UTOPIA COMPUTER

The „New" in Architecture?

6th Forum
Architekturwissenschaft

Place
Berlin University of the Arts
Hardenbergstaße 33, Room 102

Date
15th – 16th of November 2019

Juan Almarza Anwandter, Pablo Miranda Carranza
Cezara Nicola, Joseph L. Clarke
Hélène Frichot, Grayson Daniel Bailey
Marcus Bernardo, Gregory Elias Cartelli
Nathalie Kerschen, Teresa Fankhänel
Klaus Platzgummer, Emilio Ennio Vita
Erik Herrmann, Donal Lally, Carmen K. M. Lam

The critical concern of the workshop "Utopia Computer" is the euphoria, expectation and hope inspired by the introduction of computers within architecture in the early digital age. With the advent of the personal computer and the launch of the Internet in the 1990s, utopian ideals found in architectural discourse from the 1960s were revisited and adjusted to the specific characteristics of digital media. Buckminster Fuller's World Game, Gordon Pask's belief in an architecture that can learn via feedback loops, and Frei Otto's form-finding experiments bore witness to concepts of participatory planning procedures and self-optimising design processes. These ideas gathered momentum in the 1990s: virtual spaces were explored as potential sites for generating collective and interactive urban solutions, and algorithm-based computer software fostered the notion of a self-organising architecture. At the same time, technological developments that influenced architectural practice at the turn of the millennium were part of neoliberal shifts in politics and the economy. Scenarios of all-encompassing surveillance and the commercial use of private data, as well as social injustices resulting from free-market economic practices, thus beg the question, have dystopian narratives replaced utopian ones? Taking the 1990s discourse as a starting point, the workshop seeks to explore in what ways utopian ideas from the 1960s have impacted today's digital culture by addressing the following topics:

Subjects and Societies
explores the effects of digital technology on social actors who interact with architecture.

Organism and Organisation
focuses on the assumed and actual changes in design due to digitalisation, especially with regard to natural growth processes.

Data and Form
looks at how digital tools transform architectural design by processing large amounts of data.

Friday
November 15, 2019

PROGRAM

Session   Subjects and Societies

2:00 pm   Introduction - Welcome

2:30 pm   About the Role of Digital
                        Technologies in the Modelling
                        of Contemporary Architectural
                        Experience
                        Juan Almarza Anwandter

3.00 pm   Diagrams of Rationality:
                        Christopher Alexander and the
                        Automation of Design
                        Pablo Miranda Carranza

3:30 pm   - Coffee Break -

4:00 pm   Virtual Artistic Spaces: Roy
                        Ascott's LPDT2, Cybernetics and
                        Beyond
                        Cezara Nicola

4:30 pm   The Art of Work: From Büroland-
                        schaft to Computational Design
                        Joseph L. Clarke

5:00 pm   Panel Discussion

5:30 pm   - Break -

7:00 pm   Dirty Theory for a New
                        Materialism: From Gilles
                        Deleuze to Jennifer Bloomer
                        Hélène Frichot

8:00 pm   - Dinner -

PROGRAM

Organism and Organization   Session II   Session III   Data and Form

Organism and Organization	Session II	Session III	Data and Form
Prerequisites for Self-Organization: the Reemergence of Colin Ward Grayson Daniel Bailey	9:30 am	1:30 pm	The Architecture Machine. The Role of Computers in Architecture Teresa Fankhänel
Unmanageable Utopias: Analogic Cybernetics Aided Self-Organized-Settlements Marcus Bernardo	10:00 am	2:00 pm	Code and Notation: Considerations on the Mediality of Architectural Drawings Klaus Platzgummer
- Coffee Break -	10:30 am	2:30 pm	Cognitive Prosthesis, Time, Fractals Emilio Ennio Vita
Manipulating Fabrics: The Language Between Organism and Organization, 1956-1962 Gregory Elias Cartelli	11:00 am	3:00 pm	First Panel Discussion
		3:30 pm	- Coffee Break -
Towards a New Understanding of the Animal Nathalie Kerschen	11:30 am	4:00 pm	Houses of Ice. From Raster Utopias to the Discrete Movement Erik Herrmann
Panel Discussion	12:00 am		
- Lunch Break -	12:30 am	4:30 pm	Vestal Fire: Artificial Intelligence, Data Centres and Dirty Matter Donal Lally
		5:00 pm	Models, Statistics, Inscriptions - Tracing the Transformation of Architectural Positions in the Ekistics Carmen K.M. Lam
		5:30 pm	Second Panel Discussion
		6:00 pm	Closing Remarks

ABSTRACTS

About the Role of Digital Technologies in the Modelling of Contemporary Architectural Experience

Juan Almarza Anwandter
(TU Berlin)

"All our lives today are somehow regulated through digital media. So it's absolutely crucial who controls this digital media. This is the greatest threat to our freedom […] We are not even aware of it as we don't experience it as unfreedom. It's not like the old days of the police state, where you look over your shoulder and see a man following you. You feel totally free, but your every move is registered and you're subtly manipulated." (Slavoj Žižek)

