

1ST INTERNATIONAL ACADEMIC CONFERENCE
PLACES AND TECHNOLOGIES 2014

BELGRADE, 3-4. APRIL 2014 | KEEPING UP WITH TECHNOLOGIES TO IMPROVE PLACES

editors:

Eva Vaništa Lazarević, Aleksandra Đukić,
Aleksandra Krstić - Furundžić, Milena Vukmirović

conference proceedings



ISBN 978-86-7924-114-6

www.placesandtechnologies.eu

Proceedings of INTERNATIONAL ACADEMIC
CONFERENCE ON PLACES AND
TECHNOLOGIES

APRIL 3-4, 2014, BELGRADE, SERBIA

PLACES AND TECHNOLOGIES 2014

PROCEEDINGS OF FIRST INTERNATIONAL ACADEMIC CONFERENCE ON PLACES AND TECHNOLOGIES

International Academic Conference on Places and Technologies, Places and Technologies 2014, will be the first conference organized by University of Belgrade – Faculty of Architecture, Professional association Urban Laboratory and University of Belgrade – Faculty of Philosophy.

Editors: Dr Eva Vaništa Lazarević, Dr Aleksandra Krstić-Furundžić, Dr Aleksandra Đukić and Dr Milena Vukmirović

For publisher: Dr Vladan Đokić

Publisher: University of Belgrade – Faculty of Architecture

Design: Stanislav Mirković

Place and year: Belgrade 2014

ISBN 978-86-7924-114-6

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

711.4.01(082)(0.034.2)
711.4:005.591.6(082)(0.034.2)

INTERNATIONAL Academic Conference on Places
and Technologies (1st ; 2014 ; Belgrade)

Places and Technologies 2014 [Elektronski
izvori] : keeping up with technologies to
improve places : conference proceedings : 1st
international academic conference, Belgrade,
3-4. April 2014 / [organized by University
of Belgrade - Faculty of Architecture,
Professional Association Urban Laboratory and
University of Belgrade - Faculty of
Philosophy] ; editors Eva Vaništa Lazarević
... [et al.]. - Belgrade : Faculty of
Architecture, 2014 (Belgrade : Faculty of
Architecture). - 1 USB fleš memorija ; 1 x 2
x 14 cm

Sistemska zahtevi: Nisu navedeni. - Nasl. sa
naslovnog ekrana. - Tiraž 150. -
Bibliografija uz svaki rad.

ISBN 978-86-7924-114-6

1. Vaništa Lazarević, Eva, 1961- [urednik]
2. Faculty of Architecture (Belgrade)
a) Градови - Мултидисциплинарни приступ -
Зборници b) Урбанистичко планирање -
Технолошки развој - Зборници

COBISS.SR-ID 206380812

ORGANIZERS



University of Belgrade
Faculty of Architecture

URBANLAB
PROFESSIONAL ASSOCIATION URBAN LABORATORY



ФИЛОЗОФСКИ
ФАКУЛТЕТ
1838

GENERAL SPONSOR



SPONSORS



Inženjerska komora Srbije

**INSTITUT
FRANÇAIS**
SERBIE



Gradska opština Savski Venac

Arhi.pro

PHILIPS



Foundation
Dokukino

DONATORS



Република Србија
МИНИСТАРСТВО ПРОСВЕТЕ,
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА



TONDACH
Krov za sva vremena!



SUPPORTERS



ISOCARP
Knowledge for better Cities



CAB
CENTAR ZA ARHITEKTURU
ISTRAŽIVANJE



SIUP
Državni institut za
gradnju i opštinu



**SUPER
PROSTOR**
Portal za
arhitekturnu
kulturu prostora

CONTENTS

PART I: URBANISM

Urban planning and technologies

OVERCOMING BARRIERS TO GROWTH

Stephen Platt 16

URBAN CHALLENGES OF ENERGY EFFICIENCY AND CONTEXT-SENSITIVE PLANNING APPROACHES IN BULGARIA

Elena Dimitrova 25

NEW URBAN PROTOCOLS FOR FRAGMENTED TERRITORIES _ THE EXAMPLE OF WESTERN THESSALONIKI

Styliani Rossikopoulou-Pappa, Valia Fragkia 33

A FEASIBILITY STUDY FOR A TECHNOLOGICAL PARK IN FALCONARA MARITTIMA AN, ITALY

Giovanni Sergi 41

SAVING URBAN PLANNING FROM ANOTHER UTOPIAN MODEL

Danijela Milojkić, Marija Maruna 48

THE IMPLICATIONS OF DIGITAL TECHNOLOGY ON THE PERCEPTION OF CENTRALITY

Mihai Alexandru, Cătălina Ioniță 56

TECHNOLOGY AND LANDSCAPE: REDUCE, REUSE AND RECYCLE THE MINING DROSSCAPES

Nicola Martinelli, Francesco Marocco, Alessandro Reina, Maristella Loi, Federica Greco 63

THE ILLEGAL SETTLEMENTS IN BELGRADE VS. TAMING CITY GROWTH: CASE STUDY OF BELGRADE

Biserka Mitrović, Miodrag Ralević, Branislav Antonić 71

IMPACT OF CLIMATE CHANGE IN URBAN PLANNING

Tamara Tošić 78

CONCEPT OF URBAN VILLAGE: THE APPLICATION OF THE CONCEPT AS A FOUNDATION FOR NEW TYPOLOGY OF URBAN VILLAGES

Branislav Antonić 85

RESILIENCE AND VULNERABILITY OF URBAN SYSTEMS. A METHODOLOGICAL PROPOSAL FOR SEISMIC RISK MITIGATION

Rigels Pirgu 94

Urban design and technologies

PUBLIC PLACES AND SPLIT DEVELOPMENT MODEL Višnja Kukoč	103
AGILE LANDSCAPES: REDESIGNING URBAN SPACE Anastasios Tellios, Despoina Zavraka	110
PLANNING AND DESIGNING SAFE AND SECURE OPEN PUBLIC SPACES IN SERBIA Svetlana Stanarević, Aleksandra Djukic	118
SPATIAL AND FUNCTIONAL TRANSFORMATION OF BUSINESS AREAS UNDER THE IMPACT OF INFORMATION TECHNOLOGIES – CASE STUDY OF NIŠ ADMINISTRATIVE DISTRICT Aleksandar Ristić, Petar Mitković	130
THE IMPACT OF NEW TECHNOLOGIES ON CITY ACUPUNCTURE METHODOLOGY AND INTERVENTIONS Kristina Careva, Rene Lisac	138
COMFORT OF OPEN PUBLIC SPACES: CASE STUDY NEW BELGRADE Aleksandra Djukic, Nevena Novakovic	145
005 PUBLIC ART IN BERLIN Biljana Arandjelovic	151
PROTECTION OF PERSON WHIT DISABILITIES: IMPLEMENTATION OF ACCESSIBILITY STANDARDS Dragana Vasiljevic Tomic, Radojko Obradović	160
VERTICAL PUBLIC SPACE Sorana Cornelia Radulescu, Roger Riewe	167
READY-AVAILABLE HYBRID METHODOLOGIES FOR CONTEMPORARY PUBLIC SPACE RESEARCH Milena Ivkovic, Berit Piepgras, Robin van Emden	175
RETAIL – NEW TECHNOLOGIES AND URBAN CENTRALITY Martin Brabant	181
TECHNOLOGY AND NEOLIBERAL URBAN PLACES Marija Cvjetković	191
NEURAL CITIES OR HOW CITIES TEACH US TO DESIGN THEM BETTER Angelica Stan	198
MORPHOLOGICAL AND TYPOLOGICAL CLASSIFICATION OF GREEN STREET FORMS: MLADEN STOJANOVIC STREET IN BANJA LUKA Tanja Trkulja	206

