SYMPOSIUM
CroArtScia 2015
TECHNOLOGICAL INNOVATIONS: ART & SCIENCE

Under the Auspices

The Department of Mathematical, Physical and Chemical Sciences, and The Department of Fine Arts, The Croatian Academy of Sciences and Arts, Zagreb

Organizers

Matrix Croatica
Museum of Contemporary Art - The Vjenceslav Richter and Nada Kareš Richter Collection
Society of Culture and Art Ivan Filipović
The Ruđer Bošković Institute
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Croatian State Archives, Zagreb
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Heritage Museum "Stephen Gruber",Županja
Klovićevi Dvori Gallery, Zagreb
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Museum of Arts and Crafts, Zagreb
Showroom Izidor Kršnjavi, Zagreb
Small Stage Theatre, Zagreb
The City of Sisak, Sisak
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Cherif Matta, Mount Saint Vincent University, Dalhousie University, Halifax, NS, Canada
Vesna Meštrić, The Museum of Contemporary Art, Zagreb, Croatia

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INTRODUCTION

This year's Third International Interdisciplinary Scientific Symposium: **CroArtScia2015 – Technological Innovations: Art & Science** will take place **in Zagreb, May 27-30**, with one day in **Sisak, May 29,** under the auspices of the Department of Mathematical, Physical, and Chemical Sciences, and the Department of Fine Arts at the Croatian Academy of Sciences and Arts. The symposium has been jointly organized by the Ruđer Bošković Institute, the Museum of Contemporary Art, the Society of Culture and Art Ivan Filipović, Matrix Croatica, Technical Museum Zagreb, and the partner institutions: Academy of Applied Arts, Rijeka; Academy of Arts, Osijek; Academy of Fine Arts, Zagreb; Municipal Museum Sisak; Croatian Council of the International Society for Education through Art – InSEA, Zagreb; Croatian Natural History Museum, Zagreb; Croatian National Tourist Board; Croatian State Archives; EU-EBS Institute, Zagreb; Harmonik-Akademie, Wiener Neustadt, Austria; Heritage Museum "Stjepan Gruber", Županja; Klovićevi Dvori Gallery, Zagreb; Motovun Film Festival, Zagreb; Museum of Arts and Crafts, Zagreb; Showroom Izidor Kršnjavi, Zagreb; Small Stage Theatre, Zagreb; the City of Sisak; the City of Zagreb; Tourist Board of Sisak; and Zagreb Tourist Board & Convention Bureau. The previous two simposia were CroArtScia2011 – Symmetry: Art and Science (May 4-7, 2011, Zagreb / Samobor), and CroArtScia2013 – Asymmetry: Art, Science and Education (May 8-11, 2013, Zagreb / Veliki Tabor).

CroArtScia2015 is an international interdisciplinary symposium focusing on the convergence and synergy of science, art, and technology. It is intended for those experts working in the arts, sciences, and technology who recognize the need of interaction and collaboration. Science and art have a joint impact on Creative Technology and its development, and technology affects the development of science and arts, and their creativity. The aim of CroArtScia2015 is to sensitize the wider public to the interactions between natural sciences, humanities, technology, and arts. Our intention has been to encourage artists and scientists to join and collaborate on research projects. With its emphasis on communication and collaboration, this symposium will include lectures by a number of Croatian and foreign participants from the field of arts and sciences, aiming to provide meaningful creative and intellectual experiences for both the general audience and the symposium's participants. It will also provide an opportunity for the participants to enrich their knowledge in the field of arts, sciences, humanities, and technology, and to embark upon collaborative projects. In addition to the extensive scientific part of the symposium programme, there will also be events such as concerts, performances, workshops, and an exhibition. CroArtScia2015 thus seeks to function as a platform for presenting and discussing various approaches, providing common points between sciences, arts, and technology, and encouraging cooperation between artists and scientists on joint projects. CroArtScia also encourages the formation of new academic structures for teaching arts and sciences in connection with technology, stimulating the development of creative, multidisciplinary / interdisciplinary approaches for solving the complex problems faced by the society today. There is a huge area in which arts and sciences can meet, from Creative Technology and Creative Entrepreneurship to joint research projects and courses.

A compilation of summaries has been prepared for the Symposium and the reviewed manuscripts will be published within the CroArtScia Conference Proceedings Series.

Zagreb, May 2015

Sonja Nikolić, Vesna Meštrić, Igor Peteh, Vesna Rastija

WEDNESDAY, May 27, 2015

Croatian State Archives, Marulićev trg 21, Zagreb

16:00 Opening of the Symposium

Chair: Sonja Nikolić

Dr. sc. Tome Antičić
Director of The Ruđer Bošković Institute, Zagreb

Zvonko Kusić, F.C.A.
President of The Croatian Academy of Sciences and Arts, Zagreb

Andrej Dujella, F.C.A.
The Secretary of The Department of Mathematical, Physical, and Chemical Sciences, The Croatian Academy of Sciences and Arts, Zagreb

Vladimir Marković, F.C.A.
The Secretary of The Department of Fine Arts, The Croatian Academy of Sciences and Arts, Zagreb

Prof. Stjepan Damjanović
President of the Matrix Croatica, Zagreb

Mr. sc. Snježana Pintarić
Director of The Museum of Contemporary Art, Zagreb, Croatia

M.A. Markita Franulić
Director of The Technical Museum, Zagreb

Dr. sc. Vlatka Lemić
Director of The Croatian State Archives, Zagreb

16:30 - 16:45
Sonja Nikolić, the Ruđer Bošković Institute, Zagreb, Croatia
SCIENCE & ART & TECHNOLOGY

16:45 - 17:15
Paul Mezey, Canada Research Chair, Department of Chemistry,
Memorial University of Newfoundland, NL, Canada
HOW THE BEAUTY OF CONCEPTS BECOMES THE BEAUTY OF SHAPES IN MOLECULAR MODELLING

17:15 - 17:45
Michael Ramek, Graz University of Technology, Graz, Austria
HOMO LUDENS — LEARNING BY PLAYING

17:45 – 18:15
Hrvoj Vančik, Faculty of Science, University of Zagreb, Zagreb, Croatia
UNIVERSE AS A COUNTERFEIT (IN ART AND SCIENCE)

18:25 CONCERT
OTIUM Early Music Ensemble

20:15 - 21:45
RECEPTION by the Mayor of the City of Zagreb
The Palace Dverce, Katarinin trg 6

THURSDAY, May 28, 2015

The Technical Museum, Savska cesta 18, Zagreb

MORNING SESSION

Chair: Natalja Fjodorova

9:00 - 9:15
Markita Franulić, Technical Museum, Zagreb, Croatia
ART & SCIENCE / TECHNOLOGY AT TECHNICAL MUSEUM IN ZAGREB - EXHIBITIONS 2012-2015

9:15 - 9:45
Ljiljana Pejić, Vladimir Trkovnik, EU-EBS INSTITUTE, Zagreb, Croatia
"DOUBLE JEOPARDY" - EVIDENCE BASED SOLUTIONS & CLOSING THE GAP BETWEEN RESEARCH AND PRACTICE

9:45 - 10:05
Jirek Kočica, Secondary Commercial School, Ljubljana, Slovenia,
Marjan Bele, National Institute for Chemistry, Ljubljana, Slovenia,
Vilma Ducman, Institute for Civil Engineering, Ljubljana, Slovenia
SIGNS OF SCIENCE

Chair: Tihomir Marjanac

10:05 - 10:20
Gjino Šutić, UR Institute, Zagreb
NOVEL APPROACH TO RESEARCH AND DEVELOPMENT: CITIZEN SCIENCE, INTERDISCIPLINARITY AND INNOVATIONS

10:20 - 10:35
Mahnaz Shah, Cardiff Metropolitan University, UK
TIDAL ENERGY: AN ECOLOGICAL DESIGN DISCOURSE

10:35 - 11:10
Holger Bech Nielsen, Niels Bohr Institute, Copenhagen University, Denmark, and Colin D. Froggatt, Glasgow University, Scotland, UK
MODEL FOR THE DARK MATTER AS VERY HEAVY PEARLS ABLE TO PRODUCE ENERGY FROM NEUTRONS

Chair: Katarina Ivanišin Kardum

11:30 - 12:00
Diana Grgurić, Siniša Fajt, University of Rijeka, Rijeka, Croatia
SOUNDSCAPE EXPERIENCE AND ACOUSTIC DESIGN

12:00 - 12:30
Karolj Skala, Zorislav Šojat, Ruđer Bošković Institute, Zagreb, Croatia
REINCARNATION OF THE CRAY-1 SUPERCOMPUTER ON E2LP PLATFORM

12:30 - 13:00
Miro A. Cimerman, Dunja Donassy-Bonačić, *bcd CyberneticArt team,* Königswinter đ Berlin, Germany - Zagreb, Croatia
"SYNERGY OF ART & SCIENCE IN THE CYBERNETIC ART OF VLADIMIR BONAČIĆ & BCD CYBERNETICART TEAM" @ HUMBOLDT UNIVERSITY OF BERLIN Accompanied by the Exhibition: "ART & SCIENCE" IN 1968/9 @ LABORATORY FOR CYBERNETICS, THE RUĐER BOŠKOVIĆ INSTITUTE, ZAGREB

13:00 - 13:25
Guided tour for the participants – Exhibition in the Technical Museum
Heinrich Heidersberger, Institute Heidersberger, Germany
RHYTHMOGRAMS

Chairs: Vesna Rohaček, Dalija Finek, Iva Ćurić

13:25 - 14:35
Group Exhibition by Participants

AFTERNOON SESSION

Small Stage Theatre, Medveščak 2, Zagreb

Chair: Sonja Nikolić

16:30 - 17:00
Davor Pavuna, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland
LOVING ARTO-SCIENTISTS LIFE (AN INTRODUCTION INTO)

17:00 – 17:30
Gábor Náray-Szabó, Eötvös Loránd University, Budapest, Hungary
MOLECULAR HARMONY

17:30 – 18:00
Chérif F. Matta, Mount Saint Vincent University, Halifax, Canada
THE MOLECULAR ELECTRON DENSITY: FROM TOPOGRAPHY AND TOPOLOGY TO ABSTRACT ART

EVENING SESSION

Chair: Tončika Cukrov

18:20 - 18:50
Natalja Fjodorova, National Institute of Chemistry; Ljubljana, Slovenia
NANO WORLD IN SCIENCE AND ART

18:50 - 19:20
Celestino Soddu, Enrica Colabella, Politecnico di Milano University, Milano, Italy
GENERATIVE ART AND DESIGN

19:20 - 19:35
Nada Bezić, Croatian Music Institute, Zagreb, Croatia
ART DÉCO IN THE LIBRARY OF THE CROATIAN MUSIC INSTITUTE

Chair: Nada Bezić

19:35 - 19:50
Roberto Vdović, Morana Pap, Faculty of Architecture, University of Zagreb, Zagreb, Croatia
ICT IN ARCHITECTURE Ž CADLAB AF, EDUCATION, RESEARCH & DEVELOPMENT ACTIVITIES AT FACULTY OF ARCHITECTURE, UNIVERSITY OF ZAGREB

19:50 - 20:10
Karolina Wiktor, Marta Miś, Zachęta — National Gallery of Art, Warsaw, Poland
CULTURE AND NEUROSCIENCE — ON THE SOCIAL INVOLVEMENT OF BOTH ARTIST AND PUBLIC INSTITUTION

20:10 - 20:30
Group of students from the Academy of Arts in Osijek, Osijek, Croatia
Performance - “UNZIPP” - THE NEUTRAL THEATER COSTUME

20:30 - 21:30
Workshop - Roberto Vdović, Morana Pap, University of Zagreb, Zagreb

FRIDAY, May 29, 2015

8:30 Bus departure to Sisak in front of the Hotel Laguna, Kranjčevićeva 29

City Hall, Sisak, Rimska ulica 26

MORNING SESSION

Chair: Claudia Loher

10:00 - 10:30
Michael Ramek, Graz University of Technology, Graz, Austria
COLOUR, COLOUR VISION, AND COMPUTER-BASED PRESENTATIONS

10:30 - 11:00
Ivana Plazonić, Irena Bates, Željka Barbarić-Mikočević, Faculty of Graphic Arts, University of Zagreb, Zagreb, Croatia
SMART UTILIZATION OF TRITICALE STRAW IN THE PRINTING INDUSTRY

11:00 – 11:25
Ines Krajcar Bronić, Nada Horvatinčić, Jadranka Barešić, Andreja Sironić, Ruđer Bošković Institute, Zagreb, Croatia
RADIOCARBON DATING OF OBJECTS OF ART

11:25 - 11:45
Dušanka Janežič, University of Primorska, Koper, Slovenia
GRAPH THEORETICAL APPROACH FOR PROTEIN BINDING SITE DETECTION AND FUNCTION PREDICTION

Chair: Marina Draženović Pleša, Barbara Pažur

11:45 – 12:10
Mirjana Tomašević Dančević, Croatian Council of the International Society for Education through Art – InSEA (HRV-InSEA), and School of Applied Art and Design, Zagreb, Croatia
NEW TECHNOLOGIES IN ART EDUCATION: SEND A VISUAL MESS]@GE!