This rather disenchanted statement by Žižek points to an essential fact, which might temper our fascination with digital technologies. In the field of architecture, the incorporation of such technologies in the form of real-time responsive models, the internet of things, augmented reality, domotics and so on, constitute an undeniable expansion of our traditional phenomenological conception of "architectural experience", and as such, they raise expectations and fuel our imagination with renewed utopian scenarios. Nevertheless, a critical and informed theoretical approach on the subject requires that we take into consideration all the implications of this process, in social, political and cultural terms. Since the 1990s, the increasing digitalization of architectural experience has implied the consolidation of key-words such

as interaction, accessibility, customisation, etc., all framed within a model of ludic-sensorial experience with an overall "haptic-performative" orientation. Inhabitants become performers of customized scenarios. The traditional phenomenological discourse, as developed by Norberg-Schulz (based on the pre-eminence of an optical relationship with space, and a clear distinction between perceiving subject and perceived object), is thus challenged and inverted in its foundational premises: the once all-perceiving subject becomes objectified by an "all-perceiving architecture".

In order to tackle this paradigmatic shift from a theoretical perspective, the present investigation unfolds in four convergent topics of analysis:

▪ The historical consolidation of the displacement from titanic to daimonic forms of technology (analogue-digital, respectively), and the consequent "invisibilisation" of its material substratum.

▪ The blurring of the limits between perceptual categories such as subject-object / reality-illusion / proximity-distance.

▪ The notion of a protocol of interaction as an invisible

"layer of control" incorporated within the new models of architectural experience mediated by digital technologies, and its concrete impact on freedom and self-determination.

▪ The utopia of self-organization, understood as a "narrative of validation" of the digitalization process, (akin to the notion of self-regulation implicit in the liberal capitalistic model), critically confronted with the reality of its implementation and its relationship with coercive forms of social control, censorship, etc.

Based on relevant case studies taken from contemporary architectural practices, the presentation will briefly expose these four points through their formal and theoretical implications in order to establish a conceptual cross-link with a wider trans-disciplinary spectrum.

(Dipl.-Ing.) graduated as an architect from Universidad Católica de Valparaíso, Chile (1997) and holds a master's degree in Arts Theory and History from Universidad de Chile (2014). Since 2000, alongside his professional activities, he has developed his academic career as a professor of architectural design and theory at different Chilean universities, focusing primarily on the fields of aesthetics, semiotics, phenomenology and critical theory. Currently he is member of the board of directors of Netzwerk Architekturwissenschaft, DAAD-fellow and PhD candidate in the department of Architectural Theory at TU Berlin, working on the dissertation "Nietzsche and the language of Grand Style: towards an architectural interpretation".

Diagrams of Rationality: Christopher Alexander and the Automation of Design

Pablo Miranda Carranza
(KTH Stockholm)

In 1965 Christopher Alexander published the article "The Question of Computers in Design", describing the potential use of computers in architecture. Computers, he wrote, should be considered "a huge army of clerks, equipped with rule books, pencil and paper, all stupid and entirely without initiative, but able to follow exactly millions of precisely defined operations." The previous year Alexander had published his doctoral research, "Notes on the Synthesis of Form", in which he discussed how this "army of clerks" would be indispensable in digitally remediating modern design's methodological shortcomings.

Alexander's simile effectively summarised the historical reorganizations of intellectual labour that, beginning in the nineteenth century with de Prony and Babbage's application of Adam Smith's principle of division of labour to produce mathematical tables, led to the technical concretisation of this same principle in the digital computers of the 1940s. Historically this process involved the analysis of an increasing number of intellectual activities and their fragmentation into menial tasks that could be carried out by unskilled workers and clerks, and eventually mechanised. This sort of Taylorist intelligence became embodied in the computer during the postwar period, but also in the arguments, methods and algorithms in the field of operations research (OR), the source of Alexander's own problematisation of architecture and design.

Thus what Alexander's "armies of clerks" heralded was not just a remedy to a design process that had grown too complex for the limited cognition and bounded rationality of human individuals, but the final disintegration of the figure of the humanist architect, shaped by the institutions typical of Foucault's disciplinary societies, into the numerically modulated, "dividual" subjectivities of Deleuze's societies of control. In the process, modes of subjectivation and enunciation considered exclusive to human individuals (a restriction central to the discipline of architecture) were assimilated into the technological assemblies of computation, redistributed as mechanical procedures, specialised tasks, and new, lean organizational structures.

Using methodologies similar to critical code studies, I propose in this presentation a close reading of the algorithms and diagrams implemented by Alexander in the HIDECS 2 program and used in "Notes". Written in the then recently developed FORTRAN Assembly Program language, its code is a record of how discourses of complexity, efficiency and specialisation were inscribed in architectural software from the start, covertly challenging concepts fundamental to architecture.

is a researcher at the KTH School of Architecture in Stockholm. His work critically and historically problematises architecture's relationship to its technologies of representation in the light of the recent digitalization of the architectural design process. Miranda Carranza's work includes written texts but also programs in languages ranging from assembly to C++ or Python, and their incorporation into architectural installations and visualisation software.