Urban regeneration and technology

PROPERTY ISSUES IN THE TURKISH URBAN REGENERATION PROJECTS

Mehmet Çete, Yunus Konbul 215

URBAN ENERGY AND URBAN REGENERATION STRATEGIES: EVALUATION OF IZMIR-UZUNDERE URBAN REGENERATION PROJECT

Yakup Egercioğlu, Çilem Türkmen 222

THE EMPTY URBAN SPACES AS AN OPPORTUNITY FOR THE CITY TO REINVENT ITSELF: THE CASE OF THE INDUSTRIAL TECHNOLOGICAL OBSOLETENESS

Cătălina Ioniță, Mihai Alexandru 230

ENHANCEMENT OF URBAN LIFE QUALITY IN URBAN REGENERATION PROJECTS: IZMIR-BAYRAKLI URBAN REGENERATION PROJECT

Yakup Egercioğlu, Tuğçe Ertan 238

THE INDUSTRIAL BUILDINGS WHICH USED IN SAUDI ARABIA AND SUSTAINABILITY

Wael Al-Buzz 246

AN OVERVIEW OF URBAN REGENERATION PROJECTS IN TURKEY

Yunus Konbul, Mehmet Çete 257

ART AND CULTURE AS INITIATORS OF ARCHITECTURAL AND URBAN TRANSFORMATION IN SAVAMALA

Ksenija Pantović, Iva Čukić, Jasna Kavran 265

Smart cities/regions and network protocols

SMART CITY GRAZ: FROM THE VISION TO THE ACTION

Carlos Varela Martín, Ernst Rainer, Hans Schnitzer 276

RESIDENTS INTERACTION WITH HOME RESOURCES

Cerasela Dinu, Constantin-Daniel Oancea 285

RENEWABLE AND DISTRIBUTED SOURCES WITHIN SMART ENERGY REGIONS

Jovan Todorovic 293

THE SMART CITY FOR THE FUTURE. HOW A SPATIALLY ENABLED AFFECTED BY THE URBAN POPULATION?

Shahryar Habibi 300

PERFORMANCE EVALUATION OF ROUTING PROTOCOLS FOR AD-HOC NETWORKS

Ledina Karteri, Valma Prifti 306

SMART CITIES AND CHALLENGES OF SUSTAINABILITY	
Rigels Pirgu	315
A FUZZY BASED CALL CONTROL SYSTEM IN MOBILE NETWORKS, CONSIDERING PRIORITY COMMUNICATIONS	
Valma Prifti, Ledina Karteri	323
Historical centers, Building heritage and Technologies	
ICT AND VGI TO PROMOTE MINOR HISTORIC CENTRES AND THEIR LANDSCAPE	
Pierangela Loconte, Francesco Rotondo	331
THE SUSTAINABILITY AND CULTURAL HERITAGE MANAGEMENT	
Christian Kersten Hofbauer, Elham Madadi Kandjani, Jean Marie Corneille Meuwissen	339
CONCEPTS OF FORMING OF URBAN SOLUTIONS IN HOUSING SETTLEMENTS IN BELGRADE BUILT IN PRECAST INDUSTRIALIZED SYSTEMS IN SECOND HALF OF XX CENTURY	
Dragana Mekanov	346
NEW ARCHITECTURE IN HISTORICAL CENTRES	
Alessandro Bruccoleri	355
INFORMATION AND COMMUNICATION TECHNOLOGIES TO IMPROVE THE KNOWLEDGE OF PLACES. THE ROME HISTORICAL CENTRE AS A CASE STUDY	
Francesca Geremia	363
CONTEMPORARY INTERVENTIONS IN HISTORIC PLACES _ THE EXAMPLE OF THESSALONIKI METRO	
Stavros Apotsos	372
Image and Identity of place	
THE IMAGE OF TRIFKOVIĆ SQUARE (NOVI SAD, SERBIA) THEN AND NOW	
Ivana Blagojević, Ksenija Hiel	380
IDENTITY OF NEW MEDIA SPACES	
Jelena Brajković, Lidija Đokić	388
THESSALONIKI: A MULTICULTURAL ARCHITECTURAL DESTINATION	
Niki Manou-Andreadis, Maria Milona	400
ELEMENTS OF IDENTITY AND UNUSED POTENTIALS OF CENTRAL ZONE IN NOVI SAD	
Milena Krklješ, Dijana Apostolović, Aleksandra Milinković	408

BELGRADE SKYLINE: CONTINUITY, PARADOXES & DESIRES Vladimir Milenković, Snežana Vesnić, Tatjana Stratimirović	416
CITY OF THE MIND - INVISIBLE IN THE MAP Jelena Stankovic, Milenko Stankovic	424
WHAT MAKES A PLACE? Saskia I. de Wit, Denise Piccinini	432
SUSTAINABILITY, IDENTITY AND ROLE OF TRADITIONAL MATERIALS Olivera Ilić Martinović, Mirjana Miletić	441
IDENTITY OF URBAN SPACES; ASSESSMENT AND EVALUATION Elham Madadi-Kandjani, Christian Kersten Hofbauer, Jean Marie Corneille Meuwissen	448
IMAGE OF SUSTAINABLE PLACES Vladimir Parežanin, Miloš Mihajlović	456
PRESERVATION OF IDENTITY OF SPACE WITHIN RAPID ECONOMIC AND TECHNOLOGICAL DEVELOPMENT OF TOURIST DESTINATIONS IN THE EXAMPLE OD JIJOCA DE JERICOACOARA IN BRAZIL Maja Momirov	469
 PART II: ARCHITECTURE AND TECHNOLOGIES	
Sustainability, Sustainable buidings and technologies	
SUSTAINABLE RETROFITTING OF EXISTING AND HISTORIC BUILDINGS Marina Traykova, Tanya Chardakova	477
OSMOTIC LANDSCAPES - RECOVERED IDENTITIES Venetia Tsakalidou, Anastasia Papadopoulou	485
DESIGN SCENARIOS FOR AN OFFICE BUILDING – ENERGY AND ENVIRONMENTAL ASPECTS Aleksandra Krstic-Furundzic, Tatjana Kosic	493
TECHNOLOGICAL AND ENVIRONMENTAL ASPECTS OF RAPID HOUSING CONSTRUCTION Nikola Macut, Bojana Stanković, Nataša Ćuković-Ignjatović	507
ENERGY ANALYSIS AND REFURBISHMENT STRATEGY FOR ZAGREB UNIVERSITY BUILDINGS: FORMER FACULTY OF TECHNOLOGY IN ZAGREB BY ALFRED ALBINI Stanka Ostojić, Zoran Veršić, Iva Muraj	515