12:10 - 12:40
Tihomir Marjanac, University of Zagreb, Zagreb, Croatia
TECHNOLOGY AND INNOVATION IN DRAWINGS OF PRIMARY SCHOOL CHILDREN IN CROATIA
and
Art works competition and announcement of winners of the Exhibition of children's paintings works in the Library of Sisak with the title "I, A RESEARCHER"

Chair: Jadranka Malina

13:00 - 13:30
Nikol Radović, Petar Mladinić, University of Zagreb; 5th Gymnasium; Zagreb, Croatia
FROM ALBERTI AND THE RENAISSANCE TO MODERN TIMES ON THE WINGS OF DYNAMIC GEOMETRY PROGRAM SKETCHPAD

13:30 - 14:00
Mario Kus, Technical School, Sisak, Croatia
REPLICA OF AN EARLY ROMAN LAMP AND ITS PRODUCTION BY CNC MACHINES

14:00 - 14:30
Blaženka Slovenec and students: Borna Andres, Tin Meštrović, Lovro Sinjeri, Katarina Smernić, Gymnasium, Sisak, Croatia
PLAYING WITH SOUND

14:30 - 14:50
Marijan Crtalić, Sisak, Croatia
“INDUSTRIAL PARADISE” - movie

Public Library Vlado Gotovac Sisak, Rimska bb, Sisak

15:00 Guided tour for the participants - the Exhibition of children's paintings works in the Library of Sisak with the title "I, A RESEARCHER"

15:30 - 16:30 RECEPTION by the Mayor of the City of Sisak,

AFTERNOON SESSION

Sisak Ironworks Park, Božidara Adžije 19, Sisak

16:50 - 17:40
Neven Peko, City Museum Sisak, Sisak
Guided tour for the participants trough the Sisak Sculpture Park in Caprag with sculptures created as a part of the Colony of Artists, "Sisak Ironworks" within the "Factory Heritage Sisak Ironworks". The conservation treatment on Josip Diminić’s Object

EVENING SESSION

Sisak Old Town, Rimska 26, Sisak

18:00 Sisak Old Town: Guided tour by a curator of The City Museum Sisak

19:30 RECEPTION by the Tourist Office of Sisak, Rimska bb, Sisak

SATURDAY, May 30, 2015

Croatian State Archives, Marulićev trg 21, Zagreb

MORNING SESSION

Chair: Blaženka Perica

09:00 - 09:30
Edward J. Damich, U.S. Court of Federal Claims, Washington, DC
THE LAW OF THE PAST AND THE TECHNOLOGY OF THE FUTURE

09:30 - 10:10
Vladimir Frelih, Ana Petrović, Art Academy Osijek, University of Osijek, Osijek, Croatia
HOW TO TRAIN TECHNOLOGY

10:10 - 10:40
Davor Horvatić, Mirjana Vodopija, Department of Physics; Academy of Fine Arts; University of Zagreb, Zagreb, Croatia
ART AND FUNDAMENTAL PHYSICS

Chair: Igor Kozjak

10:40 - 11:10
Giovanni Rubino, Ministry of Foreign Affairs, Italy
WHAT YOU SEE IS WHAT YOU GET: THE CASE OF IVAN DAL CIN'S VECTORIAL PAINTINGS

11:10 - 11:30
Vitomira Lončar, College of multimedia and communication technologies, Split, Croatia
HOW CAN WE IMPROVE THE COMMUNICATION BETWEEN SCIENCE/TECHNOLOGY AND THEATRE IN CROATIA?

Chairs: Martina Bagatin, Hrvoje Gržina

11:30 POSTER Session

Mladen Burić, Amir Obhođaš, Željko Milat, Croatian State Archives, Zagreb, Croatia
EXHIBITION: COLLECTIONS OF PHOTO AND CINEMATIC TECHNOLOGY IN THE CROATIAN STATE ARCHIVES

Lucija Zore, Željko Milat, Croatian State Archives, Zagreb, Croatia
SCREENING 8 MM FILMS BY FILM PROFESSIONALS AND FILM ENTHUSIASTS

Chair: Ines Krajcar Bronić

12:30 - 12:45
Tea Zubin Ferri, Material Research Centre METRIS, Pula, Croatia
CHEMICAL ANALYSIS OF CULTURAL HERITAGE MATERIALS: LIMITATIONS, CHALLENGES AND FASCINATION

12:45 - 13:15
Irina Pucić, Branka Katušin Ražem, Branka Mihaljević
Ruđer Bošković Institute, Zagreb, Croatia

IONIZING RADIATION USED IN THE PROTECTION OF ARTWORKS AND CULTURAL HERITAGE

Chair: Irina Pucić

13:15 - 13:30
Martina Bagatin, Croatian State Archives, Zagreb, Croatia
FRANZ THIARD DE LAFOREST AND HIS “ALBUM OF DALMATIA”: CONSERVATION TREATMENT

13:30 - 14:00
Igor Kozjak, Mirela Leskovac
Croatian State Archives; Faculty of Chemical Engineering and Technology; Zagreb, Croatia
CONSERVATION METHODS APPLIED TO THE REGISTRY OF BIRTHS FROM THE PARISH OF VELJACI, BOSNIA AND HERZEGOVINA: PROBLEMS WITH THE REMOVAL OF UNPROFESSIONAL REPAIRS

CLOSING OF THE SYMPOSIUM

14:00 - 14:30
Sonja Nikolić, Ruđer Bošković Institute, Zagreb, Croatia
Paul Mezey, University of Newfoundland, NL, Canada
Michael Ramek, Graz University, Graz, Austria
CLOSING WORDS

MARTINA BAGATIN
Croatian State Archives, Zagreb
FRANZ THIARD DE LAFOREST AND HIS "ALBUM OF DALMATIA": CONSERVATION TREATMENT

The "Album of Dalmatia," which consists of 147 photographs, was made by one of our most famous photographers and writers, Franz Thiard De Laforest, and is nowadays conserved and preserved at the Central Laboratory for Conservation and Restoration of the Croatian State Archives. As a photographer, he produced a valuable collection of panoramic views and issued a portfolio with these photos. In 1898, he completed his great "Album of Dalmatia," which brought together all the images created in Dalmatia during his thirty years of work.
The album contains 146 albumin and 1 glossy collodion photographs, laminated on cardboard that is coated on both sides with industrial paper. The photographs were partly detached from the cardboard; along the edges, there was visible damage caused by liquid. Photographs were discoloured and also showed different types of mechanical damage, such as scratches and stains from dust and moisture: water stains and foxing. The cardboard itself also had lots of mechanical damage and stains. The process of preservation was very demanding with regard to the damage and the historical aspect (a high significance for Croatian cultural heritage). The procedure was carried out in three steps: identification of photographic processes in order to choose the best method of preservation, as visual and microscope examination indicated the processes (albumin or collodion); conservation treatment, during which solvents were used to remove stains and dust residues, and using the right adhesives and Japanese paper to fill and mend the losses (an additional protection process); and the preparation of proper enclosures and envelopes, made of neutral materials, for further preservation.

NADA BEZIĆ
Croatian Music Institute, Zagreb, Croatia
ART DÉCO IN THE LIBRARY OF THE CROATIAN MUSIC INSTITUTE

The exhibition *Art Déco in the Croatian Music Institute* in Zagreb (2011) showed to the broader public some interesting objects from the Institute's large and important library and archive, all produced in the 1920s and 1930s: 24 published music sheets, 2 books, 2 magazines, 4 concert programmes, 4 postcards, one letter and one invoice. Besides the visual attraction of the items, the exhibition was a splendid starting point for research on the work of visual artists from Croatia (e.g. T. Krizman, M. Rašica, R. Tommaseo), Serbia (D. Janković), Slovenia (T. Kralj), and Russia (N. Goncharova and M. Larionov). I have identified 15 authors of art design born between 1873 and 1903. Many of them participated in the international art déco exhibition in Paris in 1925, which proves that between the two World Wars the cover designs of music sheets were made by eminent artists. Of special interest are the covers of sheet music edited by the Viennese publishing house *Edition Slave / Slavenski izdavački zavod* (1918-1923), specialized in editing compositions by (South) Slavic composers. Most of its covers (at least 33) were made by Ivo Tijardović (1895-1976), Croatian composer whose inventive illustrations have recently attracted considerable interest among the researches.

MIRO A. CIMERMAN, DUNJA DONASSY-BONAČIĆ
bcd CyberneticArt team, Königswinter đ Berlin, Germany - Zagreb, Croatia
"SYNERGY OF ART & SCIENCE IN THE CYBERNETIC ART OF VLADIMIR BONAČIĆ & BCD CYBERNETICART TEAM" @ HUMBOLDT UNIVERSITY OF BERLIN Accompanied by the Exhibition: "ART & SCIENCE" IN 1968/9 @ LABORATORY FOR CYBERNETICS, THE RUĐER BOŠKOVIĆ INSTITUTE, ZAGREB

"*Back to the time when digital art was still young*" leads us to our media archaeological "time slip", where we begin our investigation of the "*last avant-garde*" – the international artist's movement [*New*] *Tendencies* ([N]T) – of the 1960s & 1970s, latterly named "*The Miracle of Zagreb*". Our aim has been to broaden our minds by reaching out for the art & science ideas and experiences of that epoch – from technology application to the value system – in order to find the relevance for our digital age.
We focus on the Tendencies 4 (1968/69) and 5 (1973), presented as a novelty in the [N]T-Program "*Computer and Visual Research*," especially on the early works of *Vladimir Bonačić*, which we survey "in vivo". We also explore the 1990s' artworks of *bcd CyberneticArt team* (founded by Vladimir Bonačić, Miro A. Cimerman, and Dunja Donassy in 1971 in Zagreb as a spin-off of [N]T).
We start our media archaeological "adventure" with a screening of the 1960' *[N]T-Documentary Film* (initiated by *bcd* and co-organized/coproduced with HRT, ZKM, MSU (*) and a number of European supporters). We present slide shows and videos, and apply *FloatingTeam* (© *bcd*) as our didactic methodology, *HU-WebConferencing-System* for remote attendance, *HU-Moodle-System* for the weekly homework management, and *Informative-Documentary-MultiMedia-Exhibition* as a final presentation. The *HU-Signal-Laboratory* is our "home" and every Wednesday is an "*open door afternoon*".

(*) *Project seminar* by *bcd* in Winter Semester 2014/15 @ *Media Theories*, directed by Prof. Wolfgang Ernst, HU Berlin. In cooperation with: Croatian Radio Television (HRT|Zagreb), Center for Art and Media Technology (ZKM|Karlsruhe), Museum of Contemporary Art (MSU|Zagreb), Institute Ruđer Bošković Zagreb and World Academy of Art & Science.