Virtual Artistic Spaces: Roy Ascott's LPDT2, Cybernetics and Beyond

Cezara Nicola
(University of Bucharest)

"As the century advances, the paradigmatic change in architecture will be registered at the level of behaviour rather than form." (Roy Ascott, "Beyond Boundaries")

In 2010, British artist and theorist Roy Ascott filmed an artistic experiment at the University of Applied Fine Arts in Vienna, Austria. Reconceptualising an older work overlapping text from various human storytellers, he added non-organic communication sources in order to achieve a type of textual architecture that was able to animate the virtual spaces of the online platform Second Life. Essentially considered an artistic endeavour, "La plissure du texte 2" (LPDT2) is a unique artefact not necessarily because of the popular but perhaps now outdated – in terms of digital technology – platform that supports it, but because of the interaction between the avatars and the spaces that surround them.

This presentation examines a seminal cybernetic artwork that integrates aesthetic and architectural principles, as well as digital technology. It further attempts to clarify why LPDT2 has been regarded as more than a mere new media artefact, like Ascott's initial 1983 work. Concepts related to cybernetic art such as cyberception, cyberscapes and moistmedia will be discussed in order to highlight the potential of development that owes its evolution to human sources as well as "bot" entities.

Exploring virtual spaces through what Ascott calls "distributed authorship", LPDT2 draws attention to a series of aspects that hint at the potential of the collaboration between entities such as AI and humans in diverse fields, from science to literature, from art to architecture. The presentation will look at the potentially optimistic, utopian view that this intersection presents, granting contemporary society the ability to create environments that can function both virtually as well as organically.

is a PhD student at the University of Bucharest, completing a dissertation titled "The Technological Imaginary in Contemporary Art", which focuses on cybernetics and scientific principles employed in the arts. Nicola is particularly interested in issues of system intersectionality and the ways in which technology informs contemporary visual culture. She is currently collaborating with various MNCs as a corporate language and cultural immersion trainer.

The Art of Work: From Bürolandschaft to Computational Design

Joseph L. Clarke
(University of Toronto)

This paper traces the utopian ideals of cybernetic and algorithmic design in late twentieth-century architecture for intellectual labour. It focuses on how the Bürolandschaft or "office landscape" approach to workplace architecture, conceived in the late 1950s, was subsequently transformed with the proliferation of desktop computers.

Radically open, non-gridded, and non-hierarchical, early Bürolandschaften reflected the optimism about the post-industrial information age. This method of office design was conceived by the Quickborner Team of West German designers and implemented in such projects as the 1961 headquarters of Kommissionshaus Buch und Ton, a division of Bertelsmann where efficient information processing was of paramount importance. The principles of the Bürolandschaft were developed in close dialogue with German cybernetic thinkers such as Max Bense and Helmar Frank. Like a self-regulating machine, an "office landscape" was meant to adapt to its occupants' evolving patterns of thought and communication. In this way, it would emancipate workers from rote, mechanical tasks and facilitate more creative and intellectually fulfilling kinds of labour. In the mid-60s, Bürolandschaft techniques spread to the United States, where they were adapted by Robert Propst of the Herman Miller furniture company and applied to numerous corporate design projects.

These approaches to office design helped lay the groundwork for the digital discourse of the 1990s, which celebrated complex and "autopoetic" formal systems. By this time, several Bürolandschaft pioneers, such as Kurd Alsleben, had left the field of office design to become algorithmic artists. Ironically, however, with the introduction of desktop computers in offices, free-form "cybernetic" office layouts tended to give way to rigid rows of identical cubicles. Paradoxically, computerization seemed to advance the promise of cybernetic design while simultaneously sapping workplace architecture of its most distinctive spatial qualities. As office workers gained access to rapid, programmable information processing capabilities at their fingertips, it no longer seemed necessary or desirable for the architectural environment to function as a giant, occupiable computation machine. Even as digital technology opened a dramatic range of new architectural possibilities, it spelled the end of the utopian aspiration to transform the architecture of intellectual labour. By investigating the technical and ideological dimensions of this shift, the presentation attempts to shed light on the shifting ideals of computation, architecture, and intellectual labour in a transitional period of post-industrial society.

is an assistant professor of art history at the University of Toronto, where he teaches courses on global architecture and urbanism from the 18th century to the present. His recent scholarship has focused on sound and communication in modern architecture, and his book "Echo's Chambers: Architecture and the Idea of Acoustic Space" will be published next year by the University of Pittsburgh Press. Clarke trained as an architect and has worked for Skidmore, Owings and Merrill and Eisenman Architects. He holds a PhD from Yale University and previously taught at the Illinois Institute of Technology.

