EKA

Estonian Academy of Arts

CONFERENCE
11 September 2019
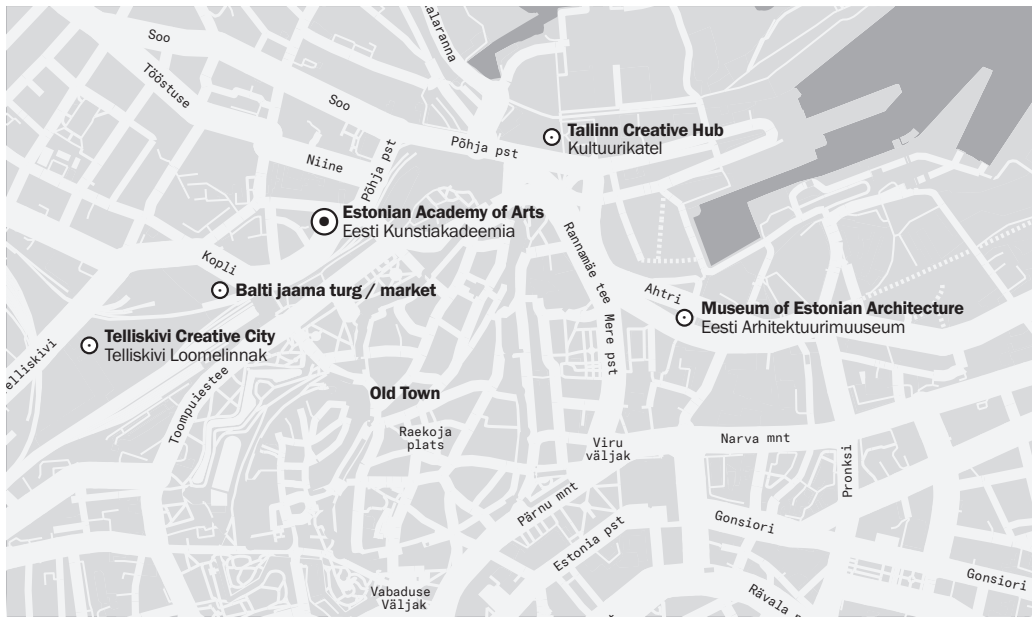
Space and Digital Reality

Ideas, representations / applications and fabrications

Estonian Academy of Arts
Põhja pst 7
Main lecture hall A101

artun.ee/space-and-digital-reality
tab.ee

Programme

08:45	Registration and coffee
09:00	**Opening of the conference**
09:30	**Keynote Speaker 1: Mario Carpo** The Rise of Computational Brutalism
10:15	Questions and coffee
10:30	**Gilles Retsin** Fresh from the Forest: Raw, Discrete and Fully Automated
10:45	**Siim Tuksam** Modulated Modularity – from Mass Customization to Custom Mass Production
11:00	**Dagmar Reinhardt** Robot Braille and Spatial Maps – Combining Tactile and Visual Narratives
11:15	**Sille Pihlak** Protocolling Prototypes / Prototyping Protocols. Automated Design to Construction Methodology in Timber Architecture
11:30	Questions
12:00	Lunch break
12:45	**Keynote Speaker 2: Roland Snooks** Strange Behavior
13:30	Questions
13:45	**Roemer van Toorn** The New Normal. A Goodbye to Language
14:00	**Annarita Papeschi** Transindividual Urbanism. Novel Territories of Digital Participatory Practices
14:15	**Adrià Carbonell** The Solid Matter(s) of Digital Nature
14:30	**Wolfgang Schwarzmann** How Does New Technology Provided by Industry 4.0 Change the Job of a Carpenter?
14:45	Questions and coffee
15:00	**Keynote Speaker 3: Antoine Picon** Atoms and Bits: Taking Seriously their Hybridization
15:45	**Keynote speakers panel and discussion**
18:00	Opening of the TAB International School's Exhibition at EKA Gallery
19:00	Opening of the TAB 2019 Curatorial Exhibition "Beauty Matters" and installation "Steam Punk" at the Museum of Estonian Architecture

Mario Carpo,
keynote speaker
The Rise of Computational Brutalism

Digitally intelligent architecture no longer looks the way it did in the 90s. Just like spline modeling and digital mass-customization upended design and fabrication twenty years ago, today robotics, Big Data, brute-force computing, and second generation Artificial Intelligence are disrupting the way things are made, the way they look – and the way of thinking what is behind them.