SUSTAINABLE REUSE OF OLD STRATEGIC INFRASTRUCTURE CANAL DANUBE-TISA-DANUBE Mirjana Jočić, Nataša Kuburović	523
PLACE ATTACHMENT AS POTENTIAL FOR SUSTAINABLE LOCAL DEVELOPMENT IN SERBIA Anđelka Mirkov	533
LOW ENERGY BUILDINGS: CONCEPT OF ENERGY PERFORMANCE OPTIMIZATION OF SINGLE-FAMILY HOUSES Katarina Slavković	540
TECHNOLOGY AND PRODUCTIVE PROCESS: MINING REJECTIONS FROM WASTE TO SUSTAINABLE RESOURCE Vincenzo Paolo Bagnato, Giovanna Mangialardi, Silvana Milella, Michele Mundo	549
ADAPTATION OF AN INDUSTRIAL BUILDING INTO HIGHER EDUCATION INSTITUTION IN ACCORDANCE WITH IMPROVED ENERGY PERFORMANCE Branko Slavković, Komnen Žižić, Danilo Dragović	557
FUNCTION OF A DESOLATE SPACE Aleksandra Pešterac, Daniela Dimitrovska	565
ENVIRONMENT CERTIFICATION OF REHABILITATION DESIGN PROJECTS: PUT AND SHU BUILDINGS AS CASE STUDY Florian Nepravishhta, Gerta Veliu, Ramadan Alushaj	570
Green strategies and technologies	
GREEN URBAN STRATEGIES IN THESSALONIKI IN THE CONTEXT OF CRISIS Evangelia Athanassiou	580
GEOSCIENTIFIC EDUCATIVE CENTRE AS SUSTAINABLE COMMUNITIES BUILDING MODEL – POSITIVE COOPERATION EXAMPLE OF LIKA-SENJ COUNTY (CROATIA) AND UNA-SANA COUNTY (BIH) Ivan Brlić, Anita Bušljeta-Tonković, Katarina Milković	587
THE OCCUPANTS' PERSPECTIVE AS CATALYST FOR LESS ENERGY INTENSIVE BUILDINGS Lucia Martincigh, Marina Di Guida, Giovanni Perrucci	597
THE COLLECTIVE SELF ORGANIZED HOUSING EXPERIENCE IN ITALY Silvia Brunoro, Giacomo Bizzarri	605

APPLICATION OF ROOF GARDENS IN THE DEFINING IMAGE OF THE CITY	
Mirjana Sekulić, Bojana Stanković, Ljiljana Dosenović	613
STRATEGY FOR NATIONAL DEFINITION OF NEARLY ZERO ENERGY BUILDINGS	
Milica Jovanović Popović, Bojana Stanković, Jasna Kavran	621
ENERGY OPTIMIZATION OF THE BUILDING ENVELOPE OF THE REPRESENTATIVE SAMPLE OF THE EXISTING RESIDENTIAL BUILDING IN BANJA LUKA	
Darija Gajić, Aleksandra Krstić – Furundžić	629
BLUE GREEN DREAM AND DAYLIGHT	
Srdjan Stankovic, Cedo Maksimovic, Milenko Stankovic	637
POSSIBILITIES FOR ENERGY REHABILITATION OF TYPICAL SINGLE FAMILY HOUSE IN BELGRADE – CASE STUDY	
Bojana Stanković, Dušan Ignjatović, Nataša Ćuković-Ignjatović	646
BLUE-GREEN INTEGRATED MODELING SOLUTIONS IN URBAN PLANNING AND ARCHITECTURAL DESIGN	
Miloš Mirosavić, Ivana Mirosavić, Srđan Stanković, Čedo Maksimović, Ranko Božović	654
POTENTIALS AND LIMITATIONS FOR ENERGY REFURBISHMENT OF MULTI-FAMILY RESIDENTIAL BUILDINGS BUILT IN BELGRADE BEFORE THE WORLD WAR ONE	
Ljiljana Đukanović, Ana Radivojević, Aleksandar Rajčić	661
FROM BUILDING INFORMATION MODELS TO SIMPLIFIED GEOMETRIES FOR ENERGY PERFORMANCE SIMULATION	
Daniel Ladenhauf, René Berndt, Eva Eggeling, Torsten Ullrich, Kurt Battisti, Markus Gratzl-Michlmair	669
ENERGY CITY GRAZ - REININGHAUS: FIRST RESULTS FROM AN ENERGY SELF-SUFFICIENT QUARTER	
Heimo Staller, Ernst Rainer, Carlos Varela Martín	677
ENERGY EFFICIENCY AS ADVANCED TECHNOLOGY FOR A SOLUTION TO THE PROBLEM OF DEPOPULATION OF RURAL AREAS IN SERBIA	
Jovana Stanišić	684
THE ENERGY EFFICIENT CITY	
Ivan Dochev	692

Innovative materials, systems and technology

INVESTIGATION OF FLY ASH INFLUENCE ON CEMENT MORTARS PROPERTIES

Dragica Jevtić, Aleksandar Savić 701

INFLUENCE OF GLASS COMPONENT JOINTS ON THE STRUCTURAL GLASS FACADE DESIGN

Aleksandra Krstic-Furundzic, Tatjana Kosic, Jefto Terzovic 709

QUANTIFYING THE THERMAL BRIDGING EFFECT WITH REGARD TO THE FAÇADE'S CONFIGURATION

Katerina Tsikaloudaki, Theodore Theodosiou, Dimitris Aravantinos, Karolos Nicolaos Kontoleon, Dimitrios Bikas 720