EDWARD J. DAMICH
U.S. Court of Federal Claims, Washington, DC
THE LAW OF THE PAST AND THE TECHNOLOGY OF THE FUTURE

There are aspects of the law of patent, copyright and trademark which present problems when the law is applied to recent technological developments. These challenges include: (1) patents for computer programs, genes and business methods; (2) the undermining of the basis of copyright law by the Internet and digital technology; and (3) trademark law and Internet search engines. How can patent law, which protects useful devices and processes, protect an abstract idea like an algorithm? The Internet functions on making copies, but copyright law gives the author the right to control copies. How are these concepts reconciled? Trademark law addresses consumer

confusion. Is there confusion when a search engine displays links to competitors' websites?

VLADIMIR FRELIH, ANA PETROVIĆ
Art Academy Osijek, University of Osijek, Osijek, Croatia
HOW TO TRAIN TECHNOLOGY

Tote Mitte (germ. *Dead Centre*) is the title of an exhibition by Ana Petrović and Vladimir Frelih, which took place in Stuttgart in November 2014. As this exhibition included hints of the basic or primitive and advanced uses of technology in its design, it was an opportunity to hold a lecture on personal reflections about the relationship between technology and art. A variety of visual results were the visible product of reflecting about the different strategies of image as such, while the technology used came as a logical facilitator in the process and a tool for creating new positions. Although in their concepts and developing ideas Ana Petrović and Vladimir Frelih are often significantly different, in terms of creation and production they approach technology in a similar way, often using glitches or errors that offer a heterogeneous range of technological possibilities and impossibilities, deconstruction strategies of the media, or altered angle viewing in observing technology, as a medium of expression that bring technology to the areas that are not its original purpose, which shifts their whole body of work to the edges of extremes, opening it to *new images*.

NATALJA FJODOROVA
National Institute of Chemistry; Ljubljana, Slovenia
NANO WORLD IN SCIENCE AND ART

In nature, nanotechnology is a science of very small things. But how small are they? Usually, nano particles are smaller than a hundred nm. The nano world consists of particles that are 1-100 nm in size, related to the nanoscale located between the microscale (where particles are larger than 100 nm) and the atomic scale. Classical physics explaines the macro as well as the micro world. The nano world requires the knowledge of quantum mechanics as things behave there in a very different way. Nanotechnology is an area which combines physics, chemistry, and biology. The Laboratory of Chemometrics (National Institute of Chemistry, Slovenia), together with the Center for Computationally Assisted Science and Technology (North Dakota State University, USA), researches the fullerene derivatives and its ability to react with different proteins. In this study, we are discussing the problems that the scientists face in the nano world, which are at the same time a source of inspiration for the artists.

MARKITA FRANULIĆ
Technical Museum, Zagreb, Croatia
ART & SCIENCE /TECHNOLOGY AT TECHNICAL MUSEUM IN ZAGREB - EXHIBITIONS 2012-2015

The talk presents some exhibition projects organized by the Technical Museum in Zagreb or in collaboration with the Museum during the period 2012-2015.

These projects connect art and science in interpreting certain general or specific topics, raising questions about artistic discourse that correlate the developments in science or technology and their influences to different areas of life and work.

DIANA GRGURIĆ, SINIŠA FAJT
University of Rijeka, Rijeka, Croatia
SOUNDSCAPE EXPERIENCE AND ACOUSTIC DESIGN

Soundscape, as the inevitable environment of a modern man, has changed in its quality and intensity, especially after the industrial and electronic revolution, as well as with urbanization. Besides polluting its own as well as the neighboring surroundings, soundscape also emerges with regard to the optimal and subjective quality of the sound perception of the environment. Our investigation is based on the premise that soundscape is a complex sounding system that changes with the development of the society, shaping our understanding of site and space. Using Acoustic Ecology as a discipline that operates with a variety of methodological parameters, we will present a collaborative work that involves humanistic and technical sciences, such as the ethno-musicological and electro-acoustical approaches to sound design, with the purpose of achieving a new aural and semantic experience of space.
In this paper, we will present two preliminary concepts related to the re-creation of soundscape.

DAVOR HORVATIĆ, MIRJANA VODOPIJA
Department of Physics; Academy of Fine Arts; University of Zagreb, Zagreb, Croatia
ART AND FUNDAMENTAL PHYSICS

In this talk, we will present the experience gathered in collaboration between artists and scientists during a project called “Structures of the Invisible.” Horvatić will present the physicist point of view and discuss questions that emerged from the discussion between artists and scientists. Vodopija will cover the artist’s perspective by presenting her work that touches upon various concepts from fundamental science.

DUŠANKA JANEŽIČ
University of Primorska, Koper, Slovenia
GRAPH THEORETICAL APPROACH TO PROTEIN BINDING SITE DETECTION AND FUNCTION PREDICTION

While structural genomics has resulted in thousands of new protein crystal structures, we still do not know the functions of most of these proteins. One reason for this shortcoming is their unique sequences or folds, which leave them assigned as proteins of an “unknown function.” Recent advances in, and applications of, some cutting-edge binding site comparison algorithms for binding site detection and function prediction have begun to shed light on this problem. Here, we review these algorithms and their use in function prediction and pharmaceutical discovery. Finding some common binding sites in weakly related proteins may lead to the discovery of new protein functions and to novel ways of drug discovery.

JIREK KOČICA, MARJAN BELE, VILMA DUCMAN
Secondary Commercial School; National Institute for Chemistry; Institute for Civil Engineering; Ljubljana, Slovenia
SIGNS OF SCIENCE

This paper deals with an artistic approach to science in a very specific way, namely through an artwork produced during the planning, designing, and building of Pregl's Research Institute in Ljubljana. The connection between art, architecture, and science was the main topic in the open communication between artists and scientists during the creation of the sculpture/installation. But this openness is still present, because the artwork "Signs of Science" is meant to be a work in progress from the beginning and so the work is still going on. In presenting this artwork, emphasis will be placed on three main views/layers, which are in simultaneous relation with (social and natural) science and technology. The first view/layer is about the relation to the history of the European worldview, which has sprung from the mythological well of the society on the basis of logos, argument, and verifiability. This view/layer is connected to ancient Greece, more accurately to the beginning of the Enlightenment.
The second view/layer is the metaphorical relation between the formula that simplifies and connects the structures of otherwise unique time-space phenomena and the principal similarities, which gives us an opportunity to bring things to a common denominator.
The third aspect is devoted to the biological and mythological structures that underlay rationality, logic, and the enlightened way of thinking.

INES KRAJCAR BRONIĆ, NADA HORVATINČIĆ, JADRANKA BAREŠIĆ, ANDREJA SIRONIĆ
Ruđer Bošković Institute, Zagreb, Croatia
RADIOCARBON DATING OF ARTWORKS

Absolute dating of artworks and cultural heritage objects is one of the most important issues in art history studies and essential for evaluating original art objects, differentiating between originals and later imitations and/or frauds, and recognizing subsequent repairs and restauration works. The radiocarbon dating (^{14}C dating) method is one of the most well-known radiometric methods of absolute dating, which can be applied for dating materials of biogenic origin, such as wood, charcoal, bones, grains, paper, parchment, textile, etc. The range of ^{14}C age determination spans from the 19th century up to č60,000 years into the past. Due to a very low natural ^{14}C concentration, the radiocarbon dating method requires special techniques for the chemical preparation of samples and the measurement of ^{14}C. Particular care must be taken in sample collection and/or storage, as well as during sample pre-treatment and chemical preparation.
As a result of measurement, one obtains the so-called conventional radiocarbon age of the sample, expressed usually in years Before Present (BP), where 0 BP = 1950 AD. However, conventional ^{14}C years do not directly equate to calendar years, because the atmospheric ^{14}C concentration varies through time. Hence, a calibration is required to convert the conventional radiocarbon age to the calendar age. Several cases of ^{14}C

dating of various art objects will be presented here. Special attention will be paid to the interpretation of calibrated ages and the meaning of radiocarbon dates. One must keep in mind that radiocarbon dating gives the age of the material (e.g. wood) and not of the artwork itself; however, the production date of the artwork cannot precede that of the material.

IGOR KOZJAK, MIRELA LESKOVAC
Croatian State Archives; Faculty of Chemical Engineering and Technology; Zagreb, Croatia

CONSERVATION METHODS APPLIED TO THE REGISTRY OF BIRTHS FROM THE PARISH OF VELJACI, BOSNIA AND HERZEGOVINA: PROBLEMS WITH THE REMOVAL OF UNPROFESSIONAL REPAIRS

Conservation of books is important in the preservation of written heritage. Methods of conservation primarily depend on the mechanical and chemical damage of the books. This paper describes the process of conservation for the Registry of Births (1908-1924), property of the parish of Veljaci, Bosnia and Herzegovina. The book was in an extremely poor condition. The paper was fragile, acidic, and mechanically badly damaged. Parts of the book were missing and the paper would break even when gently scrolling through the book. Damages on the text block were repaired over time in various ways, but the biggest problem were the unprofessional repairs made using self-adhesive paper, duct tape, and thick thermoplastic foil. Because of the fragility of paper and the necessity of removing the plastic foil, it was necessary to perform a series of mechanical and chemical tests, mostly to determine the type of foil in order to choose the solvent for its removal. Organic solvents normally act aggressively on paper, so additional tests were required to investigate the possible consequences. The solvents used in tests for foil removal were medical benzine, amyl acetate, ethyl acetate, and acetone. The results of these tests, as well as the conservation process, will be described here in detail.

MARIO KUS
Technical School, Sisak, Croatia

REPLICA OF AN EARLY CHRISTIAN LAMP AND ITS PRODUCTION BY CNC MACHINES

Replica of an early Christian lamp is a product of the Leonardo da Vinci partnership project CNC & IT, in which the Sisak School of Technology has participated as an author and coordinator. The early Christian lamp dates from the 5th century and was found at a site in Sisak. Today it is an exhibit at the Sisak Municipal Museum. The lamp is a symbol of its time and the environment from which it emerged, but also proves the fact that the city of Sisak has a deep and rich history. The basic idea behind selecting the lamp as a motif for creating a replica has been to establish a relationship between different producing technologies from different historical periods. The original lamp was made of bronze by using the technology of sand mould casting, whereas its replica was designed and manufactured by using the modern CADCAM and CNC technologies of our time. The replica's design was created by using the 3D computer program CATIA and the replica itself was produced by means of 3-axis CNC machines

(the milling machine and the lathe). It consists of seven parts interconnected by screws. Due to the geometrical complexity of the lamp, each of its seven parts demanded a special production technology. Upon completing the project, CNC & IT intends to market the replica of the early Christian lamp as a Croatian souvenir.

VITOMIRA LONČAR
College of multimedia and communication technologies, Split, Croatia

HOW CAN WE IMPROVE THE COMMUNICATION BETWEEN SCIENCE/TECHNOLOGY AND THEATRE IN CROATIA?

Theatre *Mala scena***,** the oldest private theatre in Croatia

Theatre Mala scena had its first website as early as 1997 and introduced the online ticket booking system in 2002. Today, most public and private theatres have online ticket booking and sale system, which belongs to the standard offer in developed countries. Croatian theatres have enough options to become more cooperative and technology-based, in particular through a unified ticket reservation system that would be user-friendly. Streaming of performances has been made possible with the new technology, and Croatia has introduced this kind of transmission from the Metropolitan Opera, which was welcomed by the audience. However, the Croatian theatres still do not stream their own performances.

Over a period of two years (2007-2008), *Theatre Mala Scena* was streaming its premieres. There were not many viewers, but it offered an insight into our work to an international audience and also to those viewers who cannot attend live performances because of some physical or other obstacles (persons living in small towns, people in prison, hospitals, etc.). Our core strategies are excellence, networking, social responsibility, and public action, and such live recordings "covered" all four. The highest ratings have been achieved with the intercultural project for children 3+, produced in cooperation between *Theatre Mala Scena* and Japanese partners (performance "Who are you?"). The show was non-verbal and communicated the two different cultures through actors from the participating countries playing a game. After several attempts, however, *Theatre Mala Scena* gave up the live broadcasting of their performances on the Internet.