Mario Carpo is currently Reyner Banham Professor of Architectural Theory and History, the Bartlett, University College London. Carpo's research and publications focus on the relationship among architectural theory, cultural history, and the history of media and information technology. His *Architecture in the Age of Printing* (2001) has been translated into several languages. His most recent books are *The Second Digital Turn: Design Beyond Intelligence* (2017), *The Alphabet and the Algorithm, a history of digital design theory* (2011) and *The Digital Turn in Architecture, 1992–2012, an AD Reader*.

Welcome to the conference Space and Digital Reality hosted by Estonian Academy of Arts, Faculty of Architecture! This international scientific conference is part of the Tallinn Architecture Biennale TAB 2019 conference programme.

The Third Technological Revolution
The world economy and culture have entered the era of the Third Technological Revolution. This revolution is based on digital domain and rapid advances in computing algorithms and autonomous robotics. In 25 years it has totally changed the information, communication, entertainment and surveillance technologies – both in their form as well as content.

An Emergent New Reality
A totally new reality has emerged with its own sovereign substantiality, structure and will - the Digital Reality. It consists of informational and communicative networks, complex hierarchy of computational algorithms and the meaning system of its projections on screen.

End of Modernist Era
Within Digital Reality information can create, interpret, mutate and copy itself infinitely. It is increasingly difficult to keep the plenitude of information in the constraints of property rights, including the intellectual property rights. The Digital Reality with its possibilities has shaken the political and public institutions of Modernist liberal democracies. The Digital Reality has partly broken out of the previous legal system already. Some believe it threatens the traditional concepts of Modernist paradigm – labour, market, value and price.

Digital Reality and Architecture?
We are sure Digital Reality is having a major impact on space and architecture. We ask the participants to research, imagine and speculate about the future of architectural creation, urban development as well as design education.

We wish you interesting and productive days in Tallinn!

Jüri Soolep
The head of the doctoral programme in the field of architecture and urban planning, Estonian Academy of Arts

Gilles Retsin
Fresh from the Forest:
Raw, Discrete and Fully Automated

The notion of automation grounds the digital firmly in reality. Whereas initially, architects speculated on the digital as something virtual, today, even the most banal aspects of our lives are reconfigured by the digital. The driving force behind this proliferation of digital technology is automation. In continuity with 19th century industrialisation and 20th century mechanisation, the drive for ever more efficient modes of production is what has embedded digital processes in our daily reality. Whereas the architects' notions of "digital design" and "digital fabrication" are technical and innocent, it's the notion of automation that reveals that our own architectural work with robotics and digital tools is not exempt from the political and the social.

Gilles Retsin, originally from Bruges, Belgium, is an architect and designer living in London. He studied architecture in Belgium, Chile and the UK, where he graduated from the Architectural Association. He recently edited an issue of Architectural Design (AD) on the Discrete and has co-edited Robotic Building: Architecture in the Age of Automation, with Detail Verlag. Gilles Retsin is Programme Director of the M.Arch Architectural Design at UCL, the Bartlett School of Architecture. He is also co-founder of the UCL Design Computation Lab.