THE INFLUENCE OF NEW TECHNOLOGIES ON MODERN CITY FACADES

Jasna Čikić Tovarović, Jelena Ivanović Šekularac, Nenad Šekularac 728

DYNAMIC APPEARANCE OF URBAN AND ARCHITECTURAL SURFACES

Tihana Hrastar, Tamara Marić, Bojana Bojanić 736

TOWARDS GENERATIVE CONVERGENCE IN DESIGN OF ARCHITECTURAL STRUCTURES

Jelena Milošević, Zoran Šobić, Miodrag Nestorović 744

APPLICATION OF WOOD AS AN ELEMENT OF FACADE CLADDING IN CONTEMPORARY ARCHITECTURE OF BELGRADE

Jelena Ivanović Šekularac, Jasna Čikić Tovarović, Nenad Šekularac 752

COMPARISON OF INSULATION APPLIED ON SURFACES OF MODEL PLACED IN THE AREA OF SKOPJE

Aleksandar Petrovski, Todorka Samardzioska, Ana Trombeva Gavriloska 758

APPLICATION AND EFFECTS OF PHASE CHANGE MATERIALS IN A MODERN ARCHITECTURAL AESTHETICS

Vladana Stanković, Goran Jovanović, Mirko Stanimirović 766

INTEGRATED DESIGN OF STRUCTURAL SYSTEMS

Aleksandra Nenadović 772

NEW COMPOSITE SLAB SYSTEM – LIGHTWEIGHT CONCRETE, STEEL SHEETING AND REINFORCEMENT

Zoran Šobić, Jelena Milošević, Miodrag Nestorović 780

MODERN METHODS OF STRENGTHENING MASONRY WALLS

Nenad Šekularac, Jasna Čikić Tovarović, Jelena Ivanović Šekularac 788

NEW PERSPECTIVES FOR FERROCEMENT

Ornela Lalaj, Yavuz Yardim, Salih Yilmaz 796

Cultural patterns, Architecture and technologies

SPATIAL AND SOCIAL ASPECTS OF THE ARSENAL TRANSFORMATION, MILITARY PORT IN TIVAT INTO NAUTICAL – TOURISM SETTLEMENT AND PORT „PORTO MONTENEGRO“ Goran Radović	805
DIGITAL FABRICATION IN THE FIELD OF ARCHITECTURE Roberto Vdović, Morana Pap	816
THE IMPACT OF SMART HOME TECHNOLOGIES ON ARCHITECTURAL DESIGN Goran Petrović, Marko Aleksendrić	822
BETWEEN THE PLACE AND NON-PLACE: ARCHITECTURE AND TERRITORY ON THE EXAMPLE OF SKOPJE Saša Tasić, Mitko Hadzi Pulja, Minas Bakalchev	830
INTEGRATED ARCHITECTURAL COMPLEXITY - FROM ABSTRACTION TO TECHNOLOGY AND MATERIALISATION Rada Čahtarević, Dženana Bijedić, Amra Taso	838
EVOLUTION DIGITIZED: ARCHITECTURE OF THE SUBLIME DREAM Mihailo Popović, Vladimir Milenković	846
MONOCHROMATIC IN THE ARCHITECTURAL COMPOSITION: WITH SPECIAL REFERENCE TO THE APPLICATION OF WHITE COLOUR Dragana Vasiljevic Tomic, Rifat Alihodzic, Dragana Mojsilovic	853
(RE)GENERATION & REFLECTIONS OF THE SCHOOL OF ARCHITECTURE – BANJALUKA IN THE CENTURY OF KNOWLEDGE AND SKILLS Milenko Stanković, Una Umićević	864
QUANTUM ARCHITECTURE, NON-PLACE AND ACCULTURATION Dubravko Aleksić	873
PLACES AND PRACTICES OF CONSUMPTION IN THE POST-SOCIALIST CONTEXT Dejana Nedučin, Dušan Ristić, Vladimir Kubet	880
INTERACTIONS BETWEEN LIGHT AND ARCHITECTURE: AN EXPERIMENT USING MODELS AND PHOTOGRAPHS Anita Stoilkov-Koneski	888
THE INTERPLAY OF MUSIC AND ARCHITECTURE: LAYERING OF SOUND AND SPACE Anja Kostanjšak, Morana Pap	895
CULTURAL PATTERNS AND SENSITIVITY TODAY: FROM THE PHILOSOPHY TO THE TECHNOLOGY IN ARCHITECTURAL DESIGN PROCESS	

Małgorzata Kądziela, Anna Sachse-Rynkowska	904
PART III: PLACES, TECHNOLOGIES AND RELATED FIELDS	
Big data, apps, social networks and microblogs in urban planning and design	
PLACE COMPETITIVENESS EXPRESSED THROUGH DIGITAL DATA. MEASURING THE PLACE ATTRACTIVENESS TRACKING THE GEOTAG DATA VISUALS	
Milena Vukmirovic, Eva Vanista Lazarevic	914
ROOM BOOK 2.0 – BRING BACK THE INFORMATION TO ITS PLACE	
Christoph Breser, Stefan Zedlacher	926
THE INTERCONNECTED OBJECT: ARE YOU AT HOME IN A NETWORK?	
Kalina Ntampiza, Polina Zioga	936
THE INTERACTION TIME IN A NETWORKED SOCIETY	
Danijel Baturina	944
GOOGLE EARTH AS A MICROWORLD	
Milena Zindović	962
TRANSPARENCY OF SCALE: GEOGRAPHICAL INFORMATION PROGRAM (GOOGLE EARTH) AND THE VIEW FROM BEYOND	
Pavle Stamenović, Dunja Predić, Davor Ereš	970
Geodesy and modern cartography	
ROBUST ESTIMATION APPLIED TO GEODETIC DATUM TRANSFORMATION USING A METAHEURISTIC ALGORITHM	
Mevlut Yetkin	979
THE STATE OF THE ART SURVEYING BY TECHNOLOGY OF THE TERRESTRIAL LASER SCANNING	
Marko Pejić, Branko Božić, Verica Erić, Jelena Pandžić	987
ROLE OF CARTOGRAPHY IN MAKING A “SMART CITY”: CASE STUDY OF INDIJA	
Dragutin Protić, Ivan Vučetić, Ivan Nestorov	995
MODERN CARTOGRAPHY IN PROJECT OF CENSUS	
Maja Kalinić, Dragoljub Sekulović	1002

Mobility and technologies

PERSONAL RAPID TRANSIT – A SUSTAINABLE URBAN TRANSPORT SYSTEM

Ljupko Šimunović, Luka Novačko, Mario Ćosić 1011

FLIGHTPATH TO AN ENVIRONMENTAL FRIENDLY AIR TRANSPORT

Ivana Čavka, Olja Čokorilo, Slobodan Gvozdenović 1020

PRESERVATION OF PLACE-IDENTITY THROUGH URBAN TRANSFORMATIONS BASED ON SUSTAINABLE FORMS OF TRANSPORT

Miloš Kopic 1029

BELGRADE RIVERSIDE TRAFIC INTERCHANGES

Ksenija Stevanović, Milena Stevanović 1037

SUSTAINABLE URBAN MOBILITY PLANS IN EUROPE

Davor Brčić, Ljupko Šimunović, Marko Slavulj 1045

URBAN DEVELOPMENT IN BELGRADE IN THE CONTEXT OF GLOBAL TRENDS: CHANCES OF ILLEGAL HOUSING INTEGRATION

Biserka Mitrović, Miodrag Ralević, Branislav Antonic 1051

RE-THINKING INFRASTRUCTURE PROJECT FOR THE METROPOLIS: LABORATORY GRANADA

Juan Luis Rivas Navarro, Belén Bravo Rodríguez 1059

Public participation, e-governing and tehcnology

COMMUNITY PARTICIPATION AND GREEN INFRASTRUCTURES: A DELIBERATIVE EVALUATION METHOD

Saverio Miccoli, Fabrizio Finucci, Rocco Murro 1067

RESULTS OF INTRODUCTION OF PARTICIPATORY TOOLS IN URBAN PLANNING IN SERBIA – 7 CASE STUDIES

Ratka Čolić, Harald Mueller 1075

WAYS TOWARDS A CITY OF NEW TECHNOLOGIES

Miodrag Ralevic, Tatjana Mrdjenovic, Natasa Krstic, Djemila Beganovic 1083

PARTICIPATION OF CITIZENS IN TOWN PLANNING PROCEDURES IN NEIGHBOURHOODS WITH FORMER REFUGEE AND DISPLACED POPULATION IN PRIJEDOR, BOSNIA AND HERZEGOVINA

Rada Latinović 1090

THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN A VIRTUAL ORGANIZATION

Jelena Lukić 1098

IDENTITY OF NEW MEDIA SPACES

Jelena Brajković,

PhD Candidate, Faculty of Architecture, University of Belgrade, Kralja Aleksandra Boulevard 73/II, 11 000 Belgrade, Serbia, jelena.brajkovic@arh.bg.ac.rs

Prof. Dr. Lidija Đokić

Faculty of Architecture, University of Belgrade, Kralja Aleksandra Boulevard 73/II, 11 000 Belgrade, Serbia, lidija@arh.bg.ac.rs

ABSTRACT

This paper has the goal to analyze influence that new media and technologies have made on the identity and quality of architectural space. In the present Information Age, digital technologies have crucially influenced and changed our reality, the way we behave, connect or communicate. Being part of the overall reality, architectural space is not an isolated category. It has also received and adopted the influence of new media and technologies. The way people communicate with space, due to new technologies, is now different. In some cases space is becoming an interface, a navigational environment waiting for the user to explore it. This paper analyzes the emerging new categories of space - new media spaces, qualities that such spaces possess and the identity they have developed.