On the occasion of hosting the KIDS Euro Festival at the Kennedy Centre, Washington DC in November 2014, our production "Pin" was streamed and had a large audience in Croatia. We also communicated the information about the performance with our international partners and today it is still possible to view the performance online.

Images from live broadcasting can be used for educational purposes, to present to students at art academies, and in the future this practice may improve communication with the new audiences, not too interested in theatre (the "non-audiences"), in order to stimulate their interest. Croatia is on the way of change, and technology is on the way to become its greatest benefit.

TIHOMIR MARJANAC
Faculty of Science, University of Zagreb, Zagreb, Croatia
TECHNOLOGY AND INNOVATION IN DRAWINGS MADE BY PRIMARY SCHOOL CHILDREN IN CROATIA

When asked about their future role in science, primary school children draw their visions so as to include various aspects of technology and innovation. Thus, they also drew themselves as scientists during the 2010 Researchers' Night in Croatia. We have received a total of 82 drawings done by pupils 10 to 16 years of age, 64.6% of them girls. They drew several research professions in addition to technology icons such as robots. As many as 71.95 % of children envisioned an active role for themselves in research, astronomy, or wildlife studies. Analysing these drawings, we have grouped the illustrated topics into three categories: a) innovation, b) technology, and c) applied technology, although that was not always simple because children were drawing different motifs together, such as technology icons (rockets or telescopes) along with images showing personal research. The *innovation* category consists of drawings related to chemistry and pharmaceutical laboratories, electric light, and chemical experiments; the *technology* category includes drawings of robots and machinery; and the *applied technology* category consists of drawings showing scuba-diving, space research (involving rockets and telescopes), and photographing nature (animals, birds, and fossils). An analysis has shown that innovation was illustrated in 35.37%, purely impersonal technology (not involving the author) in 14.63%, and applied technology in 29.27% of the drawings. Combined technology topics amounted to 43.9% of the drawings. Thus, the popularity of applied technology does not overcome innovation, but proves that most children are aware of its role in basic research. It is interesting to note that the majority of drawings illustrating impersonal technology showed friendly robots, usually helping around a house.

CHÉRIF F. MATTA
Mount Saint Vincent University, Halifax, Canada
THE MOLECULAR ELECTRON DENSITY: FROM TOPOGRAPHY AND TOPOLOGY TO ABSTRACT ART

Oil paintings by the speaker include abstract paintings inspired primarily by science, particularly the complex topography of electron density distribution in molecules. This talk will investigate the aesthetics in science and the beauty of representations as an underlying abstract mathematical and logical beauty (please visit http://www.cmatta.ca/art-science/).

BEATRIX MECSI, DIRK HUYLEBROUCK
Elte University Budapest, Budapest, Hungary; Department of Architecture, University of Brussels, Brussels, Belgium
THE FORBIDDEN FRUIT OF THE MYSTIC LAMB

The Belgian city of Ghent is globally famous for its altarpiece “The Mystic Lamb” by brothers Jan and Hubert Van Eyck (15th century). In this painting, Eve holds the forbidden fruit of Paradise, but it was an enigma what kind of fruit it was. The authors

show that it is not an apple, an etrog, a grape, a fig, or a pomegranate, but a special kind of lemon. There are historical and cultural indications pointing towards the exact species it may have been. Note that even Michiel Coxcie, who was assigned by the authorities of his time (16th century) to make an official copy, ignored what it was and painted an apple.

PAUL MEZEY
Memorial University of Newfoundland, NL, Canada
HOW THE BEAUTY OF CONCEPTS BECOMES THE BEAUTY OF SHAPES IN MOLECULAR MODELLING

Concepts and principles in all fields of human activity often show relations, regularities, patterns, and symmetries that lead to pictorial or even higher-dimensional models with intriguing and beautiful shapes and other features, often involving the time aspect and thus connecting such patterns to music. Some of these visually or otherwise pleasing experiences will be demonstrated in the field of chemical models of molecules and reactions, which connect the fields of chemistry, physics, mathematics, and computer modelling to various arts, the rhymes of thoughts in science to poetry, the harmony of ideas in molecular representations to music, and the abstract shapes of some well-known painters to the beautiful molecular shapes on the microscopic level.

GÁBOR NÁRAY-SZABÓ
Eötvös Loránd University, Chemistry Institute, Budapest, Hungary
MOLECULAR HARMONY

Molecules are a part of nature, like plants, animals, humans, or mountains. If we find a flower or a landscape beautiful, we may have a feeling of beauty in case of molecules, too. This holds especially for a scientist who works intensively with a number of molecular models. The molecular concept helps chemical understanding. Design of experiments and chemical transformations become easier if we use three-dimensional models, which reflect the most important attributes of molecules. In this talk, I will discuss some aspects of molecular beauty, such as symmetry, dynamism, complexity, decorative power, and utility.

HOLGER BECH NIELSEN, COLIN D. FROGGATT
Niels Bohr Institute, Copenhagen University, Denmark; Glasgow University, Scotland, UK
MODEL FOR THE DARK MATTER AS VERY HEAVY PEARLS ABLE TO PRODUCE ENERGY FROM NEUTRONS

Astronomically, there is a need for some new type of materia, called the dark matter, in order to explain the gravitational effects that cannot be explained through the “ordinary” (visible) matter (from the usual atoms). Many high-energy physicists imagine that the dark matter consists of something called “neutralinos”, particles possibly existing in the superstring theory, which may be true. However, Colin Froggatt and I, together with our

collaborators, have developed another model for the mysterious dark matter: cm-sized pearls with a very large mass – for objects of such size – namely $10Č8 kg$.
With such a mass in such a small object, the pearls are essentially invisible, even if they look like silver pearls. Thus, they can function as invisible or dark matter for astronomical purposes. Our model is remarkable in that these pearls can be understood in the pure Standard Model of high-energy physics, meaning that no new fundamental particles, such as the neutralinos, are required. Our pearls are actually bubbles of a new type of vacuum filled with some ordinary matter. Approximately once in a hundred years, one pearl hits the earth.
We suppose that this is what happened in Tunguska in 1908. The pearls can develop heat by being exposed to neutrons – about 10 MeV per nucleon. This, on the one hand, makes it possible for these pearls to make the supernovae explode.
It is, namely, a problem in the supernova physics that the computer simulations of the development of supernovae tend not to produce sufficiently strong explosions, if they produce any at all.
On the other hand, one can imagine, somewhat "science-fiction-like," that one could obtain a new energy source by somehow filling such pearls with neutrons. The problem is, of course, how to find such a pearl? And how to manipulate such a dense object? And if one needs a reactor to obtain the neutrons, why not use the reactor itself as the usual way of producing nuclear power? Pure pearls may supplement and enhance the energy production of the reactor if...

DAVOR PAVUNA
Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland
LOVING THE ARTO-SCIENTIST'S LIFE (AN INTRODUCTION)

In this talk, I will demonstrate how the interactions of an ensemble of quantum fields, present in a given human space-time configuration, result in an actual manifestation, usually termed ''30'-presentation''. The chosen singing and guitar playing will gradually give birth to an "academic", post-quantum-physics discussion on the subtle implications of different degrees of quantum entanglement, and the morpho-genetic field coherence in action. An arto-scientific music happening will eventually take place in order to encompass the whole, i.e. communication the loving of arto-scientific life.

LJILJANA PEJIĆ, VLADIMIR TRKOVNIK
EU-EBS INSTITUTE, Zagreb, Croatia
„DOUBLE JEOPARDY" - EVIDENCE BASED SOLUTIONS & CLOSING THE GAP BETWEEN RESEARCH AND PRACTICE

Evidence-based management (EBMgt) as a concept is new in itself and can be defined as making decisions by means of conscientious, explicit, and judicious use of four sources of information: practitioner expertise and judgment, evidence from the local context, critical evaluation of the best available research evidence, and the perspectives of those people who might be affected by the decision. As we will present, EBMgt is practice-focused and starts with raising the questions, problems, and issues faced by the managers and other organizational personnel. It is a family of practices, not a single rigid formulated method of making organizational decisions. Scholars,

educators, and consultants can all play a part in building the essential support for the practice of EBMgt. To effectively target critical knowledge and related resources for the practitioners, an EBMgt infrastructure is required; its development depends on the distinctive knowledge and skills found in each of these communities.
Systematic reviews (SRs) are a cornerstone of EBMgt practice and its needed infrastructure. There is a shortage of research on EBMgt, mainly because much of the work in this realm does not carry any label, or due to a lack of systematic reviews of evidence in organizational studies. EBMgt is advancing the commitment to catalyzing synergistic cross-disciplinary interactions in order to promote convergence. We in EU-EBS INSTITUTE believe that only *evidence-based solutions* and a systematic approach secure a coherent, applicable, and socially and economically justified model, as well as a solving modality, and that therefore they must become the new paradigm of systematic/complex education/professional development for *closing the gap between research and practice.*

IVANA PLAZONIĆ, IRENA BATES, ŽELJKA BARBARIĆ-MIKOČEVIĆ
Faculty of Graphic Arts, University of Zagreb, Zagreb, Croatia
SMART UTILIZATION OF TRITICALE STRAW IN THE PRINTING INDUSTRY

Nowadays, the production of paper and paper products largely focuses on alternative, non-wood raw materials. Croatia, as an agricultural country, produces large quantities of straw as a by-product of crop farming. Therefore, straw is an interesting alternative raw material for gaining cellulose fiber, which could replace wood as a source of fiber. Presently, straw is used in animal food industry, biofuel industry, construction industry, an in art owing to its numerous advantages. The potential utilization of this kind of crop residues in paper industry is of great importance considering the global deficiency of wood as a raw material. In this research, fiber isolated from triticale straw was mixed with that gained from recycled wood in order to produce alternative paper substrates. The possibility of using these paper substrates in the printing industry was examined based on the reproduction quality of the line. High-quality line reproduction is an extremely important feature in printing texts and barcodes. The line reproduction quality was here analyzed based on three main attributes: blurriness, raggedness, and width.

IRINA PUCIĆ, BRANKA KATUŠIN RAŽEM, and BRANKA MIHALJEVIĆ
Ruđer Bošković Institute, Zagreb, Croatia
IONIZING RADIATION USED IN THE PROTECTION OF ARTWORKS AND CULTURAL HERITAGE

Many artworks and cultural heritage (CH) objects are made of wood, leather, textile, paper, or similar materials prone to damage by the insects, fungi, or bacteria. An efficient solution to that problem is ionizing radiation, such as gamma radiation or fast electrons. Radiation is a universal biocide with almost unlimited penetration, it is temperature independent, leaves no residues, and does not induce secondary radioactivity. CH objects may be packed during the treatment in order to protect them and to prevent recontamination. Radiation treatment is particularly suitable for large objects, in case of disaster, and/or if contamination is such that it endangers the personnel handling those objects. Radiation consolidation of heavily damaged objects

is an option. At the Laboratory for Radiation Chemistry and Dosimetry, CH objects have been treated by radiation for 25 years Š1Ć.
The primary criterion for dose selection in the treatment of CH objects is biological contamination – up to 2 kGy for desinsection and 4-10 kGy for fungi control, while 5-20 kGy ensures full microbiological decontamination. Although radiation damage is possible, the risk is negligible and has to be assessed in the context of damage by biodeterioration and unavoidable ageing. In order to meet the high standards, the conservators and restorers demand from the personnel at the irradiation facility to fine-tune the dosage according to the materials that constitute the object and their state. The radiation resistance of ornamental materials (pigments, varnishes, glass, decorative stones, etc.), which may differ from that of the constituent material, has to be assessed as well. There is an ongoing research to ensure the safe and efficient radiation treatment of artefacts and CH objects in every particular case.
Š1Ć B. Katušin-Ražem, D. Ražem, M. Braun, *Radiat. Phys. Chem.* 78 (2009) 729.