Dirty Theory for a New Materialism: From Gilles Deleuze to Jennifer Bloomer

Hélène Frichot
(KTH Stockholm)

In his anxious late essay "Postscript on Societies of Control" (1990), Gilles Deleuze introduces the aesthetic figures of the mole and the serpent in order to describe a shift from the containment of disciplinary societies to the slippery surveillance of societies of control. Societies of control are characterised primarily by the rapid development of information technologies and attendant processes of computation, the likes of which Deleuze could only have had the vaguest presentiment. This lecture returns to the nineties, a moment at which architecture was about to launch into a period of exhilarated experimentation with computational procedures and form-finding adventures, or what at the time was simply called digital architecture. At much the same historical juncture, an architectural thinker-practitioner whose work has maintained an undercurrent of influence amongst feminist architects was introducing another version of the mole as devious female practitioner. The mole, or mole-ster for Jennifer Bloomer seeks to disturb the allegorical house of architecture, understood here as architecture's disciplinary status quo. Bloomer was one of the first architectural thinkers to introduce the work of Deleuze to an anglophone architectural audience in advance of the eager uptake by digital architects of Deleuze's concepts of the fold and the virtual. When we return to the work of Bloomer, what we find is an anticipation of what would come to be called "new materialism" and "feminist new materialism", which alerts us to the importance of critically assessing the material and socio-technical implications of computationally informed architectures. To reclaim this other story, I will conclude by introducing a dirty theory for a new materialism.

Architect and philosopher, writer and critic, Professor Hélène Frichot is the director of Critical Studies in Architecture, School of Architecture, KTH (Royal Institute of Technology) Stockholm, Sweden. Her research examines the transdisciplinary field between architecture and philosophy, with an emphasis on feminist theories and practices. In 2017 she was the recipient of a Riksbankens Jubileumsfond sabbatical grant, one outcome of which is "Creative Ecologies: Theorizing the Practice of Architecture" (2018). She is a co-editor of "After Effects: Theories and Methodologies in Architectural Research" (2019); "Architecture and Feminisms: Ecologies, Economies, Technologies" (2017); "Deleuze and the City" (2016), and "Deleuze and Architecture" (2013). Forthcoming publications under contract include: "Architecture and Affect", co-edited with Marko Jobst and "Writing Architectures: Ficto-Critical Approaches", co-edited with Naomi Stead.

Prerequisites for Self-Organization: The Reemergence of Colin Ward

Grayson Daniel Bailey
(University at Buffalo /
Bauhaus University Weimar)

Strangely, the subject of cybernetics in architecture elusively weaves between technical solipsism and vague potentials within generative process, while keeping a distance from an essential persona who contributed significantly to "self-organization" theory. Perhaps this is due to the lack of contemporary considerations of Colin Ward's architectural theories and histories, in the framework of self-organization or otherwise. One can easily assume this is because his name is accompanied by the descriptor "anarchist".

The absence of Colin Ward's work in the architectural discourse of self-organizing systems is particularly noticeable due to his specific writing on the overlap of anarchic and cybernetic theory in "Anarchism as a Theory of Organization". Coupled with his writing on self-organized housing and urban practice, Ward provided a wealth of architecturally pertinent links between non-hierarchical theories of social value and the built environment.

In examining the results of cybernetic applications in the past century, one can see that they have not headed in the optimistic direction that Ward envisioned in the 1970s. Indeed, "non-hierarchical" often stands in for systems of derivative control. As with most technical processes, digital and algorithmic methods are neither inherently coercive nor liberatory, and the negation of cybernetic applications based on previous failures would be a form of Neo-Luddism rather than an effective path forward for the discipline. Neither faith nor fear should accompany the application of novel systems thinking, but in moving away from the disappointments of network utopianism one can use the goal-oriented theories of Ward to re-examine the potential of non-hierarchical models in architecture.

Ward's basic theories and the anarchic systems theorists he builds upon are central in establishing the necessary conceptual framework for architects and theorists to re-apply self-organizational methods in architecture and provide prerequisites for such applications. These prerequisites centre around the two following arguments. The first is that non-hierarchical organizations cannot be limited to contained applications within larger hierarchical structures. While self-organization is a comprehensive logic, it is too often applied with limited terms of operation. The second is that self-organization must be applied with demonstrable system goals. Previously, the faith-based application of self-organization, operating with an exclusive goal of system survival, enabled influences to be enacted systemically without attribution and did not provide room for critical appraisal.

Following a renewed consideration of Ward's work, and the establishment of demonstrable system evaluation, this presentation suggests that non-hierarchical thinking can act as a truly reformative model within architectural production.

received his M.Arch from the University of Nebraska before working in New York City and Stuttgart, Germany. While in Stuttgart, Bailey worked in the Laboratory of Visionary Architects (LAVA) as a junior and design architect, focusing on novel digital techniques, large-scale developments and utopic urban visions. Currently Bailey is pursuing dual post-professional degrees in Media/Architecture and Situated Technologies at the Bauhaus-Universität Weimar and the State University of New York at Buffalo, researching forms of agency and legitimation within artistic and architectural production.

Unmanageable Utopias: Analogic Cybernetics Aided Self-Organized Settlements

Marcus Bernardo and
José S. Cabral Filho
(UFMG Belo Horizonte)

In the midst of utopian architectural thinking around electronic cybernetic devices, this presentation proposes, through case studies, a utopian project based on cybernetic reasoning, as Mary Catherine Bateson calls for in "How to Be a Systems Thinker". The case studies feature self-organized families trying to solve their housing problems, in collaboration with activists, by occupying land in a large Brazilian city. Their needs were unable to be met either by the state or by the real estate market, comprised as they were of heterogenous numbers, sizes, requirements and financial resources.