INTRODUCTION

The phenomenon of new media has a strong impact on both the theoretical and practical fields of art and architecture. Many theoreticians are being preoccupied with the impact of this phenomenon in the fields of art and architecture, trying to grasp its essence and define its language, giving us a valuable theoretical framework for further analysis. At the same time, contemporary practice leaves us without breath with numerous new examples of creative use of technology in the processes of defining and creating space on the verge of the believable.

How are the new media redefining the notion of space in architecture, what are the boundaries of such space, what is the role of the human body in such a space, how is our perception challenged, are all questions to be answered later.

NEW TECHNOLOGIES AND MEDIA - ELEMENTS OF THEIR IDENTITY

What are the *new media*? What does the term *new media* mean? The term *new media* also has a more precise form - *new technological media*, through which we can better understand its full meaning. So, the term *new media* in architecture

assumes that new technologies have been used as *medium*⁹⁰ for conceptualizing, producing, creating and presenting, even experiencing, space in architecture. Nowadays traditional media and categories in art and architecture such as painting, sculpture, photography, façade or wall surface, lightning, public space... and so on... are being infused and redefined by new technologies, therefore becoming more extended and more complex categories.

Digital Technologies

The most influential in terms of creating a new identity and new qualities, not only of space, but the overall reality, are undoubtedly the digital⁹¹ technologies. During the 1990s their rapid and unstoppable development⁹², became a phenomenon known as the digital revolution. An important part of this phenomenon was especially the advent of the World Wide Web, which added a special layer to global connectivity (Paul, 2008). The main characteristics of the digital media, defining its identity, are *interdisciplinarity, evolvability, participativity, dynamism, adaptability, system-based logic* and so on. New concepts derived from digital technologies, also strongly influencing the identity of space are: *Coding and recontextualization of information, processing; Interactivity, concept of the interface and the user; Connectivity and telepresence; Virtuality, composite and augmented realities; Cybernetics, concept of man-machine, artificial organism, science fiction*. Being infused by digital technologies, significant advancements appeared in the fields of light technologies and bio-technologies, which are nowadays becoming more and more present in space.

Light technologies

Lighting of architectural space has always been a strong element in defining the overall identity of space, with special influence and power on modeling psychological experience of the space. By differently defining the entrance points of natural light in space or, in case of artificial lighting, choosing a certain tone, color, source or position of light, architectural space can be radically altered, and the perception can be easily altered. Nowadays lighting technologies can give plain space additional layers, creating a virtual moment in space, not physical but perceivable. In the age of digital media light technologies such as LED technologies, laser, neon, electric light and fiber optics... have been paired up with digitally driven systems to become *dynamic, responsive or sensitive*. Modern concepts of light technologies are *computer-controlled dynamic light systems* as well as *smart light-infused materials*.

Biotechnologies

Engineers today are more and more interested in investigating “emerging and progressive biological advances upon architectural and design practice... This covers

⁹⁰ An agency or means of doing something.

<http://www.oxforddictionaries.com/definition/english/medium>, accessed January 10, 2014.

⁹¹ Involving or relating to the use of computer technology.

<http://www.oxforddictionaries.com/definition/english/digital?q=digital>, accessed January 10, 2014.

⁹² Although foundations of many digital technologies go back sixty years

a wide range of disciplines, encompassing biology, microbiology, biotechnology, medicine and surgery” (Castle, 2008, p.4). Nowadays we have emerging terms and fields of architecture such as *protocell* architecture, *neoplastic* design, *biomimicry* forms, *organic* architecture, and *biomorphic*, *morphogenetic*, *fluid* forms and so on. What is especially provocative from the architectural point of view is that these disciplines “put forward a wholly new proposition for architecture. It challenges the very notion of what the substance is and what it can be...” (Castle, 2008, p.4). In the core of such technologies and concepts derived from them, lies the ultimate phenomenon of '*biologicalisation*' of the present world. “Biotechnology, including disciplines such as genetics, molecular biology, biochemistry, embryology and cell biology, as well as chemical engineering, information technology and robotics, is the area in which developments possess, for better or worse, the highest potential for changing the way we understand life” (Cruz and Pike, 2008, p.9). These technologies have developed concepts in architecture such as *bio-architectural composites*, *semi-living spaces*, *synthetic but evolutionary spaces*...

THE IDENTITY AND QUALITY OF SPACE

Technological development is one of the main characteristics of the modern age. It seems that architecture is more and more becoming dependent on technological concepts. Architectural space has always been an embodiment of the technological spirit of the time. During the Industrial Age architectural space was strictly defined, constructed mainly out of steel and glass, with a clear notion of modular assemblability and prefabrication. First the Crystal Palace in London and later the Eiffel's Tower in Paris strongly demonstrated domination and possibilities of materials such as glass and steel.

The present Information Age, in which we live is dominated by digital systems. Frank Gehry's Guggenheim Museum in Bilbao Branko Kolarevic sees as “probably the best known example that captures the *zeitgeist* of the digital information revolution... Information Age, just like the Industrial Age before, is challenging not only how we design buildings but also how we manufacture and construct them” (Kolarevic, 2009, p.3).

Not only in relation to technology, has the identity of architectural space always embodied the *zeitgeist* in which society exists. It reflects the overall principles and qualities appreciated by the society. Architectural space in the Classical Period reflected principles of immortality and duration. Through the Renaissance Period it reflected order and proportion... and in the Industrial Age mass production and modularity. Nowadays architectural space reflects principles and qualities such as *mobility*, *adaptability*, *flexibility*, *responsiveness*, *interactivity* and *virtuality*. All of these elements of identity reflect concepts derived from new media and technologies. More than ever the line between science and art is thin. Today scientists, researchers, explorers, all those who explore possibilities of applying new technologies in terms of narrative, but also realization of space are pushing architecture forward.

So what is the identity of new media spaces? For modern engineers “...Imperatives of modernism – mass production and the prevalence of a rational and functional approach – are more obsolete. Instead, their pieces are intended as sophisticated fairytales for grown-ups. They speak to the mind in subliminal narratives, and instill controversial feelings of opulence... and fragility. The sensual darkness of their work opens the doors of a mysterious and fantastic world, where their designs become the protagonist in our own imaginary piece of theatre” (Freyer, Noel, Rucki, 2010, p.16). What are qualities of such modern fairytales? Virtuality, illusion, enhanced sensing, abandoning the physical, enhancing the reality?