Siim Tuksam
Modulated Modularity – from Mass Customization to Custom Mass Production

Modulated modularity proposes an algorithmic method for approaching modularity in architecture in the age of automation. The method of spatial and tectonic modulation is based on the experience gained by developing experimental projects for industrial pre-fabrication and efficient assembly, utilising available standard materials within the practice of PART Architects. In this paper I shed light on the motivations behind the development of the method and propose a reading of the resulting architecture. The paper consists of three main topics: a case for modularity looking at the realities of automated fabrication and construction moving from the ideal of mass customisation to custom mass production; modulation and the emergent otherness of algorithmic geometric systems, performance simulation and evolutionary optimisation; and how modulated modularity might result in human scale architecture through the notions of proportion and rhythm.

Siim Tuksam is an architect, founder of PART – Practice for Architecture, Research and Theory. He has an M.Arch. with distinction from University of Applied Arts Vienna, Studio Greg Lynn, and has gained experience at the Southern California Institute of Architecture and a number of architecture and design offices. He is currently PhD fellow and junior researcher in Estonian Academy of Arts.

Dagmar Reinhardt
Robot Braille and Spatial Maps –
Combining Tactile and Visual Narratives

People experience spaces differently according to individual abilities to process visual and tactile information. Blind or partially sighted people decode and choreograph an array of sensory interactions in public spaces so they are able to produce an organized and meaningful understanding of public and urban spaces. This research explores computational design, scripting and robotic milling with a standard six-axis industrial robot for spatial and interpretative mapping, using pixel and line based textures and patterns as information, narratives and meta-text for spaces and public areas. In a collaboration between The Institute for the Blind and Partially Sighted (IBOS) and Aarhus School of Architecture's RobotLab, material prototypes and hyperartefacts were produced that inform tactile and visual experiences. By adopting universal design principles, raised forms with images, diagrams and braille combinations support a diverse audience in understanding content, situations, and events. The research thus contributes to the transactional relationship between people and embedded sensory characteristics in the built environment in support of community.

Dagmar Reinhardt is an architect, researcher and educator, and a principal of *reinhardt jung*, a research-based architecture practice that has been widely published, and received numerous recognitions and awards for affordable and multi-generational residential works. Reinhardt is currently an associate professor at the Aarhus School of Architecture, Denmark, where she leads the robotics lab, in continuation of her work as Associate Professor at the School of Architecture, Design and Planning, The University of Sydney.

Sille Pihlak
Protocolling Prototypes / Prototyping
Protocols. Automated Design to Construction
Methodology in Timber Architecture

Redefining the production chain of architecture from design to fabrication based on computational understanding of modulation makes it possible to move towards more flexible and adaptable architecture. With particular collaborative workflow between architects, engineers and fabricators, modulated prototyping provokes apparent design implications in tectonics and space organization. The dynamic relationship between the digital, material, design protocols and the experimental prototypes have became key elements in design and fabrication process.

This thesis looks at adaptive design and fabrication methods for working with undulating substances – to capture the potential of live geometry and living materials. Monitoring the changing relationship between the protocol and the prototype, has opened up premises for the successful design and construction process. Workflow, based on discrete syntax, proposes methodology, that allows all composing participants in the building process – architects, engineers and fabricators, work in non-narrative looping manner, around common platform. Fabricating with natural living material, with fluctuating properties, could be taken into account until the very end of the fabrication process.

Sille Pihlak is an architect, laureate of Young Architect Award 2017. She studied at the Southern California Institute of Architecture in the US and graduated from University of Applied Arts Vienna, in Austria. She holds interior architecture bachelor and is currently PhD fellow and junior researcher in Estonian Academy of Arts. She founded architectural office PART together with Siim Tuksam in 2015.

Roland Snooks,
keynote speaker
Strange Behavior

Strange Behavior is an exploration of a behavioral approach to generative design concerned with the interaction of intention and emergence and the strange characteristics and specificity of the architectural artefacts this creates. Drawn from a series of recent design projects, a process is articulated that establishes a synthesis of the behavior of algorithms, robots, materials and painterly operations. These projects contribute to an architectural approach defined as behavioral formation, a design methodology which draws from the logic of swarm intelligence and operates through multi-agent algorithms.

