr M Murphy (Belfast, Ireland), The Vertical Studio: reimagining propinquity

Hirbod Norouzianpour (New Mexico, U.S.), Integrating Service-Learning Method into the curriculum of U.S. Architecture Schools

Saiful Fazli Ramli +Dr Ibrahim Motawa (Glasgow, Scotland), HBIM Preventive Conservation Framework for historic timber buildings in Malaysia

Sarah Mulrooney, Amy Mc Keogh, Niall Smith, Alan Giltinan, James Pearce, Laura Hurley, Aoife Browne, Kieran Ruane, Caroline Akiboye, Simon Conolly, Maroun Tabbal (Cork, Ireland), Making Design POP

Dougal Sheridan + Deirdre McMenamin (Berlin, Germany), Reflections on collaborative configurations

Dr Silpa Singarajwarapan + Dr Ibrahim Motawa (Glasgow), BIM-based Building Code Compliance Systems

The Vertical Studio: Re-imagining propinquity in architectural education

Historically, architectural education was based on a collective group structure wherein the 'expert' trains the apprentice in all aspects of design; practical and theoretical. This remained the established approach supporting many seminal influences of the early 20th century such as Bauhaus. The subject of architecture has the mandate to involve itself in many societal aspects such as sociology, history, business, style, craft etc and, as such, collaborative peer-to-peer engagement is an imperative in developing close and necessary relationships to establish and enhance thinking.

More latterly a level of comfort has been induced by teaching through a level segregated curricular which has seen the separation of critical aspects of the subject, such as history and theory or environment aspects, into taught modules distinct from the studio with an emphasis on competition and the individual project been valued over cooperation. There is an imperative to re-imagine architectural education to reflect the changing industry it ultimately operates within. This combined with the challenges of teaching the subject in a pandemic environment further obscures the path of rediscovering the benefits of nearness and interdependency.This paper proposes that collaboration and a return to propinquity of learning and relationships is being recreated in architectural education through the vertical teaching pedagogy. A pedagogy which comprises multi-year group teaching with the same studio master in which students of mixed-age or skill level are taught together, embracing collaboration and working towards similar and convergent goals.

It is proposed that the architecture studio holds the potential to be an empowering learning experience nerved by the constant nearness of peers and tutors. Such an environment nurtures and develops the students cognitive thinking, promoting professional skills to comprehend, process and apply information. Such ambition is further driven by the demands of an industry which seeks greater collaboration through physical nearness of the project team.

The aim of this paper is to review the literature around vertical studio learning and collaborative working. The paper will consider the concept of propinquity in terms of enhancing student learning through engagement, socialisation, collaboration and professionalism. Limitations of the pedagogy will be considered as well as suggestions on how these can be addressed in new and dynamic contexts.

Miss Courtney McIlkenny and Dr Martina Murphy

Integrating Service-Learning (SL) method to the curriculum of the United States Architecture Schools

Many academic institutions are promoting "Service learning" or "engaged pedagogy", especially in the courses related to public services and health as an alternative to the traditional pedagogy methods. The service-learning goal is educating students on a specific topic that is related to their major by giving services to communities. Although communities would be benefited, the service that they are receiving is not the main focus of these engagements. This kind of education can improve the different students' skill sets (both hard and soft skills), make them expose them to the real problems that they might face in the profession, and give them profound knowledge about the course.

However, this approach can be challenging for students, instructors, and communities to adopt due to the nature of it and being new, relativity. In this paper, the author is going to discuss the baseline theories and challenges based on the United States' Architecture education system. In the next phase, the author is going to review the challenges that traditional architecture courses and curriculum are facing for adopting service-learning. By understanding the theory behind service-learning, and base on the challenges that architecture education and profession are facing in the United States, the author is trying to classify architecture courses regarding those types. As a result, the practical techniques, and structure for developing a syllabus, base on the nature of those courses, are going to be explained.