NEW MEDIA SPACES AND THEIR IDENTITY

Interactive Space

Interactive space is an ever more present category in nowadays architecture. This type of space has, as the main concept, *interactivity* which derived from digital technologies and media. For most digital technologies interactivity is a fundamental concept. In order to use computers or some digitally driven systems it is necessary for the user to make input contact and continue using the system in the appropriate way. *Interface* is a navigational method or a device that guides the user through an action he has started with the system. The *user* is a much needed category in the world of digital systems and this concept of the information media has been translated onto the identity of interactive spaces.

Due to the use of digital media, architectural space is nowadays transforming into interface, a navigational environment waiting for the *user* to experience it or put it to purpose. Interactive concepts in space are in their nature *event-based*. The main identity characteristics of such environments are *flexibility, responsiveness, changeability* and *connectivity of remote places*. The aesthetics of such space is specific, non-static, usually time-based or limited, finally non-readable in some cases without the external context information. The main quality of interactive space is that it is responsive to “human body which is able to directly experience its environment in a very direct and personal way” (Bullivant, 2006, p.7).



Figure 1: Bridge. Michael Cross. 2006. <http://www.microsiervos.com/images/michael-cross-bridge.jpg>

BRIDGE. MICHEL CROSS. 2006. DILSTON GROVE. This interactive environment is seeking human interaction to enable a dream-like scenario. Floor space of the disused concrete church is filled with dark water. As a person approaches to water by stairs, a small wooden step suddenly raises from the depth, inviting the visitor to continue walking on water. As a person does so, another step emerges. As the steps emerge in front of the person, they also disappear behind him (Freyer, Noel, Rucki, 2010). By allowing us to fulfil the everlasting dream of walking on water, this interactive environment creates, as told by users, *a very immersive, slightly frightening, physically involving experience*. As steps are so subtly emerging and disappearing, they appear as almost non-existing, giving the human interaction with water a more intense and unsecure feeling.

3D KINETIC FACADE IN SOCHI. ASIF KHAN. 2014. Olympic Face Detection: An extendable telescopic cylinder should transform, within seconds, the faces of the visitors into digital data sets and into a model larger than life, on the textile white membrane of an interactive façade, during the 2014 Winter Games⁹³. As the main concept, the project has the concept of innovative communication between the user and the architecture. Boldly and questionably, this concept is putting terms like *selfie picture* and *architecture* in the same sentence. Functioning of the space is based on a photographic approach, and the developers are hoping to gain cinematic experience. The aesthetics of this space is not conventional. It is process-based, where we find beauty more in the process itself - the way architecture is becoming a photographic media, then in any other traditional way. Looking at it, we see space that combines and blurs media and categories such as photography, cinema and architecture. The main quality of this space is that it is offering bold ideas about how traditional architectural surface can be treated; that it can become interactive and dynamic media for interpreting and exploring information society phenomena and habits.

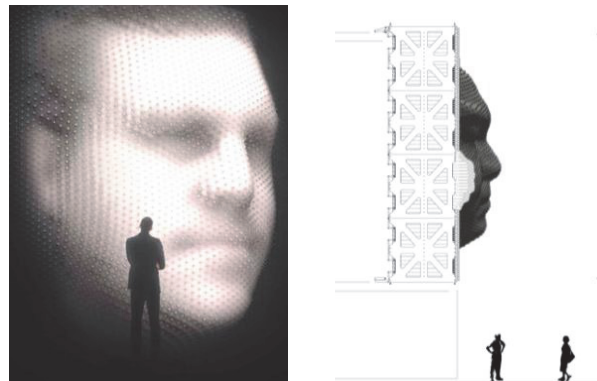


Figure 2: Kinetic Façade in Sochi. Rendering: Asif Khan.

<http://www.detail.de/architektur/news/selfies-in-3d-kinetische-fassade-in-sotschi-022685.html>

Figure 3: Kinetic Façade in Sochi, Graphics: iart ag

<http://www.detail.de/architektur/news/selfies-in-3d-kinetische-fassade-in-sotschi-022685.html>

⁹³ <http://www.detail.de/architektur/news/selfies-in-3d-kinetische-fassade-in-sotschi-022685.html>, accessed January 28, 2014.

Virtual and Augmented Space

Digital media have given a new dimension to the concept of virtual reality, augmented reality or the composite one. But the term *virtual* is not new. The use of the term can be traced back to the late 14th century. The first dictionary definition dates back to 1902, where "A virtual X (where X is a common noun), is something, not an X, which has the efficiency (virtus) of an X" (Baldwin, 1903, reprinted in Pierce, 1958, vol. 6, p. 372). So in the terms of reality, virtual reality would be not exactly a reality but having all its *virtues*. It is a *latent event, not real but can be experienced, not existing but existing* and so on... Virtual reality is perceivable, but not physical in all its aspects. *Virtual reality* and *virtual space* are complex philosophical questions. The concept of existing, being present in virtual space, can be grasped through the definition of the philosopher Michael Heim "Something can be present in virtual reality without its usual physical limitations" (Heim, 1993, p.160). When digital media appeared, they quickly established domination, not only over the term, but also over the category of space itself. Virtual space is nowadays, in most cases, generated and accessible by digital technologies only. Virtual space is a complex category in architecture, highly dependent on technology, challenging questions of perception, physical senses and presence in space. In the Digital Age, in a new way, *virtuality* is becoming a quality of space, with endless possibilities for developing. Virtual spaces especially challenge traditional concepts of reality and presence of physical body in space (Paul, 2008).

ONDULATION. THOMAS MCINTOSH.2002. *Ondulation* is a composition for water, sound and light. The main subject of the space narrative is visualization of sound. In semi-darkness, water in a large basin ripples, as waves radiate across its surface, with perfect mathematical purity. Two powerful speakers, concealed beneath the elastic lining of the pool, allow for the sonic vibrations to be transmitted into the fluid. Water movements reflect on surrounding walls (Freyer, Noel, Rucki, 2010). Due to mixing virtual categories such as sound and light, with physical medium of water into unified visual equilibrium, the overall experience of the space gets to be highly immersive. This immersive space possesses quality of augmented reality, reaching highly unstable, highly sensitive, fragile and poetic aesthetic values.