Roland Snooks is the director of the architectural practice Studio Roland Snooks and a co-founder of the experimental research practice Kokkugia. Roland's architectural work explores the emergence of intricate formations from self-organising processes. He is an Associate Professor at RMIT University in the School of Architecture and Urban Design, where he directs the RMIT Architectural Robotics Lab. Roland has previously taught widely in the US including at Columbia University, University of Pennsylvania, SCI-Arc and the Pratt Institute. Roland's design research is focused on the development of behavioral processes of formation that draw from the logic of swarm intelligence and the operation of multi-agent algorithms.

Roemer Van Toorn
The New Normal. A Goodbye to Language
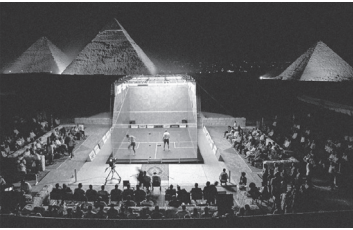
We are at the beginning of a new *renaissance*, a new modernity, of which we are far from sure what it brings or could enlighten. As institution architecture has always directed our sensuous experiences and conceptual understandings of the worlds we live by and look out for. The power to create images is a good partial definition of architecture's competence. According to me the architectural imagination – and that very much includes the image – can be a staging ground for action, enlightening individuals and cultural movements. *An enlightenment not as universal truth, but as temporality, one of provisional possibilities and lines of flight*. Instead of disqualifying the spectacle – as the classical left used to practice in the safe haven of academia – we should investigate how ethical spectacles could be created. To do so is not simple. Spectacular culture is most often designed to manipulate people and take their money, not to set the stage for democracy. But at the same time, we have to recognize that consumer (popular) culture – its crafted fantasies and stimulated desires – speak to something deep and real within us. The challenge is what these ethical spectacles could consist of. This urgent question is by no means an easy one, but without a framework of understanding and alternative theory (such as one on the image), any means of instrumentality will be futile.

Roemer van Toorn is architectural theory professor at the UMA school of architecture Umeå University, Sweden. He was head of publications at the Berlage Institute Postgraduate Laboratory of Architecture, the Netherlands from 1993–2010. He was professor at the Delft School of Design (DSD), University of Technology Delft and guest professor at the Universität der Künste Berlin (UDK), Germany. He has been the editor of several issues of the annual publication "Architecture in the Netherlands", contributor and advisor of magazine Archis (Volume), Hunch, Domus, Abitare and Lo-Res.

Annarita Papeschi
Transindividual Urbanism. Novel Territories
of Digital Participatory Practices

Like an omen, the advent of ubiquitous technologies has carried the general expectation for the emergence of new forms of collective authorship. Drawing on cybernetic theory of communication and on the work of French philosopher Gilbert Simondon, the paper builds an ecological and materialist foundation to ideas of digital participation, thus offering a better understanding of the complex nature of collective feedback. These ideas are further explored through a design-research practice that uses participatory urban analysis and digital design speculations to investigate the aesthetical, technological and cultural dimension of Transindividuality as a generative model for collective authorship. In the two projects presented – The HeartBit Walks and Affectual Infrastructures – biometric sensing is used as a tool for the systematic deconstruction of the human agency and the reimagination of platforms for group knowledge creation with the potential to radically reshape the processes through which culture and places connect locally.

Annarita Papeschi is a practising architect (ARB, RIBA) and educator, with a Laurea in Architettura from the Università degli Studi di Firenze and a MArch in Architecture and Urbanism from the Architectural Association School of Architecture. She was previously a Lead Architect at Zaha Hadid Architects and co-founded in 2013 FLOW Architecture. Currently, she is at Syracuse University London as Adjunct Professor and at The Bartlett School of Architecture as Urban Design March Theory Tutor.