The presentation will describe two cases: the parcelling and infrastructure planning of recently occupied land by an organized group, and the installation of a sewage system in an 8-year-old, consolidated and already socially disorganized occupation. Both involve around 200 families each and together will showcase three cybernetic strategies capable of alleviating the groups' housing problems: (1) the use of Stafford Beer's Team Syntegrity for collective problematisation as an alternative to traditional assemblies; (2) the use of analogically-computed interactive topological models to imagine possible solutions as an alternative to the traditional deterministic blueprints; and (3) the use of self-organization to perform the necessary actions as an alternative to integral coordination.

Three cybernetic modes of reasoning will be introduced for analysis and discussion. They are derived from Humberto Maturana, Heinz von Foerster and Ranulph Glanville, respectively,: (1) self-organization comes not from isolation but from interaction between autonomous parts and the progressive creation of new common rules (as explored by Holland and Kauffman); (2) without the autonomy to decide what one wants to decide, self-organization becomes automation, as employed in Toyotism, and; (3) a complex situation does not require a determinate model to be answered if there is no need for predictability of results.

These cases bring back into our imagination the same utopia Beer advocates in his 1973 "designing freedom" lectures: a space where collective organization works by and for the individual's freedom, in this way, remaining complex and unmanageable by datacentres, universal models, or large computers.

Marcus Bernardo holds a degree in Architecture and Urbanism from the State University of Londrina (2010) and a master's degree from the Federal University of Minas Gerais (2014), where he is currently a PhD candidate studying cybernetics. During his master's work he researched strategies for using digital technologies in the context of the self-construction of favelas. Following that he worked in the law research group Cidade e Alteridade, which advocates for the rights of the city to collective autonomy and urban management. He has further worked as teacher at the Oi Kabum BH Technical School of Art and Technology and at the UniBH Architecture School.
Marcus is supported in his research by FAPEMIG.

Manipulating Fabrics: The Language Between Organism and Organization, 1956–1962.

Gregory Elias Cartelli
(Princeton University)

In 1956 Stafford Beer acquired a Pegasus computer for his research department at United Steel. The same year, Gordon Pask designed the rudimentary educational device SAKI for the Solartron corporation. Yet in 1958, at the second Congrès International de Cybernétique, both would present on the dangers that automation posed: for industries, for society, and for the human. This presentation argues that before computer architecture was "liquid", it was fabric, both social and biological, and that liquidity itself, in its inexorable flow, poses a danger (both real and theoretical) to humanistic architecture. It ultimately posits that such changing ontologies are predicated on changes in language. To do so, it takes as its subject Beer and Pask's experimental autopoiesic research group cum publication cum investment firm cum cybernetic experiment artorga (ARTificial ORGAnism), inaugurated the same year they launched their polemics.

Artorga sought to enact a revision of cybernetics' disciplinary formation, claiming its origins in biology rather than information theory and operations research. The project represents the effort to retain both biological complexity and organic matter in the conception and construction of organizational structures. Accordingly, this paper positions the development of artorga against the contemporaneous origin of Moretti's parametricism. Instead of treating the virtualization of structure as the inevitable result of the post-war technosciences, artorga's proposition of a textile logic of "fabric" can be read as a moment of resistance that prompts a reconsideration of how architecture's attention to the biotic became translated into the computational.

By excavating the concerns surrounding automation at the turn of the 1960s, and the material experiments by which these agents tested pre-architectural, but no less architectonic, alternatives to it, I show how social responsibility and responsiveness were considered hand in hand with technological progression. However, the promise and perils of organic rhetoric made artorga's call for structural autonomy an unstable premise. In addressing this – by attending to how the publication's eventual focus on linguistic formation provided a foundation for Varela's later proposition of a "concrete" epistemology – I look to illustrate a particular epistemo-material complex rooted in a conception of biological matter as a reparative media. As we witness architecture's return to the organic today (in arguments for an understanding of buildings as biological objects) artorga's brief life allows us to make sense of what that return truly signifies.

is a PhD student in the History and Theory of Architecture at Princeton University. He holds a Master of Environmental Design from the Yale School of Architecture, and a BA in Photography from Bard College. His research investigates the disciplinary and methodological imbrications operative in the mid-century reconstruction of an architectural elementalism and subsequent articulations of synthetic architectural technics.

Towards a New Understanding of the Animal

Nathalie Kerschen
(McGill University
Montreal)

"Science manipulates things and gives up living in them" (Merleau-Ponty 1993).