Hirbod Norouzianpour

HBIM Preventive Conservation Framework for Historic Timber Buildings in Malaysia

Many historic timber buildings stay in poor conditions with indications of critical building defects due to unsatisfactory conservation management. Over the last decade, the Malaysian Government has spent approximately £68 million on conserving historic buildings. However, it has been observed that buildings continue to deteriorate. The basis of historic building conservation particularly in timber materials is established by legislation through regular inspections and documentation. In addition, the current Covid-19 outbreak and the pandemic subsequent lockdowns have affected all industries including Architecture-Engineering-Construction (AEC) industry and have changed the way that works on reactive maintenance for historic buildings can be conducted. To address the issues and with the current innovations, integrated H-BIM models with related conservation works (such as scheduling and documentation) and new normal environment working place are proposed to improve maintenance practices. This research aims to develop preventive conservation framework for historic timber buildings integrated with H-BIM process. This paper reviews the character and challenges of historic timber buildings in South-East Asia (SEA) and in Malaysia as a case study. The paper also investigates the potentials of H-BIM approaches for monitoring service life of timber material on historic timber building conservation projects. The outcomes of the research intend to establish new methodology for preventive conservation, understanding the character and service life of timber materials, and introducing H-BIM framework for historic building conservation in Malaysia.

Saiful Fazli Ramli, Ibrahim Motawa
and Cristina Gonzalez-Longo

Making Design POP

"It's good to learn together, and lessons learned with comrades in adversity, sear you for life."[1]

In early Summer 2020, the head of Blackrock Castle Observatory (BCO), CIT, met with the organiser of the Design POP festival to discuss a pavilion design. BCO approached the Cork Centre for Architectural Education (CCAE, CIT & UCC) as pavilion designers and a multi-disciplinary collaborative team was created. This paper presents multiple voices from the newly formed community of practice.

Two CCAE students received CIT scholarships to design the pavilion with the support of CCAE, BCO and Design POP. The overall programme was set at eight-weeks from design to completion. Working remotely, the student designers came up with a concept of entropy. The designers proposed a pavilion that would be populated with exhibits by the greater community of artists and architects and celebrate outer space and science.

With permission and support from CIT and UCC, the team was the first to use the CCAE workshop since the lockdown. The designers had the inputs from the workshop coordinator, a structural engineer and practising architects with experience in experimental structures. Prototypes were tested in the workshop before mass production began. For the final two weeks of the project, the team had access to a warehouse in the Cork Docklands. The warehouse, a vast structure, enabled social distancing while engendering a feeling of optimism and camaraderie within the shared project. A team of volunteers, including family and friends of the designers, came on board to work on the prefabrication of elements of the display system.

Although the Design POP 2020 festival was cancelled due to government restrictions, the project has been adapted and installed at BCO and will be part of their newly opened exhibition space and Design POP 2021. The team that was established continues to work together to further their shared interests.

Contributors to this paper: Amy Mc Keogh, Design POP Festival Organiser. Niall Smith and Alan Giltinan, Blackrock Castle Observatory, CIT. James Pearce, CCAE student and Laura Hurley, CCAE graduate. Aoife Browne, CCAE Workshop. Kieran Ruane, Structural Engineer, CIT. Caroline Akiboye, Simon Conolly, Maroun Tabbal and Sarah Mulrooney, CCAE Staff.

[1] Denise Scott Brown, "Learning the Wrong Lessons from the Beaux-Arts" in AD Profiles 17: The Beaux-Arts (London, 1979), p.32. Quoted in Richard W. Hayes, The Yale Building Project: The First 40 Years (New Haven Yale University Press, 2007), p. 21.

Reflections on Collaborative Configurations

This paper reflects on the social-spatial configuration - the propinquity- of 3 participatory summer school projects involving the collaborative construction of 3 distinct artefacts; a bridge, a tapestry and a pavilion. In the Seasonal Bridge, an incremental system of construction was developed from small additive constructional elements that required the makers to take immediate design responsibility in response to surroundings and ground conditions and mico-compositional considerations. In the Workhouse 'Mapestry', collective mapping and stitching processes were the methodological techniques utilized in the creation of a 6m2 textile artifact. The size allowed a conversational scale of co-production - the register of many hands and thoughts.The Summer School for Skopje University in North Macedonia involved the collective mapping of spatial configurations and informal environments in the remote village of Lazaropole, and the collaborative construction of a new public pavilion from elements constructed individually by participants and with a collective drawing as a canopy.