NIKOL RADOVIĆ, PETAR MLADINIĆ
University of Zagreb; 5th Secondary School; Zagreb, Croatia
FROM ALBERTI AND THE RENAISSANCE TO MODERN TIMES ON THE WINGS OF DYNAMIC GEOMETRY: SKETCHPAD 5.03 HR

Today, there are two crucial issues related to the teaching and learning of mathematics/ geometry. The first is whether the content of geometry taught in the elementary and/or secondary school is sufficient for understanding and teaching today's real needs and problems, and the second whether there is a need for an extensive reform of the mathematics curriculum. The answer to both questions is, paradoxically, yes!
This work demonstrates how it is possible to present/visualize three-dimensional space with the knowledge of the three fundamental theorems of elementary geometry and Alberti's classical perspective construction. Classical visualization themes will become more dynamic through the use of a dynamic geometry program, Sketchpad 5.03 HR, as a drawing tool, which will contribute to the modernization of teaching and learning geometry.

MICHAEL RAMEK
Graz University of Technology, Graz, Austria
HOMO LUDENS — LEARNING BY PLAYING

At the author's institution, *Theoretical Chemistry* is taught as a mandatory course in the master curriculum *Chemistry* within the framework of an interuniversity cooperation. While the ratio teacher/student in this cooperation programme is rather good, the allocated teaching time is quite limited. Out of these boundary conditions, a quiz has been developed in the recent years, which proved to be a valuable augmentation of the lecture course.
This quiz is organized similar to a popular TV show with 15 levels, each featuring a question, three wrong answers and one correct answer, and three jokers that players can use once per round. It can be played anonymously in any of the usual web browsers, answers are collected for statistical purposes only. In this presentation,

background information and selected data from the access statistic are presented, leading to a live demonstration of the quiz (volunteers are welcome for this part!).

MICHAEL RAMEK
Graz University of Technology, Graz, Austria
COLOUR, COLOUR VISION, AND COMPUTER-BASED PRESENTATIONS

Human colour vision is based on three types of colour receptors in the retina, which are sensitive to the red, green, and blue frequency range. The red and green receptors overlap considerably, since the red receptor in fact is a modification of the green receptor (most other mammals cannot see red). Because of this overlap, a great variety of colours can be distinguished in this spectral range: red, orange, yellow, green, cyan.
The genes for colour vision are coded on the X-gene, hence significant gender differences can be observed: approximately 9% of the male population, but less than 0.5% of the female population are colour deficient on one of seven different forms (protanopia, deuteranopia, deuteranomalia, protanomalia, tritanopia, monochromatopia, achromatopia). All of these forms can be understood as a combination of red-, green-, or blue-blindness. Red- and green-blindness definitely constitute the majority of cases, whereas blue-blindness is a rare condition.
Computer-generated images, ranging from web sites to power point presentations, have become routine in our communication age. Computer monitors, TV screens, video walls, ..., all work with three colour channels (RGB) that match the sensitivities of the human colour receptors. Very understandably, software standards and commonly used programs work along the axes of this RGB system. However, since a non-negligible fraction of the population is red- or green-blind, not all colour combinations can be distinguished by all viewers. The top five unsuitable colour combinations are: red/black, red/yellow, green/black, magenta/white, cyan/white.

GIOVANNI RUBINO
Ministry of Foreign Affairs, Italy
WHAT YOU SEE IS WHAT YOU GET: THE CASE OF IVAN DAL CIN'S VECTORIAL PAINTINGS

It is widely recognized that the new media, such as the Internet, Instagram, Facebook, and alike, have a considerable impact on the contemporary art practices. This phenomenon started between the late 1980s and the early 1990s, at first in the USA and then in Europe, eventually reaching the art world of Eastern Europe as well. Along with this new technological environment, the human senses (especially the ones related to art: sight, touch, and hearing) have not only changed, but also increased in sensitivity. The so-called digital natives are growing in a new era, where sharing information and data is a fundamental approach in understanding the real world and its consumption. We could hypothesize a sort of a “smartsense”, added to the previously existing ones, which is able to innovate the meaning of the past, the present and, maybe, the future art production. Vice versa, we may assume that the more advanced devices, from the smartphone to the tablet, are deeply transforming our daily life, and therefore an increasing number of artists have been developing new ways of researching and making art. As an example for this statement, I wish to look closely at

several “Vectorial Paintings” by the Italian artist, graphic and web designer Ivan Dal Cin. By employing virtual brushes, which are directly based on specific websites, he has produced illusory, non-objective paintings. Then every user can choose to print those works or to see them on the screen. As a consequence, the paintings have no time or space, but exist for our “smartsense”, leading to the question: Is what you see what you get?

MAHNAZ SHAH
Cardiff Metropolitan University, UK
TIDAL ENERGY: AN ECOLOGICAL DESIGN DISCOURSE

The aim of this paper is to critically review and question the current discourses on the Severn Barrage, Wales, UK. The paper highlights the key objections with regard to the Barrage and other tidal-energy-based projects’ specifications put forward for the Severn Estuary and its henceforth continuous misreading by a number of local and specialist groups. The paper is divided into three main sections: the first attempts to review the Severn Barrage concept along with other potential tidal power solutions within its historical context; the second section hopes to situate the above projects within the accompanying theoretical frameworks; the final section then hopes to locate those elements within these theoretical constructs that have clearly been misread, suggesting a possible way out of this gridlock. This last section will also consider the lessons one can learn from the Rance tidal dam (1966) in Brittany. We would like to argue that the very definition of architectural and urban design sensibility has made a slight shift in order to integrate the current discourses on ecological and sustainable design studies. To our understanding, the term “sustainable” now intricately connects architecture and urban design studies to the environmental studies – at both conceptual and structural levels. This paper is an attempt to succinctly put forward the main discourses, perceptions, and at times misconceptions of the factors involved in harnessing tidal energy from the Severn Estuary, Wales. Forthermore, it attempts a brief comparison with the Rance Barrage in France.

KAROLJ SKALA, ZORISLAV ŠOJAT
Ruđer Bošković Institute, Zagreb, Croatia
REINCARNATION OF THE CRAY-1 SUPERCOMPUTER ON E2LP PLATFORM

Today, the development of FPGAs allows us to implement many of the historical computer designs. An implementation of the Cray-1 onto the E2LP board will enable the prospective electrical engineers and computer designers, as well as software engineers, to gain hands-on experience with one of the most important computer architectures, allowing them to study and adapt a very elegant vector processor design, which implements many important features of modern processors – pipelining, caching, chaining, and so on – in a consistent and comprehensive way.
An important aspect of using the Cray processors for teaching purposes is that the documentation of the preserved Cray designs (by bitsavers.org) is very thorough and extensive, therefore a full understanding and implementation is possible. Cray processors are completely hardwired (i.e. not microcoded) and fully synchronous, and thus an excellent example of efficacy and the complexity/performance tradeoffs of

computer design.
Application in the E2LP project involves the adaptation of generic design to the specific requirements in order to be used as a teaching tool, adaptation of the timings appropriate to the E2LP board, possible/probable debugging of the original design, development of a Cray Assembly Language translator (unfortunately, almost no software for this Cray series has survived the last 20 years of computer history), development of a basic monitoring programme for E2LP Cray implementation and, finally, the definition of parameters and the necessary descriptions for a series of advanced exercises. An essay shall be written, in which the major aspects of Cray design will be presented from the perspective of the system architect and the system implementor, historical and present-day, showing the students some of the possible avenues of further or different development of computer architectures.
A short video about this implementation aims at showing the essential features of research and development results. The film is 6 minutes long and made with the assistance of scientists, with a desire to demonstrate a new method of dissemination of scientific results with the use of artistic elements and the application of multimedia communications.

BLAŽENKA SLOVENEC and students: BORNA ANDRES, TIN MEŠTROVIĆ, LOVRO SINJERI, KATARINA SMERNIĆ
Gymnasium, Sisak, Croatia
PLAYING WITH SOUND

Teaching mathematics and physics in high school plays an important role in the education of a high-school student. In order to make the knowledge of physics and mathematics more appealing to the students, we have decided to combine music, sound, architecture, and ancient civilization into a single presentation. We will show you how easy it is to explain the superposition of waves while playing an instrument, and the acoustics or the levitation of bodies with the density lesser than water and the standing wave by playing drum and guitar. There is a direct link between architecture and acoustics, which effects the physical characteristics of a sound, such as echoes, materials, and the position of elements in an interior. The first reflections, which appear 80 milliseconds after the original sound, have a special significance for excellent sound quality. When the time interval between the first sound and its echo is short, the listener has the impression of standing near to the sound source and that is the key for great acoustics in concert halls. Acoustics also depends on the shape of the concert hall. When talking about the distribution of sound in a room, it is important to know that sound takes the shortest route to the listener. From an acoustical aspect, the best halls are fan-shaped or trapezoidal halls. Such an example is the theatre in Epidaurus, which has its auditorium built into a mountain and is perfectly symmetrical. Because of the position of its auditorium and its symmetry, it is the best example of acoustics built by the ancient civilization.

CELESTINO SODDU, ENRICA COLABELLA
Politecnico di Milano University, Milano, Italy
GENERATIVE ART AND DESIGN

Part 1: Celestino Soddu, "Generative Art and Design"
Starting from the 1980s, I have defined Generative Art and Design as performing the more advanced creative processes. These are able to contribute to the construction of dynamic transformation procedures by performing generative algorithms as a new approach to Art and Science. At the same time, this approach follows the Italian Renaissance by using and representing subjective interpretative logics. This talk presents a particular dynamic approach to generative geometry and topology, as well as its results in architecture, design, and art, which are shown directly in their generation process. They are performed as an endless sequence of variations, all different yet all belonging to a recognizable idea/code.
The act of writing Generative Algorithms gives a real result of dynamic investigation and representation of the existing environment from different and progressive logical points of view, tracing the rules for transforming it from the past into the future.

Part 2: Enrica Colabella, "Poetic Logic for Generating Complexity"
In *"La Scienza Nuova"* (1725), Gian Battista Vico used the term "Poetic Logic" for the first time, defining it as the ability of the human mind to create metaphors. This process allows us to make connections between elements that would otherwise remain unrelated. The present talk starts by raising the question of how this process is performed by connecting science and literature, followed by a brief historical excursus from Vico to Crane to Allen Grossman. The main part is about the author's experience with the "Poetic Logic" (Philosophy – Methodology –Tools) and as a teacher of Generative Design at the Polytechnic University in Milan.

GJINO ŠUTIĆ
UR Institute, Zagreb
NOVEL APPROACH TO RESEARCH AND DEVELOPMENT: CITIZEN SCIENCE, INTERDISCIPLINARITY AND INNOVATIONS

"Novel Approach to Research and Development: Citizen Science, Interdisciplinarity, and Innovations" is a short presentation on the postmodern development of science and technical culture. It will cover a wide range of novel topics, such as: Citizen Science, Hacker & Maker Culture, and Biohacking. An insight into the private interdisciplinary work of the presenter, Gjino Šutić, in the area of science, art, and education, is meant to show what has led to the creation of the UR Institute – an unconventional, interdisciplinary, and non-profit scientific institute bulit upon the pillars of postmodern scientific disciplines. A large number of UR Institute's interesting and fruitful recent and current projects in multiple fields (such as biotechnology, bioelectronics, electronics, nanotechnology, ecology, education, and postmodern hybrid art-science) have been accomplished in a short period of time. Projects have been realized in collaborative work, with a diversification of the research staff, open-source and open-door policy, and showing the indications of a sustainable business model. In this presentation, we will explore the potential of this new business model for

scientific institutions, research, and development, and offer an insight into the global trends in scientific development.

MIRJANA TOMAŠEVIĆ DANČEVIĆ
Croatian Council of the International Society for Education through Art – InSEA (HRV-InSEA), and School of Applied Art and Design, Zagreb, Croatia
NEW TECHNOLOGIES IN ART EDUCATION: SEND A VISUAL MESSŽGE!