Seventy years later, Merleau-Ponty's critique on the reductive nature of science and its application in cybernetics still proves valid. Yet the concept of the "animal-machine" (Merleau-Ponty 1990) which has undergirded the cybernetic project since its early days thrives among a younger generation of computational designers. One important sign of this trend is the current desire to incorporate information about natural processes, biological principles of morphogenesis and evolution, or animal behaviour into the generation of complex geometries and new materials. If computation and scientific methods allow for innovation, from a phenomenological perspective they tend also to reduce architecture to a set of mathematical variables and rules, and the living body to a simple "component" within a larger "system" (Pask 1969). However, the animal body is not an "automaton," as Merleau-Ponty argues, but a "perceiving" and "moving body" expressing its Umwelt (milieu), in Uexküll's sense of the term. Given the framework of systems theory, cognitive sciences, theoretical biology and cybernetics upon which "generative architecture" (Cogdell 2018) has installed itself, the question arises whether it is sufficient to limit the phenomenological experience of "depth" to animal and machine behaviour, and to trust the production of "atmospheres" (Pérez-Gómez 2016) with the scientific and mathematical properties of "self-organizing systems". In other words, is the manipulation of algorithms which build upon the observation of "natural processes" or animal behaviour appropriate to create "places" that allow us to "dwell in the world" (Heidegger 2013)? Investigating what it means to be a "living system" in the context of the "cybernetic machine" (Cordeschi 2009), this presentation critically assesses form-finding processes through the lens of the embodied animal.

is currently enrolled as a PhD Candidate at the Peter Guo-hua Fu School of Architecture, McGill University Montreal. Next to a post-professional M.Arch from McGill University (2011) and an M.Arch from ENSA Paris-Malaquais (2010), she also holds a BA in philosophy from the Université Paris-Sorbonne IV (2014). Nathalie is a licenced architect in France. Her art projects "The white box-Voidchronicles" (2010) and "Think/Green" (2012) were on display at the Casino - Forum for Contemporary Art (Luxembourg), the B.P.S.22 (Charleroi) and Brussel's Design September, among others. Nathalie is supported in her research by the Fonds National de la Recherche, Luxembourg (11273634).

The Architecture Machine. The Role of Computers in Architecture

Teresa Fankhänel
(TU München)

The computer is a tool that is not fundamentally different from other implements that have been used in architecture – the pencil, the ruler, the blueprint or the photocopier. Like all tools, software leaves behind traces in the buildings that are designed with its help: from the wireframes of the early period of digital design, to the projects associated with the so-called "blob crisis", all the way to the parametric scripts so popular today.

This presentation discusses an upcoming exhibition at the Architekturmuseum der TUM, which takes a comprehensive look at digital developments in architecture. From its beginnings in the 1950s and 1960s to the present day, it tells a story in four chapters and presents the computer as a drawing machine, a design tool, a storytelling medium and an interactive communication platform. The fundamental question behind it is simple: has the computer changed architecture, and if so, how?

The aim of the exhibition is to investigate the ways in which the application of computers has transformed both architects' working methods as well as the presentation of architecture. Through case studies of major projects that reflect larger international transformations, we consider the various levels of representation of architectural spaces. This encompasses two-dimensional (vector drawings and renderings), three-dimensional (models and 3-D prints) and four-dimensional projects (moving images and animations). This history is supplemented by current developments such as augmented reality, virtual reality, and artificial intelligence, offering a prospect of technologies that can be expected to evolve rapidly in the future.

This research project is supported by the Gerda Henkel Stiftung.

is the curator of the exhibition "The Architecture Machine. The Role of Computers in Architecture" running July 16 – October 11, 2020 at the Architekturmuseum der TUM in Munich. Previously, she produced the exhibition "African Mobilities" and was the curatorial assistant for "The Architectural Model. Tool, Fetish, Small Utopia" at the German Architecture Museum, DAM. Her doctoral dissertation about model maker Theodore Conrad and the mid-century boom in model making will be available in bookstores soon.

Code and Notation: Considerations on the Mediality of Architectural Drawings

Klaus Platzgummer
(TU Berlin)

It goes without saying that the documentation of complex trains of thought require notation. In this regard, the documentation of architectural design and drafting is no exception. At least since the Renaissance, these processes have been documented with three distinct forms of notation: graphic notations, textual notations and numeric notations. In this tripartite notation system, graphic notations dominated textual and numeric notations for centuries. This is demonstrated, for example, by the rise of drawing practices in the early modern production of architecture.

In this presentation I will argue this through a discussion of software interfaces, such as command-line-interfaces in CAD software. All major CAD software (AutoCAD, Archicad, Vectorworks, Rhinoceros) have integrated command-line-interfaces, operating with textual commands and numeric parameters. Digital codes per se introduce a mediality of notation, leading to such paradoxes that drawings can be generated by typing words and numbers into command-lines.

holds a master's in Architecture from the ETH Zürich (2015) and a master's with distinction in History and Critical Thinking in Architecture from the Architectural Association (2016). His dissertation at the AA examined encyclopaedic orderings of architectural knowledge and won the Graduate School Prize for Writing (2017). In 2019 he was a visiting lecturer at the Technion in Israel. Platzgummer is currently a teaching and research associate at the Department of Architectural Theory, TU Berlin and a tutor for History and Theory Studies at AA. He joined the Netzwerk Architekturwissenschaft in June 2018.

One might assume that when architectural design and drafting moves from the analogue into the digital realm, its notation would remain a predominately graphical endeavour - a drawing: with the difference perhaps that a digital architectural notation is three-dimensional, scalable, distortable, tiltable, rotatable, duplicable, erasable. I attempt to turn away from this general assumption that digital notation is predominately graphical. The historic notation system has been shaken to its foundations, and the documentation of the design and drafting processes has undergone a unification of its mediality.