Adrià Carbonell
The Solid Matter(s) of Digital Nature:
Multiscalar Technologies of World Urbanization
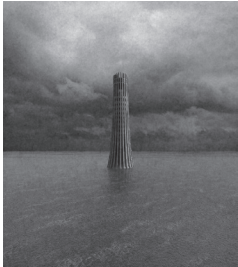
This paper looks at the intersection of two fundamental paradigms of our time: the urban age and the digital age, and particularly at the way they are reshaping the idea and the materiality of our contemporary world. Furthermore, it brings a historical perspective by introducing the work of Ildefons Cerdà's and his "Teoría General de la Urbanización" as a precursor of data based urbanism. If most of the international attention gathered around his work has typically focused on hygiene, circulation and morphological unity, most important for the success of his theory was the scientific and methodological organisation of a territorial system, from the collection and production of data and statistics to the design of legal instruments of space management. Last, it explores how the emergence of digital technologies have defined a new theoretical and technological framework that triggered a process of world urbanisation. The interplay of geographical space and virtual space is scrutinised by looking at their material origins and effects in order to disentangle the multiple scales of digital urbanisation, from planetary networks of ICT to the urbanisation of the human body.

Adrià Carbonell is an architect and urban designer. He is a lecturer at the Royal Institute of Technology (KTH) in Stockholm, and has previously held teaching positions at KU Leuven, Umeå University and the American University of Sharjah. He is also a founder of the research platform Aside, where he writes on the relationships between architecture, urbanism and geography.

Wolfgang Schwarzmann
How Does New Technology Provided by
Industry 4.0 Change the Job of a Carpenter?

In central Europe, new CNC-robots are installed in many workshops of carpenters. At first, these machines shift the profession of a carpenter, moving from a manually skilled handcraft to a machine-supported technician. As a second element of transition, these new solutions start a process of transformation with regard to knowledge and tradition. We can expect more rapid access to knowledge, a better collection of building elements in databases, however with the risk of loss of individual handicraft skills. Embedded in the theoretical foundation of the Actor-Network Theory (ANT) the profession of a carpenter has to be interpreted as being part of a constantly shifting network of relationships. Technology might make a carpenter faster and more cost-efficient but, without doubt, former core elements of his profession will loose relevance. The ongoing research project is investigating the technological change driven by new concepts of Industry 4.0 in the working environment of a carpenter and further on the effect to his profession and identification. An expected outcome of the ongoing research will be the identification of essential key skills the profession of a carpenter has to cover.

Wolfgang Schwarzmann is a researcher and PhD student at the University of Liechtenstein. After he finished his Architecture studies in Austria, he worked as a carpenter-trainee at a Workshop and by that developed a deep understanding of this specific field. Further on he worked in the architecture office of Prof. Hermann Kaufmann, a well-known Austrian Wood-Construction-Architect.

Antoine Picon,
keynote speaker
Atoms and Bits: Taking Seriously
their Hybridization

The rise of big data and algorithms is not the most salient aspect of the new reality, which we are gradually entering because of the development of digital tools. The hybridization between physical and electronic contents, an hybridization often characterized as "augmented reality" represents an even more fundamental shift. The lecture will discuss this phenomenon and its consequences, beginning with the "spatial turn" that has marked digital culture in the past decades. Urban maps are of special interest when one tries to assess some of these consequences. The lecture will also envisage issues such as the emergence of a new form of materiality. It will conclude by raising the question of computability. Are we entering a new world in which everything, or almost, will be computable?

Antoine Picon is the G. Ware Travelstead Professor of the History of Architecture and Technology and Director of Research at the GSD. He teaches courses in the history and theory of architecture and technology. He is also Director of Research at the Ecole Nationale des Ponts et Chaussées in Paris. Trained as an engineer, architect, and historian, Picon works on the history of architectural and urban technologies from the eighteenth century to the present. He has published extensively on this subject.