The author advocates the view that the contemporary education should invent new teaching methods in order to keep up with the challenges of the multidimensional social reality. In accordance with these requirements, as the president of the Croatian Council of the International Society for Education through Art – InSEA (HRV-InSEA), she has launched three new sub/projects based on the use of new technologies in Visual Arts education:
I. How to communicate feelings in the medium of digital photography, a project carried out in two stages as two subprojects: I.1 and I.2: Feeling of PAIN/JOY in digital photos of students aged 12 – 19.
II. MESS@GES: Send a visual message in the medium of digital photography
The main goal of all three projects has been to encourage students to express their feelings/needs/ideas/opinions in the medium of digital photography, and to communicate them to others. Each project ended with an international exhibition, accompanied by a Croatian-English bilingual catalogue – in print and online. More specifically, the last project aimed at exploring some new methods and possibilities in Visual Arts education, particularly by using digital photography (manipulated digitally / unmanipulated) as an easily accessible contemporary medium in order to connect the students on an international level, and to record the results of the project in an online exhibition catalogue that could be easily published on websites of schools and associations, as well as sent to e-mail addresses of ministries, newspapers, donators, etc., in order to advocate the importance of Visual Arts education worldwide. Each sent/published message consists of the "from field" (author's name), an indicated message recipient (sent to:…), the "subject line" (title of the photo), and the "body" (1. photography, 2. verbal message, optionally).

HRVOJ VANČIK
Faculty of Science, University of Zagreb, Zagreb
UNIVERSE AS A COUNTERFEIT (IN ART AND SCIENCE)

As a consequence of the general delocalization of information, as well as the promoted policy in the modern societies towards such kind of globalism, the borderline between science and pseudoscience, original work and plagiarism, or serious art and superficial entertainment is intended to disappear. Special role in the construction of such an "apparent world" is played by the appearance of virtual culture.
A critical view on such kind of globalism will be presented on the basis of the newest research in this field. Especially, the simplicity-complexity dichotomy, as well as the possibility of retro-evolution, will be discussed.

KAROLINA WIKTOR, MARTA MIŚ
Zachęta — National Gallery of Art, Warsaw, Poland
CULTURE AND NEUROSCIENCE – ON THE SOCIAL INVOLVEMENT OF ARTISTS AND PUBLIC INSTITUTIONS

The conference *Culture and Neuroscience* at Zachęta – National Gallery of Art (October 25, 2014) was organized by Karolina Wiktor, a visual artist who had two strokes in 2009 and suffered from aphasia as a result (a speech impediment caused by damage to the brain). “I learned about the huge potential of our brain in an organoleptic way, I would say. Vertebral artery aneurysm and two strokes made me realize how fragile our being is. At the same time, it was exactly my sickness that made me aware of the substantial gaps in education and public awareness. Learning letters and words anew helped me understand the meaning of certain words, such as <dialogue and cooperation for social development>. No matter how loftily this may sound, I began to see sense in it.” – says Karolina Wiktor. This served as the starting point for a conference that would connect neuroscience with culture in a broad sense. A dialogue between these two fields was already underway, but it was taking place in a closed milieu and in a manner that was difficult to understand due to a very hermetic terminology. Our desire was that to organize a conference that would contribute to a wider significance and open character of these discussions by enabling people from both culture and science, healthy or disabled, with no exclusions. The conference in 2014 was the first edition of this social project. This talk presents the idea behind it and our future plans.

TEA ZUBIN FERRI
Material Research Centre METRIS, Pula, Croatia
CHEMICAL ANALYSIS OF CULTURAL HERITAGE MATERIALS: LIMITATIONS, CHALLENGES AND FASCINATION

Methods and instruments used today for researching novel materials are also applied to the research of materials that are classified as cultural heritage. Among the large number of methods and instruments available, the choice depends, first of all, on the type and amount of the available sample. In research concerning innovative materials, the amount of the sample does not usually represent a problem. On the contrary, chemical analyses of cultural heritage materials are regularly undertaken using extremely small amounts of the sample, which typically has to be enough to accomplish more than one, in that case non-destructive examination in order to respond to the queries that the archaeologists or restorers may have. The analytical techniques accessible today allow us to examine with precision even micrograms of the sample and to compare the results with the data already known about an artefact. Sometimes these data do not match, meaning that unknown aspects are being discovered. For example, finding a synthetic pigment on a medieval altarpiece reveals that some repainting has occurred, and may even discredit the artefact’s authenticity. Powerful chemometric methods can help us find wrong chronological attributions of prehistoric pottery in cases when the excavation was not carried out correctly, and gas-chromatography coupled with mass spectrometry can reveal the preparation method of an ancient coating used in the Roman times to make the tableware impermeable. Finally, the possibility of discovering how the first nanotechnology, although unconsciously, was actually achieved 1600 years ago (or even in the prehistoric times

according to some authors) is accompanied by excitement and fascination about the fact that some technological solutions applied centuries ago are not as outdated or completely understood as we may think.

POSTERS

DAVOR BEŠVIR, VENIJA BOBNJARIĆ-VUČKOVIĆ
Croatian Conservation Institute, Ludbreg, Croatia

CONSERVATION AND RESTORATION ANALYSIS OF THE ALTAR OF ST. MIHOVIL FROM THE CHAPEL OF ST. DOROTHY IN LOGORIŠTE

The chapel of St. Dorothy (dating from the 17th century) is situated on a hill outside the settlement of Logorište, in the vicinity of Karlovac. It was directly affected by the demolitions during the Homeland war, and for that reason, during 1992, the inventory of the chapel was relocated. Two very valuable altars, dating from the 17th and 18th centuries, were deposited in the Ludbreg depot. The altar of St. Mihovil, which used to be placed on the right side of the chapel, used to be the main altar until the 18th century, when it was replaced by a new altar. During the relocation of 1992, it underwent certain changes in composition and in colour. According to its characteristics, it can be dated to the second half of the 17th century, it is of black and golden type of altars of a more modest local folk origin. It has a monochrome, black architecture with gilded and polychrome ornaments. The pertaining sculptures were also gilded. The altar has been repainted several times over time, while the pillars were coated with galvanized sheet metal. In order to determine the original features of the altar, several detailed conservation and restoration analysis were carried out using the following methods: 1 stratigraphic analysis of the cross section; 2 x-ray fluorescent spectroscopy (XRF); 3 thin-layer chromatography; 4 FT-IR spectroscopy; 5 mechanical and chemical stratigraphy; 6 chemical tests. The tests which were carried out during the analysis have shown a complex situation because the original features of the altar and especially its colours were considerably changed. The analysis has shown several important facts. 1. In some parts of the altar there are three to five visible layers of undercoat, poliment and paint or thin layers of gold, whereas some parts have up to three interlayers. 2. All pigments which had been used in all layers of paint have been determined during the analysis. 3. The pigment binder shows presence of oil, terpene resin and protein binder. 4. The most effective chemical substances for removing multiple layers of paint have been determined during the analysis.

TIHONI BRČIĆ
Academy of Dramatic Arts, Zagreb, Croatia

USE OF ULTRASOUND IMAGING AND COMPUTER GRAPHICS IN FILM TITLES

This lecture explores the use of technology in creating *in vivo* title sequences in films. The concept of film graphics inside the living body has been used rarely and exclusively with photography and computer animation. Ethical and practical reasons have dictated the creation of a simulated *in vitro* environment. During my doctoral research at the Academy of Fine Arts in Zagreb, I have introduced sound as a tool, instead of light used in photography or film. Medical 4D ultrasound imaging was used in creating titles

with animated, three-dimensional sonograms. While photography achieved authentic realism in the movie “Sisters”, computer graphics (CG) produced a synthetic, non-organic look in film titles. Films such as “Look Who's Talking” and “Splice” used CG to digitally recreate a semi-photorealistic uterus, while others utilized a stylized approach with more success. The “Hollow Man” offered microbial typography suspended in transparent cerebrospinal fluid, and “The Final Destination” reanimated medical X-ray images with three-dimensional CG. Title sequence for the film “Two Pink Lines” was made with 4D ultrasound technology. It duplicated the culturally accepted, low-resolution aesthetic of sonograms, evoking the look and feeling of foetal typography. Rubber-type models were scanned with a transabdominal probe using high frequency sound waves in the range from 2-18 MHz. Sophisticated computer software used the data from multiple echoes to reconstruct 3D sonogram images. In my doctoral research, medicine and art have given birth to a new form of film graphics. Compact design, mobility, and 3D printing have been introduced to ultrasound technology, presenting the artists with new ways of artistic expression.

MIRO A. CIMERMAN, DUNJA DONASSY-BONAČIĆ
bcd CyberneticArt team, Königswinter | Berlin, Germany | Zagreb, Croatia
EXHIBITION: “ART & SCIENCE” IN 1968/9 @ LABORATORY FOR CYBERNETICS, RUĐER BOŠKOVIĆ INSTITUTE, ZAGREB

Early *computer-generated cybernetic artworks* (1968/69) by Vladimir Bonačić emerged at the interface of science and art, as a result of collaboration between the then *Gallery of Contemporary Art* and the *Laboratory for Cybernetics* at the *Ruđer Bošković Institute*, in the framework of *T4* events (Zagreb, 1968, 1969) of the international artists movement *[New] Tendencies* ([N]T). At that time, the Laboratory was known for its research and development of the “*System for Pseudo-Random Digital Transformation*”, based on the application of the *Galois Field Theory*. The organizers of [N]T approached Vladimir Bonačić and their intensive collaboration led to the art historical signet work named object *t4* – a joint work of *artist Ivan Picelj* and *scientist Vladimir Bonačić* – created in 1968 and exhibited in 1969 for the *t4* exhibition. Vladimir introduced a new approach to exploring the “*behavior*” *of the Galois Fields* with the aim of applying it for *cybernetic art*. By using visual effects, he removed the stumbling blocks hindering the *search for the hidden data structures of the Galois Fields*, hitherto unknown to mathematical processing. For the *emulation*, he used the programming language *Assembler* and a *PDP-8 computer*, supplemented by an *interactive optical system “Screen with Light Pen”* constructed in the Laboratory. It consists of digital-analog converters that, monitored by a computer program, control the illumination of the oscilloscope screen. Light patterns on the screen could be filmed by photo camera. The desired artistic impression could be achieved through interactive analog-digital electronic interventions, direct access to the computer program, and photographic procedures. For the simulation, he used the programming language Real-Time FORTRAN and a SDS 930 computer with the line printer as output device.

ANDREJA DRAGOJEVIĆ, SANELA HUZJAK, MARIJANA MIMICA, IGOR KOZJAK
Croatian State Archives, Zagreb, Croatia
NON-DESTRUCTIVE RESEARCH METHODS APPLIED TO THE STATUTE OF DUBROVNIK FROM 1437

Research of the conservation process provides valuable information about the history of an object, the production technique, and the materials used. Non-destructive methods of research do not endanger any part of the object, so the method fits the contemporary understanding of the ethics of conservation. The preservation of each part of a cultural object also preserves its history, which thus remains its integral part.
The Statute of Dubrovnik from 1437 is a cultural object of legal, cultural, historical, and artistic importance. It is actually a transcript of the Statute from the 13th century, which continued to be supplemented by new laws until 1657. In addition to the legal life of Dubrovnik, it also provides information about the life of its citizens through 400 years of history. On the fifth page of the Statute, there is an initial with the image of St Blaise, the patron saint of the city. The miniature has been recorded in daylight and under the UV (ultraviolet) and IR (infrared) light. The best results were given by the UV light, which revealed a detail that supplied us with a new and previously unknown historical image of the object. By using the XRF spectroscopy (X-ray fluorescence spectroscopy) method, we have found out which pigments were used by the artist when painting the miniature. A microscopic analysis of the surface of parchment and leather has revealed the type of skin from which the sheets of the book block and the binding were made. Solubility tests showed the characteristics of inks with which the text and the initials were written. The non-destructive research methods that we have used revealed some previously undiscovered details and helped us understand the production history of the Statute of Dubrovnik, which is extremely valuable for the written cultural heritage.