Cognitive Prosthesis, Time, Fractals

Emilio Ennio Vita
(Politecnico di Milano)

The act of drawing is not purely intellectual. Drawing needs two tools, a tool "to do", and a tool "for thinking". Drawing a triangle requires paper and pencil but also the idea of a triangle. Computerization has not changed this relationship, but drawing has become an infinitely more abstract thing no longer linked to the physicality of the tool.

As a "to do" tool, software lets us manipulate incredibly complex forms like Bézier and NURBS curves in a "parametric" way, without any mathematical knowledge of the equations that generate them. The same process applies to the tools "to think", we can imagine not just Euclidean shapes like triangles, circles etc., but also new forms like fractals.

Following the discovery of parametric tool and fractals, the practical action of drawing changed, and created the opportunity to think and manipulate forms that were previously unthinkable, because the IT tool provides us with tools structured with "the time inside".

We could say that the computer possesses not only the time of the clock inside it but also a metaphorical time that we can experience when we develop parametric shapes. We believe that this is the first time the

designer has "time" available on his "colour palette" to generate parametric forms.

More than this, the conceptual change represented by the discovery and use of "fractals" is significant and fascinating. With relatively simple equations it is possible to "draw" natural forms which were impossible to manage before this "discovery". The way in which this calculation method captures the sense of nature and how it manages to provide incredibly precise models of natural shapes is staggering.

From a mathematical point of view, the "chaos equations" which generate fractals do not represent anything surprising. If we look at the results analytically, we only see the unpredictability of the results themselves. But by marking a dot for each value obtained from those equations, a clear and recognisable natural form, such as the famous image in the shape of a fern, emerges. It is astonishing to see how this metaphor captures the most profoundly structural aspects of the organism and how this form has characteristics that are perceptible only within a temporal dimension.

In this discussion I want to reflect on this topic and present some examples of how

design, art and architecture have been changed by this new practical and conceptual tool – fractals – and how it has been developed in recent architectural projects.

is an architect specialising in architectural representation and communication. His research examines the practical and theoretical aspects of the use of computer media as a tool for designing. Vita is an Adjunct Professor at the Politecnico di Milano and at the Academy of Fine Arts of Brera (Milano), and the organizer and director of the international "COrtonaOPen3D" Smart City Design Workshop.

Houses of Ice. From Raster Utopias to the Discrete Movement

Erik Herrmann
(Ohio State University)

"I am to build a house of ice
Because it is more liquid." (Kurt
Schwitters, "My House")

Centred in the former Yugosla-
via, the New Tendencies move-
ment of the early 1960s was a
major epicentre for experimen-
tal developments in postwar
artistic expression. The move-
ment's protagonists embraced
emerging technologies like the
computer to transpose artistic
production into new methods of
visual research. Confronted
with an increasingly intercon-
nected world, New Tendencies
artists developed participa-
tory experiments to engage the
public in the creation and
criticism of art, media and
environments.

Like their artist counterparts,
architects of the New Tenden-
cies movement proposed par-
ticipatory urban models based
on principles of cybernetic
control, networked systems and
information aesthetics. Disas-
trous postwar planning policies
spurred these radical young
architects to envision dynamic
liquid architectures capable of
assuaging the social and eco-
logical pressures of the late
1960s. Their utopian visions
recast the city as a continuous
landscape of bits capable of
responding to constant change.
Each design proposal was ac-
companied by treatises outlin-
ing self-management protocols
that would guide their dynamics
over time. For the architects
of these proposals, Leonardo
and Laura Mosso and Vjenceslav
Richter, the raster was a
convenient formal device for
exploring relationships between
individuals and collectives.

Today, in the wake of a second
digital turn suggested by Mario
Carpo, the bit has reemerged as
a form of expression in a new
category of discrete, non-
normative architecture. While
there are obvious formal affin-
ities with the radical visions
discussed above, projects of
today's discrete movement also
share a rhetoric of complex,
adaptable, open-ended archi-
tecture with their utopian
precursors.

Framed by a consideration of
historic and contemporary
models of discrete architec-
ture, this presentation will
reflect on the pixel as a dig-
ital cultural technique of the
architectural imagination. It
will outline and discuss tech-
niques and modalities of the
pixel in both 1960s utopias and
contemporary projects. Cen-
tral to this conversation will
be the computational concepts
architects use to break the
problem of architecture down.
What exactly are architecture's
parts? How does the way we com-
putationally break architecture
down inform our conception of
the built environment's conti-
nuities? How is meaningfulness
constructed in these systems.
How does this approach inform
contemporary forms of liquid
architecture?

is an Assistant Professor of
Architecture at the Knowlton
School at The Ohio State
University and co-director of
Outpost Office. Herrmann was the
2016-2017 Walter B. Sanders Fellow
at Taubman College and a 2014-
2015 Fellow of the Alexander von
Humboldt Foundation as a visit-
ing researcher at The Institute
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work and writing explores technol-
ogy's role in altering fundamental
design concepts. Herrmann holds
a Bachelor of Architecture from
the University of Tennessee and a
Master of Architecture from the
Yale School of Architecture.