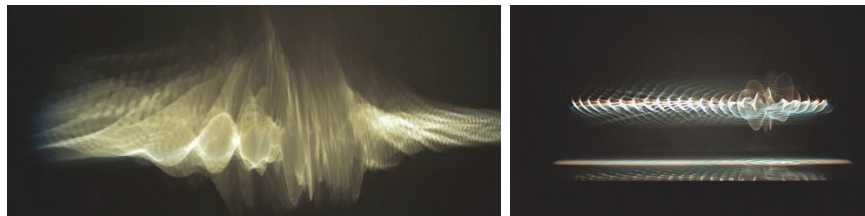


Figure 5: Ondulation. Thomas McIntosh.2002 http://www.undefine.ca/wp-content/uploads/2009/09/008_Ondulation-420x168.jpg

Figure 4: Ondulation. Thomas McIntosh.2002 <http://www.fondation-langlois.org/media/CRD/public/d00017911.jpg>

OSMOSE (1995), *EPHEMERE* (1998). CHARLOTTE DAVIES. These two virtual-reality environments present classics of the category of completely immersive environments that push viewers heavily into an alternate world. In *Osmose* the user enters the virtual space by means of head-mounted displays and a monitor tracking vest that tracks the wearer's breathing and balance. The world is at first a three-dimensional grid that introduces coordinates for orientation. "The breathing and body balance of the system users transports them into a forest and other natural environments. To avoid representational realism in the creation of her worlds, Davies provides in space an element of translucency and use textures that suggest a constant flow of particles"(Paul, 2008, p.127). *Osmose* is a sensual environment, but as Paul notes, it includes layers of „text“ and „code“, which illustrate the software on which the work is based. It investigates the relationships between technology, nature and body, three categories nowadays seriously challenged and interconnected. In *Ephemere* Davies uses a structure of three main levels – landscape, earth and interior body. *Ephemere*, like *Osmose*, includes *interior body* realm and blurs the boundaries between the subject and its surroundings. The main quality of this space is that by „immersing viewers in a virtual world driven by their own body and breathing“ it is radically challenging traditional notions of embodiment and the body's connection with its physical environment (Paul, 2008).

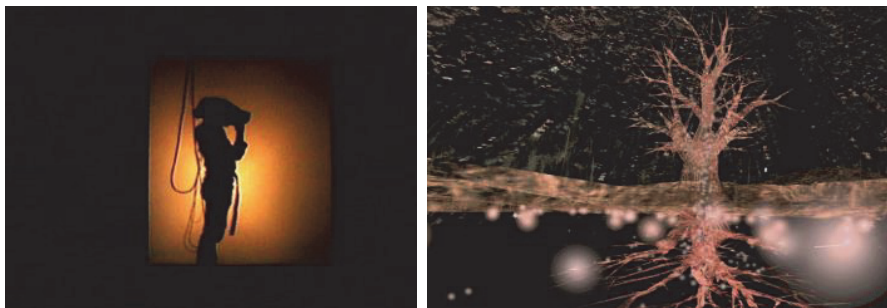


Figure 6: Virtual Reality Headset. <http://www.immersence.com/publications/1998/1998-MMirapaul.html>

Figure 7: Virtual Reality Headset. http://www.digitalstudies.org/ojs/index.php/digital_studies/article/viewFile/181/249/1192

Illuminated Space

Engineers today are using computer-controlled lighting technologies as a dynamic sculptural element in space. Digitally-driven light installations, flexible and responsive LED screens and surfaces, pixelated light, kinetic light sculptures, interactive laser installations... are nowadays highly effective visual systems that strongly define the identity of space. Such spaces partly inherit the identity characteristics of digital media (*interactivity, responsiveness or participation*) and partly the identity of light technologies - *immateriality, make-believe, transparency or lightness*. Some elements of identity are mutual for the digital media and for the lighting systems. Those are qualities of *virtuality* and *immersiveness*. Lighting

technologies have also paired up with physics in order to create materials that are light-infused. Such materials were at the beginning plain fibre-optics, but now, in order to achieve some new qualities of space, creative industries have paired up with science labs to realize the idea of reinventing traditional materials and infusing them with light. 'Dynamic fluo paint', smart materials that can glow as reaction to temperature changes, or other physical stimulus⁹⁴ are just some contemporary concepts of using light in a new way in architectural environments.

OPEN AIR. RAFAEL LOZANO-HEMMER. PHILADELPHIA. 2012. This work is an example of a digitally driven interactive light-system project that adds a new layer to plain earthly space by illuminating the sky above Philadelphia's historic Benjamin Franklin Parkway. Twenty four powerful searchlights create unique, dynamic light formations in the sky, which react to voice messages sent by participants using a free mobile app and website. Lights react, in brightness and position, to the frequency and amplitude of the voice recordings, creating an intense, dynamic and virtual layer in space. We see again technology and nature intersecting. Beautiful scenes of illuminated night sky, the depth and the scale of it, its dynamism, present us the usually hidden sub-layers of space at night.



Figure 8: Open Air. Rafael Lozano-Hemmer <http://www.lozano-hemmer.com/showimage>

Figure 9: Open Air. Rafael Lozano-Hemmer http://www.lozano-hemmer.com/showimage.php?img=philly_2012&proj=Open%20Air&id=66

VIDEO PROJECTION MAPPING. Techniques of video projection mapping are nowadays widely spread and used in architectural space. Their dynamic nature and carefully planned positioning in space have a strong power of creating illusion in space, giving it a virtual layer of dynamism. At first, projection mapping was used on large scale facades of objects in public space, but now it is also being used in interiors, becoming the dominant element of the identity of space, producing a more intimate connection with the viewer. Here we can see space becoming *media* in terms of mass communication. Animation, video and cinematic media in this case get a new canvas, in the form of an architectural surface. Joined together in a new

⁹⁴ <http://www.studiooosegaard.net/project/smart-highway/info/>, accessed January 23, 2014.

way, video and architecture influence one another as to create a whole new experience and a new dimension for both traditional categories.



Figure 10: Songdo. AntiVj. 2009. South Korea <http://www.antivj.com/>

Figure 11: Atrium Champagne Bar, London Foster+Parters, 2013. <http://www.dailytonic.com/atrium-champagne-bar-by-foster-partners-uk/>

SMART LIGHT-INFUSED MATERIALS. At the moment, Studio Roosegaarde is one of the first to experiment in practice with the light-infused materials and smart light technologies. One of the small scale projects of the studio, the Van Gogh Bicycle Path, whose final design is expected to be finished in 2014, and realised in the Province of Noord-Brabant in the Netherlands, demonstrates the possibilities of these techniques of lightning and the identity it can create in space. The Roosegaarde - Van Gogh bicycle path makes use of the light-emitting techniques of the Smart Highway concept, a joint development of Studio Roosegaarde and Heijmans for the highway of tomorrow. The path should consist of thousands of sparkling stones designed by artist Daan Roosegaarde. The light stones will be used to create patterns in the path that will charge during the day and emit light during the evening. "This creates interplay of light and poetry. The design this way provides a modern interpretation to Vincent van Gogh. Cultural heritage and innovation merge in this new, public landscape"⁹⁵.

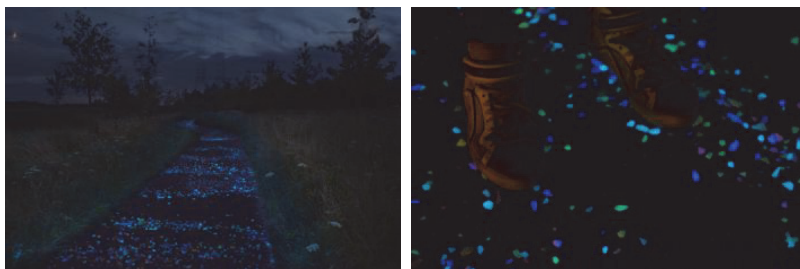


Figure 12: Van Gogh Bicycle Path. Roosegaarde. http://uk.heijmans.nl/Roosegaarde-%20Van_Gogh_Bicycle_Path#.UmjeGmkW2Sd

Figure 13: Van Gogh Bicycle Path. Roosegaarde. http://uk.heijmans.nl/Roosegaarde-%20Van_Gogh_Bicycle_Path#.UmjeGmkW2Sd

⁹⁵ http://uk.heijmans.nl/Roosegaarde-%20Van_Gogh_Bicycle_Path#.UmjeGmkW2Sd, accessed December 28, 2013.