MARJANA PAULA FERENČIĆ, JAŠA, ČALOGOVIĆ, ROMAN BRAJŠA, DUBRAVKO JELIĆ, KARMEN BRAJŠA
The Croatian Association of Visual Artists (HDLU); Hvar Observatory, Faculty of Geodesy, University of Zagreb; Fidelta Ltd.; Zagreb, Croatia
IN THE EYE OF THE BEHOLDER

The Sun has played a highly symbolic role in visual presentations throughout history. It overcomes the darkness and illuminates the whole world. It has often been associated and identified with the deity who sees everything that happens on Earth, therefore considered to be the eye of the world or God's eye. The Sun has been symbolically linked to Christ, the god Ra, Apollo, or Helium, but also with the ultimate symbol of life (eternal life). Fascination with the Sun and sunlight in art can be perceived by exploring various artistic media and expressions. Throughout art history, this has resulted in the emergence of certain stylistic art directions (such as Impressionism and Expressionism). The Sun has been recognized as life, such as cells are in science, as it is the most important source of energy for life on Earth and a main driver of its climate system. Modern solar telescopes have revealed that the whole Sun's surface consists of solar granules, small (about 1000 km across) cellular features that last only for 10 to 20 minutes. The whole Sun is covered by ca. 4 million granules, except in the areas covered by sunspots, which prevent the development of convection currents. The cell is a structural, functional and biological unit present in all organisms as the smallest unit

of life that can replicate independently, which is why cells are often called the “building blocks of life”. In the past 10 years, significant efforts have been made towards developing more realistic *in vitro* cell culture models, which can be “near to *in vivo*” conditions. Three-dimensional (3D) cell cultures are a product of this new technology. Images of 3D cultures under the microscope show similarity with the structure of the Sun. The techniques and methods used to present the Sun or the cells have included the telescope, the microscope, and the artist's brush strokes. Visual reproductions by Vincent van Gogh, Turner, Rabuzin, Seder, Kožarić, and Monet, as well as those from Egyptian, Greek, and Christian mythology, are presented here together with images of the Sun, the Sun’s granules, and cell growth in 3D format.

ANA FILOŠEVIĆ, ROZI ANDRETIĆ WLADOVSKI
Department of biotechnology, University of Rijeka, Rijeka, Croatia
DROSOPHILA MELANOGASTER AS A MODEL ORGANISM IN THE NEUROBIOLOGY OF ADDICTION: THE BEHAVIOURAL GENETICS APPROACH

Drosophila melanogaster has been used for many years in scientific research as a model organism owing to its quick reproduction, easy maintenance, inexpensive cultivation, and a sequenced genome. Due to the conservation of biological pathways between *Drosophila* and humans (70%), these flies have been increasingly used to test different types of cancer, diseases, and other biological mechanisms. Drug addiction to a psychostimulant is a pathological form of neuroplasticity, which includes a cascade of neurochemical changes. The first exposure of the model organism to a dose of psychostimulants leads to acute sensitivity, which is accompanied by a reward effect, whereas chronic administration is accompanied by tolerance or sensitization, and addiction. Behavioural sensitization to psychostimulants denotes an increasing behavioural response to the intermittent dose of the same concentration of psychostimulants. In our work, we study behaviour sensitization in order to define which genes and proteins are involved in the development of addiction and the neural networks involved in the cascade of neurochemical changes induced by the consumption of psychostimulants. A better understanding of such basic processes involved in the development of addiction will help in designing successful prevention and treatment of addiction.
In *Drosophila*, behavioural sensitization has been traditionally measured by using video recordings followed by a visual analysis, which is a time-consuming process and prone to subjectivity. In this study, we are defining a new, high-throughput assay for measuring behavioural sensitization in *Drosophila*. The assay is an adaptation of the “Drosophila Activity Monitoring System” (DAMS), which allows long-term monitoring of the changes in the locomotor activity and sleep patterns in a large number of flies.

MAYA GERASIMOVA
The Institute of Oriental Studies, Russian Academy of Sciences, Moscow, Russia
ART BY MEANS OF HIGH TECHNOLOGY

If we recognise Art as a set of human activities and their products that involves imaginative and technical skills and engage the audience's aesthetic sensibilities, today’s current Kyoto Station (opened in 1997) can be considered as an example of

how artistic conception can be implemented by means of high technology. The station has nothing in common with the traditional image of the city. It is one of the country's largest buildings, incorporating a shopping mall, hotel, movie theatre, department store, restaurants, and several government facilities under one 15-story roof with a slightly irregular cubic façade of plate glass over a steel frame. Inside, it gives the impression of a soaring atrium, as if it were an interplanetary station. This effect is achieved not only due to the building's high-tech construction and design, but also owing to the so-called principle of "borrowed scenery" (*shakkei*), which means incorporating the background landscape into the composition of a garden or using the surrounding landscape as an integral part of the architectural complex as a whole. The "borrowed scenery" in the station building is… the sky. There are huge openings here and there, through which the sky can be seen. This is what creates the impression of staying in cosmic space. But the main element of the Kyoto Station is its staircase, which seems to lead straight to the sky, reminding of an endless stream – *nagare*. For the Japanese, the *nagare* stream is a metaphor for human life. Another metaphor for human life is travel, and the train station is a symbol of travel… The staircase and the escalators are therefore not just functional parts of the building. They carry a traditional philosophical and poetic meaning, and can be recognized as *mitate* – one of the main Japanese artistic techniques.

HRVOJE GRŽINA
Croatian State Archives, Zagreb, Croatia
HISTORICAL PHOTOGRAPHIC PROCESSES

Throughout almost one hundred and ninety years of its existence, starting with the first durable photographic image made by Nicéphore Niépce in 1826 in France, photography has undergone a series of technological changes. With the development of photographic technology and materials, older photographic processes were gradually coming out of practice and were replaced by new ones, and with every step forward, photography was becoming accessible to a wider range of people.
Photographs made by means of different processes can now be found in various collections stored in archives, museums, libraries, and private collections. Their identification, as well as our knowledge about their basic chemical and physical characteristics, are the first steps in any type of research, as without understanding the photographic processes used in their making, it is very difficult to determine the environmental conditions needed for their preservation. Following the development and changes in photographic technology and materials, this poster outlines the most important photographic processes used in Croatia, starting from the daguerreotype to the colour photograph, still in use today. Richly illustrated and containing various images from the Croatian State Archives' Photographic Library, together with examples from a personal reference collection of photographic processes, the poster provides an organized overview of the most common historical photographic processes present in the Croatian collections.

KATARINA IVANIŠIN KARDUM, MARIJA CRNČEVIĆ
Technical Museum, Zagreb, Croatia; Public institution for the management of protected natural values in the Dubrovnik-Neretva County, Dubrovnik, Croatia
TRADITIONAL KNOWLEDGE ON HOUSEHOLD NATURAL DYES IN THE DUBROVNIK REGION

The research focuses on the traditional knowledge regarding the uses of household dye substances of vegetal, animal, or mineral origin in the Dubrovnik region, southern Croatia. Field data has been collected through open interviews, mainly involving farmers and elderly people who were born or have been living in the region for a long time. As less and less people live in this area and the population is predominantly elderly, this traditional knowledge is in danger of vanishing. This research will offer an insight into the traditional dyeing methods used and passed on from one generation to the next. The research includes data about plant and animal species: the scientific name, family, vernacular name, life form, status (wild or cultivated), parts used in the production of household dyes, the process of making a dye, and the way the dye is used. Traditional knowledge on painting tools and its origin will also be investigated.

TANJA JURKIN, BRANKA KATUŠIN-RAŽEM, DUŠAN RAŽEM, BERNARDA RUNDEK FRANIĆ, ANA MARIJA FRANIĆ, MAJA VRTULEK, VENIJA BOBNJARIĆ-VUČKOVIĆ
Ruđer Bošković Institute; Croatian Conservation Institute; Zagreb; Croatia; Croatian Conservation Institute, Ludbreg; Croatia
RADIATION DESINSECTION METHOD USED IN PROTECTING THE TEXTILE CULTURAL HERITAGE ARTEFACTS

Textile artefacts, as well as other objects of organic origin, are susceptible to biodeterioration owing to the activity of insects, fungi, bacteria, etc., resulting in changes and even complete disintegration. The gamma irradiation method is an efficient, safe, simple, and fast method for inactivating all biological contaminants at all stages of their life cycle by causing damage to their DNA molecule. The panoramic ^{60}Co gamma ray irradiator at the Radiation Chemistry and Dosimetry Laboratory (RCDL) of the Ruđer Bošković Institute has been used for the past 30 years in protecting and preserving cultural heritage objects. The most important parameter in irradiation treatment, the absorbed dose, depends on the initial level of contamination, the radiosensitivity of the contaminants, and the desirable factor of their reduction. The lowest dose is chosen that ensures conservation and does not damage the material. Special care is taken in case of materials that are more radiation sensitive, such as textiles. Desinsection of textile with doses of 0.5–2 kGy is efficient and reliable, as it does not cause changes in the material. Using higher doses for disinfection (2-10 kGy for the control of fungi, 5-20 kGy for decontamination) must be specially justified.
In cooperation with the Croatian Conservation Institute (CCI), many historical liturgical textile items that used to be kept in inadequate conditions have been desinsected. After the conservation and restoration process was completed, the objects were returned to the monasteries and churches, or stored in a special depot for the preventive maintenance of textiles (Textiloteka) at the CCI (Conservation Centre Ludbreg). The desinsection treatment of numerous garments from the *Alka* collection, which have been entrusted to CCI for conservation and restoration, is another example of successful application of the irradiation method.

BRANKA KATUŠIN-RAŽEM, DUŠAN RAŽEM, MARIO BRAUN, BRANKA MIHALJEVIĆ
Ruđer Bošković Institute; Croatian Conservation Institute; Zagreb, Croatia

AN OVERVIEW OF THE APPLICATION OF IRRADIATION FOR THE PROTECTING OF CROATIAN CULTURAL HERITAGE

The application of irradiation treatment in protecting cultural heritage artefacts in Croatia was made possible by developing radiation processing procedures and by adopting adequate methods of quality control at the Radiation Chemistry and Dosimetry Laboratory of the Ruđer Bošković Institute. After upgrading the ^{60}Co gamma irradiation source and converting the irradiation facility into a panoramic irradiator in 1983, it became possible to perform irradiation on a large scale for both research and the commercial pilot plant-scale solving applications. The latter include sterilization, pasteurization, and decontamination of various materials, such as medical supplies, pharmaceuticals, cosmetics, and foods, but also disinfestation of cultural heritage artefacts. Demand for the irradiation treatment of cultural heritage objects has proven particularly important as the increasing number of these objects, especially polychrome wooden sculptures, badly need salvation, restoration, and conservation as a consequence of direct and indirect damages inflicted to them during the war in Croatia (1991-1995). The irradiation facility at the Ruđer Bošković Institute is briefly described, including the account of more than twenty-five years of its activity in the field of irradiation treatment of cultural heritage. Some case studies performed in cooperation with the Croatian Conservation Institute and other interested parties are presented, as well as some cases of protective and curative treatments of disinfestation and decontamination. Instruction on the method at all levels and international cooperation are also mentioned.

KATARINA MARUŠIĆ, MAJA ŠEGVIĆ KLARIĆ, ANA DUMBOVIĆ, BRANKA MIHALJEVIĆ
Ruđer Bošković Institute, Zagreb

PROTECTION OF CULTURAL HERITAGE ARTEFACTS BY IONIZING RADIATION

Cultural heritage artefacts of organic origin, such as wood, leather, paper, or textiles are subject to degradation due to the biological activity of various parasites. Many items can be threatened by the appearance of mould and fungi, caused by an increased concentration of moisture in the rooms where they are located. Radiation method is a process that exposes these vulnerable subjects to gamma radiation, and it has already proved very effective in saving objects acknowledged as cultural heritage.
The Laboratory for Radiation Chemistry and Dosimetry at the Ruđer Bošković Institute has a panoramic multifunction device for irradiation with ^{60}Co gamma rays. Recently, the device has been increasingly used for preserving and protecting cultural heritage artefacts.
This paper outlines the necessity of an interdisciplinary scientific approach, as well as using the radiation method as the best choice to solve the problem of mould in one original example, in cooperation with the Croatian Conservation Institute.