These projects allow a reflection on the nature of collaboration, and in particular how collaboration is itself a configured act. Each project involved the task of realising an artefact within the limits of the time period, materials and resources available, location, weather, social cohesiveness etc. The dynamic involves a shared uncertainty and suspension of what the end result will be, followed, through its realisation, by collective exultation with the discovery of the final form. It is argued that this suspension, in tension with the collective ambition to produce an outcome, is key to the collaborative act. In this way the collaborative process might be thought of as analogous to the concept of 'serious play' in the Platonic dialogues, the original philosophical exchange. In 'serious play', an agreement to postpone forming opinions and making decisions 'grants the interlocutors a freedom to explore ideas and arguments wherever they might lead without forcing those arguments to serve a predetermined outcome'. (Kidder, 2011:06) However, in sustaining this suspension, at what point do limits and necessity create the proximity – the propinquity - that is central to generating the collaborative act? In their heterotopian nature, summer schools allow a playful exploration of the tensions between suspension, necessity and propinquity, and are thus an ideal laboratory for testing
collaboratory processes.

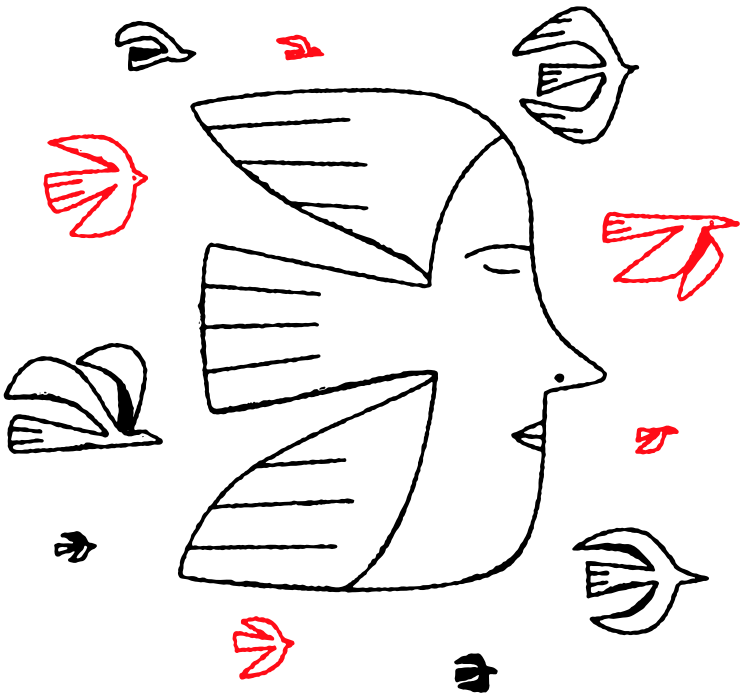
Dougal Sheridan + Deirdre McMenamin

BIM-based Building Code Compliance Checking Systems

Building designs are usually checked against a frequently changing and increasingly complex set of building code and regulations. Manual code checking used to be the major task for both designers and enforcers, often leading to ambiguity, inconsistency in assessments and delays in the overall construction process. With the advanced technical capabilities provided by Building Information Modelling (BIM) systems, the potential for new generations of BIM based automated code checking tools has been gaining attention by the building industry to improve the efficiency of building design and procurement. As manual checking of building designs for compliance against building codes is complex and prone to human error with significant cost implications, it is surmised that these BIM-based Building Code Compliance Checking System or BIM-based Model Checking (BCM) would not only prove beneficial to designers but also to building certifiers, consultants, building code authorities, specification writers and builders. Ongoing research within the Architecture, Engineering, and Construction (AEC) industry and academic institutions have since produced many pilot prototypes and even commercialised BIM-based Building Code Compliance Checking Systems. This paper aims to provide an overview of the current BCM landscape within the AEC industry. The paper will review examples of BIM-based Building Code Compliance Checking Systems in research and in practical use, at many levels of maturity from conceptual idea to functional commercial BCM system. The paper will identify current research gaps and limitations, interpreting cause and effects of the issues culminating in suggestion of key opportunities and potentials for future development in this area of research.

Silpa Singharajwarapan, Ibrahim Motawa
and Cristina Gonzalez-Longo

AIARG 2021 Ulster University Belfast



Pentagram's interpretation of Michael Sorkin's
'Two Hundred Fifty Things an Architect Should Know' (Credit Pentagram)