Bio-Synthetic Space

Protocell technology represents chemical innovations of synthetic biology - “that is artificial cell systems that self-reproduce and maintain themselves” (Castle, 2011, p.5). In this technology we find science disciplines like microbiology, medicine, chemistry, but also ecology. In the terms of architecture, its main vision is to create synthetic but evolutionary systems of cells, that can evolve from a micro level to fully built structures and spaces, creating functional and sustainable environments. The main characteristics of the identity of this technology are *evolving*, *manipulation*, *repositioning* and *restructuring*. Space created on protocell principles should also gain these same characteristics and qualities. Such space would be an artificially designed living system, and this concept is yet to be explored for its possibilities in architecture.



Figure 13: Hylozoik Ground. Philip Beesley.
2010.http://i1.ytimg.com/vi/v86B9Nz_LVU/maxresdefault.jpg

Figure 14: Hylozoik Ground. Philip Beesley.
2010.http://i1.ytimg.com/vi/v86B9Nz_LVU/maxresdefault.jpg

HYLOZOIC GROUND. PHILIP BEESLEY. CANADIAN PAVILION, VENICE BIENALLE, 2010. Hylozoic Ground is installation based on protocell technology. “It is an environment organized as a textile matrix supporting responsive actions and 'living' technologies, conceived as the first stages of self-renewing functions that might take root within a future architecture” (Beesley, Armstrong, 2011, p.81). The protocell populations are designed with the same metabolism. They are sensitive to environmental conditions and respond locally to the presence of metal ions in the flasks. The chemical metabolisms are connected via the neural net of the responsive geotextile system as well as through the physical and chemical changes in the environment. The protocell metabolisms are able to respond to heat, light and the presence of carbon dioxide. As result they produce a colorful landscape of crystals at the oil/water interface that gradually become petrified over the duration of time. Protocells are chemical systems capable of behaving in ways we would associate with life. By building environments of responsive and complex protocell systems, gradually we could come to the point of communicating with space as if it is alive (Armstrong, 2011).

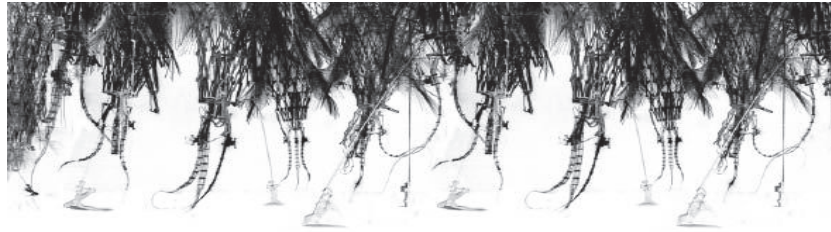


Figure 15: Hylozoik Ground. Philip Beesley. 2010.
http://i1.ytimg.com/vi/v86B9Nz_LVU/maxresdefault.jpg

CONCLUSIONS

The most influencing technology of today, becoming not only a tool, but also a media in architecture is the digital technology. Paired up with light technologies and bio-technologies, it is unstoppable in inspiring and suggesting new possibilities for development of architecture. It has influenced the notion of space in architecture by developing new concepts, new identities and new features of space as radical as being synthetic or semi-living. Space has become event-based, interactive, responsive, performative, augmented, virtual, smart, evolvable, adaptable, and so on. It has adopted the main principles and concepts of the technologies that mediate it. The main adopted principles, derived from digital technologies, which influence space are the principles of user/interface communication, processing and virtual reality. Advancements in bio-technologies have made principles like living, evolving, adapting and sensing become a possible direction of development of architectural space. In terms of light technologies light-infused materials, video mapping and dynamic light systems have made it possible for light to get a more dominant role in defining the overall identity of space.

What is certain is that nowadays the term *architectural space* is not a clear category; it is upgraded with the virtual space of new media. More often instead of *space* we use with the term *environment*, because of all of the extended layers in which it manifests and can be perceived. In such environments the role of the physical human body is radically changing. The limits and the future possibilities for the human interaction with space, and the experience of it, are yet to be seen.

REFERENCES

- Armstrong, Rachel. 2011. "How Protocells Can Make 'Stuff' Much More Interesting". *Architectural Design, Protocell Architecture*. Vol. 81, No. 2 (March/April). p.68-78.
- Baldwin, J. M. 1903. *Dictionary of Philosophy and Psychology*, New York. Reprinted in Peirce, C. S., *Collected Papers*, Cambridge, Massachusetts, 1935, 1958, Vol. 6, 372.
- Beesley, Philip, and Armstrong, Rachel. 2011. "Soil and Protoplasm: The Hylozoic Ground Project". *Architectural Design, Protocell Architecture*. Vol. 81, No. 2 (March/April). p.78-90.
- Bullivant, Lucy. 2006. *Responsive Environments*. London: V&A Publications.

- Castle, Helen. 2008. "Editorial". *Architectural Design, Neoplastic Design*. Vol. 78, No. 6 (November/December). p.4.
- Castle, Helen. 2011. "Editorial". *Architectural Design, Protocell Architecture*. Vol. 81, No. 2 (March/April). p.5.
- Cruz, Marcos, and Pike, Steve. 2008. "Neoplastic Design: Design Experimentation With Bio-Architectural Composites." *Architectural Design, Neoplastic Design*. Vol. 78 No. 6 (November/December). p.6-16.
- Freyer, Conny, and Noel, Sebastien, and Rucki, Eva. 2010. *Digital by Design*. London: Thames & Hudson Ltd.
- Heim, M.1993. *The Metaphysics of Virtual Reality*, Oxford, p.160; cf. also p. 132.
- Kolarevic, Branko. 2009. *Architecture in the Digital Age. Design and Manufacturing*. Edited by Branko Kolarevic. Milton Park, Abingdon, Oxon: Taylor and Francis Group.
- Manovich, Lev. 2001. *The Language of New Media*. Cambridge, Massachusetts: The MIT Press.
- Paul, Christiane. 2008. *Digital Art*. London: Thames & Hudson Ltd.
- Rush, Michael. 2005. *New Media in Art*. London: Thames & Hudson Ltd.
- <http://www.oxforddictionaries.com/definition/english/medium>, accessed January 10, 2014.
- <http://www.oxforddictionaries.com/definition/english/digital?q=digital>, accessed January 10, 2014.
- <http://www.detail.de/architektur/news/selfies-in-3d-kinetische-fassade-in-sotschi-022685.html>, accessed January 28, 2014.
- <http://www.studio Roosegaarde.net/project/smart-highway/info/>, accessed January 23, 2014.
- http://uk.heijmans.nl/Roosegaarde-%20Van_Gogh_Bicycle_Path#.UmjeGmkW2Sd />, accessed December 28, 2013.