Vestal Fire: Artificial Intelligence, Data Centres and Dirty Matter

Donal Lally
(TU Dublin)

In recent years there has been growing scholarly interest in the data centre typology and in particular the energy they consume. However, very little work has been done to explore the output, i.e. the heat they produce; and the material effect that production of heat has on human and non-human habitats, both locally and globally. From the first domestic hearth; to the Roman temple of Vesta, to the coal-burning furnaces of the industrial revolution, anthropogenic fire has played a central role in the production of urban space. In 2018, South Dublin County Council and Amazon Inc. announced they were partnering on a scheme to reuse the exhausted heat from the fifth, and newest, of their data centres in the Dublin suburb of Tallaght. As part of the arrangement, Amazon will build a new energy centre to collect and distribute exhausted heat into the local area. This presentation will analyse the historical role anthropogenic fire has played in shaping the urbanisation of European civilisation. In addition, it will use a case study analysis to explore the new role data centres, and their advanced machine learning systems play as agents in the production of new forms of district heating infrastructure. In doing so, it will reveal how fire is once again a primary driver in the reshaping of our urban habitats; opening them up to a stealthier and more pervasive form of the Smart City.

is an architect and researcher whose work focuses on the data centre. Lally is a founding member of Annex, the multidisciplinary curatorial team chosen to deliver "Entanglement", the Irish Pavilion at the Venice Biennale 2020. His research has been published in Arch Plus and Strelka Magazine. In addition, Lally is the founder and director of the architectural practice "zero-degree machine"; and a researcher and lecturer in design theory at TU Dublin.

Tracing the Formations and Marginalisation of Ekistics' Ideas from its Heyday (1962-1974) to the End of Century

Carmen K.M. Lam
(Bauhaus University
Weimar)

From 1962 until 1975, Greek architect-urban planner C. A. Doxiadis and Harvard urban design-professor Jaqueline Tyrwhitt invited thinkers of their time to infuse the architectural implications of their work into Ekistics, an urban design approach that claimed to establish "a science of human settlement".

Because founding this new field entailed scientific techniques and statistical methods, they borrowed from various emerging scientific disciplines, which included general systems theory, cybernetics, communication theory and proxemics. Common to all is a belief in methods of control through statistics and modelling, materialised through inscriptions such as diagrams and graphs.

This presentation provides a historical account of adopted Ekistics ideas which originated in scientific paradigms, were reinterpreted through visual artefacts, and underwent transformation not without transmission loss. It points to a chain of transformed architectural positions that emerged through science and technology thanks to the historical development of Ekistics.

The analysis ends with The City of The Future research, where the metamorphosis of ideas arrived at an urban scale, becoming a precursor to current discourse about the smart city.

is an aspiring transdisciplinary designer and researcher who surveys the expanded field among architecture, STS studies and media arts with a keen interest in knowledge production for the common good. A native of Hong Kong educated in Austria, the US and Germany, she received her dual master degrees in Media Architecture from Bauhaus-University Weimar and the State University of New York at Buffalo. Her ongoing projects include an immersive discourse visualization for Bauhausjubiläum in Weimar, civic media, a project on the science of human settlement, architectural and exhibition designs of various scales, and speculative design for posthuman futures.

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is a Visiting Professor at the Berlin University of the Arts (UDK) where she teaches architectural history with a focus on media and gender studies and led the DFG research project "Architecture and New Media". She was a Research Fellow at the International Research Institute for Cultural Techniques and Media Philosophy (IKKM) at the Bauhaus-University Weimar and for the research group "Media Cultures of Computer Simulation" (MECS) at Leuphana University. She holds a PhD in architectural theory on the subject of architecture and film.

Chris Dähne

is an architect and architectural historian whose research focuses on the medialization and digitality of architecture. She was conducting research at the TU Darmstadt, DFG-Project "BAUdigital" and taught at the Goethe-University Frankfurt a. M., Bauhaus-University Weimar and TU Delft. She holds degrees from the University of Applied Science Darmstadt and TU Delft. At the IHAAU at TU Delft she received her PhD on the subject film and architecture. She was a research fellow at the Waseda University Tokyo and visiting teacher at the TU Delft and TU Darmstadt.

Michael Dürrfeld

studied architecture and urban planning in Hamburg and Berlin and received his PhD in architectural theory from TU Berlin. As an architectural research-er he has researched and taught in Berlin, Santiago de Chile and Buenos Aires. From 2012 to 2018 he worked as a PostDoc in the Cluster of Excellence "Image Knowledge Gestaltung. An Interdisciplinary Laboratory" at Humboldt-University Berlin. He is a founding member of "Netzwerk Architekturwissenschaft e.V." and co-founder of „ID+Lab" for the research of interdisciplinary collaborations.

Frederike Lausch

is a researcher on architecture. She studied architecture at the Bauhaus-University Weimar und the METU in Ankara. She worked as a research assistant at the Goethe University Frankfurt and the TU Darmstadt. She wrote her PhD on translation processes between Gilles Deleuze's philosophy and the US-American architectural dis-course of the Anyone Corporation in the 1990s. Frederike is cur-rently a Fellow of the Wüstenrot Stiftung working on the pro-ject "Fascism and Architecture. Max Bächer's interest in Albert Speer".

6th Forum Architekturwissenschaft

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