MORANA NOVAK, IVONA MATIĆ
Institute for the Protection of Cultural Heritage of Slovenia, Ljubljana, Slovenia
RAMAN SPECTROSCOPY IN THE ART-SCIENCE INTERFACE

Restoring and preserving works of art should be preceded by a scientific analysis and characterization of all materials present in the object. Thus, scientific conservation resides in an interface of art and science and the characterization of materials offers a better insight into precious works of art. Raman spectroscopy is becoming increasingly important as an analytical diagnostic tool for investigating old and brittle art objects and antiquities. Raman spectroscopy has been used as a valuable analytical tool for the non-invasive analysis of both organic and inorganic materials in art objects. It has several advantages over other analytical techniques, such as high specificity, selectivity, and speed, high spatial resolution and relative immunity to interferences. There are various reasons for choosing spectroscopic investigation as a method suitable for antiquities and art objects. One is the fundamental interest in the materials and techniques used many years ago and applied in a particular period or place. This knowledge is important and may also be applied for roughly dating the artefact. The spectroscopic examination of objects is of great help during the conservation or restoration treatment, and artistic analysis can be of help in solving art-historical questions. This review provides a brief introduction into the physical principles of Raman spectroscopy, a description of modern instruments used in laboratories for Raman measurements, and an overview of the ways in which the scattering effect can be used in the analysis of art objects. Several studies that demonstrate the application of this technique in the cultural heritage field will be shown.

IGOR PETEH
The Faculty of Teacher Education, University of Zagreb, Zagreb, Croatia
THE ORGAN – ART AND TECHNOLOGICAL PROGRESS. The Organ as a Mirror of Its Time

The organ (Lat. *organum*, Gr. ὄργανον: "instrument, tool, device") is a keyboard instrument that uses pressurized air in order to produce sound in pipes. Parts of the modern organ include the console (with one to five manuals and a pedalboard), the manubria (stop-knobs) for activating individual registers, the wind pipes, the valves, the compressor, and the bellows. Obtaining sound with the help of air coming from human lungs has been known from the very beginning of civilization, and the earliest, simple wind instruments are direct predecessors of the organ.
The history of the organ began with the pan flute, a set of windpipes of various length, where the player produced the sound by directly blowing into the instrument. The bagpipe is similar in terms of the playing technique, but its bag, to which the player constantly adds air by blowing into it, serves as an intermediary between the musician and the instrument with its chanter. The principle of obtaining sound is the same as with the organ, but the latter differs from both the pan flute and the bagpipe in its advanced technology, which has gradually made the direct air force from the player's lungs obsolete in creating sound. The organ mirrors the cultural and technological advance of Europe as a whole, since it has developed in a number of countries simultaneously. Therefore, it represent the unique technical and artistic heritage of the Old Continent.

IRINA PUCIĆ, KATJA KAVKLER, BRANKA MIHALJEVIĆ
Ruđer Bošković Institute, Zagreb, Croatia; Institute for the Protection of Cultural Heritage of Slovenia, Restoration Centre, Ljubljana, Slovenia
RADIATION TREATMENT OF MODEL TEXTILE SAMPLES

Natural textile fibres are sensitive to biological deteriorants, particularly to insects and fungi. This serious problem may be solved by radiation treatment Š1Ć. To meet the high standards of conservators and avoid any side effects, the lowest effective radiation dose is applied. Numerous textile items have already been efficiently disinsected by gamma radiation at the Laboratory for Radiation Chemistry and Dosimetry (RBI), with a radiation dose below 2 kGy Š2Ć. In case of fungal contamination, doses up to 6 kGy and sometimes even higher may be needed. The treated textiles are often already damaged, which is why possible effects of higher doses should be assessed. Because of that, tests have been conducted on model samples of the most common textiles: silk, flax cotton, and wool. Some samples were heat or UV-aged before being exposed to γ-irradiation. In order to observe all changes induced by radiation, which are very small and difficult to discern from those of natural ageing, a high dose of D=120 kGy was applied. Changes were determined by means of thermal analysis: differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM). The results indicated that even a large dose caused almost no change in the protein-based materials (silk, wool), while those based on cellulose (cotton, flax) had their thermal stability somewhat reduced after irradiation. Despite high-dose radiation, changes were comparable to or smaller than those caused by artificial aging. The conclusion is that heritage textile materials can be safely treated by radiation, even with the doses needed for controlling fungi.

BLAŽENKA SLOVENEC, NIKOL RADOVIĆ
Gymnasium, Sisak; University of Zagreb, Zagreb; Croatia
LET'S DANCE

Physics of dance balancing is very interesting, as well as complicate to understand. Our aim has been to bring new insights concerning the problem of statics and dynamics in dance balancing.

BOGDAN SOLIĆ
Zagreb, Croatia
A WORKING REPLICA OF THE GUTENBERG PRINTING PRESS

Johannes Gutenberg (b. ca. 1398 in Mainz – d. February 3, 1468 in Mainz) is credited with having invented the printing method that uses movable type. Among his many contributions to the printing technique, one should note the invention of a process for mass-producing movable type, the use of oil-based ink, and the use of a wooden printing press similar to the agricultural screw presses of the period. His truly epochal invention was combining these elements into a practical system that allowed for a mass production of printed books and was economically viable for the printers and readers alike. It has been assumed that the process he invented around 1450 was the method

that continued to be used almost unchanged for another 500 years. Owing to his inventions, he is nowadays regarded as one of the most influential figures in human history. We do not know many details about Gutenberg's life and work. The exact schematics of the original press used by Gutenberg have been lost. This replica is my attempt at reconstructing what the original press made by Gutenberg may have looked like and how it operated.

MARKO VINCEKOVIĆ
Department of Chemistry, Faculty of Agriculture, University of Zagreb
BIOTECH FORMULATION OF PLANT GROWTH PROMOTERS BY ENCAPSULATING FUNGAL BIO-FACTORS

Microencapsulation of bioactive agents has been developed in recent years as a new, potential tool for ecological and sustainable plant production. Encapsulation in biopolymer matrices has been recognized as an effective method for controlled the release of an active agent used for plant protection/nutrition. Polysaccharides, such as chitosan and alginate, are biopolymers that easily create biodegradable capsules in which an active ingredient can be incorporated using an aqueous system at ambient temperatures. The ability to tailor the physicochemical properties of the chitosan/alginate complexes by controlling the degree of association between the functional groups offers a route toward rationalizing the biopolymer microcapsule design. The main aim of this study has been to investigate the intermolecular interactions in a mixture of two oppositely charged biopolymers and bioactive agents, which will help tailor the optimal encapsulation of plant protection/nutrition agents. Biopolymer-based microcapsules with a single active agent have extensive applications in agriculture. Nevertheless, our knowledge of the simultaneous encapsulation of biological and chemical agents is still rather limited. The novel sodium alginate/chitosan-based microcapsules, simultaneously loaded with copper/*Trichoderma viride*, have been prepared. The optimal conditions for preparing homogeneous, spherical, and smooth microcapsules have been established. The physical characteristics, encapsulation efficiency, the loading capacity for bioactive agents, as well as the release characteristics under varying conditions, have been investigated *in vitro*. The results revealed the coexistence of copper and *Trichoderma viride* in the microcapsules with an improved viability of *Trichoderma viride* and may therefore be an effective vehicle for their delivery to the plants.

SRĐAN VUČINIĆ
Croatian Academy of Sciences and Arts, Zagreb
FUNCTIONAL BIOMIMETICS OF THE GREAT SPHINX OF EGYPT

Along with the Great Pyramid of Giza, the Sphinx is one of the greatest enigmas and the most studied ancient monuments of human history. There is no other place teeming with so many researchers looking into the mysteries of the human past that may allow them to rewrite history. The Great Sphinx is one of the world's largest and oldest statues, yet the basic facts about it, such as a real-life model for the face (was it a lion, when it was built, and by whom) are a matter of debate. These questions have collectively earned the title “The Riddle of the Sphinx.” This presentation offers an

interdisciplinary and scientifically based approach combining functionalism, medicine, biomimetics, art, and science in order to show the “best-known” facts about the Sphinx and to confront them with a newer, less known, and very small variable or insight in order to reveal and maybe answer the “Great Riddle” – such as what species the Sphinx was and what was the purpose of the sculpture. Thus, this presentation will be an example of how a small detail, deviation, or variable can give us a wholly new perspective on our accustomed beliefs and knowledge by using the example of the Great Sphinx of Egypt. Do not just copy, catch on. Fantasies excluded.

EXHIBITION

IVA ČURIĆ

Academy of Fine Arts, University of Zagreb, Zagreb

TRANSCRIPTION

My area of research is based on demonstrating very simple, familiar materials applicable from construction to deconstruction and vice versa, as well as an apparition on the verge of appearance – disappearance. With the classical 2D graphics, often inevitable in the process, as is the product, I am trying to create a spacious integral mass by combining graphics, sound, light, and movement. My work consciously addresses the senses – sound, sight, and touch – and in doing so provokes the observers’ perception (often classifying the work in the area of device art).

S-table 2010

The main attribute of this work is the elementary incidence of characters, numbers, and parts of sentences that are converted into an array of variations. That kind of symbolic text acquires the function of unknown graphic notation, which is read and decoded by a machine into the audio dimension. Each board with prints gets a specific sound and its own sounded frequency of the audio spectrum.

Concept "F" 2011 (contains three works) 2D graphic, light box, glass cube

The starting point of Concept f is fog as a fluid and complex atmospheric phenomenon. It is a visible mass consisting of cloud water droplets or ice crystals suspended in the air at or near the Earth’s surface. Graphics and its extension are inseparable when viewing the work. The graphics inside the Light box are sounded and react on the spectator. The print layers are moving and the sound that we hear is the sound of the fog which is as undefined as its representation inside the glass cube.

E-MITATION 2015

This is an interactive light-heat installation whose primary medium is electric heater producing the temperature of 500 °C. The heat and its energy that is imitated in space buckle on the air, which distortion is seen as a moving shadow.

DALIA FINEK

Academy of Fine Arts, University of Zagreb, Zagreb

FREQUENCIES

“Frequencies” consist of three parts: graphics, Lightbox, and video, created one after another. My main motivation was music. Through my artistic creativity, I am trying to transfer sound, vibration, and tone into the visual field. My research began by learning

about the Chladni figures. In my “Frequencies”, I have followed the Chladni experiment, with minor modifications. Using a violin bow, I “played” at the border of a graphic zinc plate sprinkled with sugar and produced frequency. The graphic zinc plate was set up on my hand and, depending on the position of my fingers, produced different samples of frequencies. The resulting samples of frequencies were printed in the standard graphics process. The same sample frequencies were then used in light-boxes, where I perforated the Plexiglas. The plates were placed in wooden boxes whose interior contained the tape with LED lights. They “passed through the frequency” in space around and through the perforations. After a three-part ensemble “Frequency”, I began studying the six Solfeggio frequencies that were originally used in the ancient Gregorian chant. I discovered that today’s solfeggio scale was based on hymn of St John the Baptist: the first syllables of the hymn sung with the note that was one degree higher than the first syllable of the previous line. Each syllable (UT, RE, MI, FA, SOL and LA) is the tone or note with a certain frequency. Here begins a new stage of the “Frequencies”. With the help of the available components, I produced a frequency vibrator capable of forming an “image frequency”. My future goal is to visualize the six Solfeggio frequencies. I produce them on graphics zinc plates sprinkled with sugar. They have the possibility of printing graphics.

MEHRDAD GAROUSI
Hamadan, Iran
SIERPINSKI DREAM

This animation presents a journey inside an endless fractal world embedded inside a limited icosahedral shape. It is a combination of five different fractal formulas, each of them activated at specific iterations. Two well-known examples of them are IcosahedronIFS and Menger3, which make the first icosahedral shape at the beginning of the animation and one of the most interesting parts of the journey that takes place between 1:10 and 1:20, when although one expects to have the Sierpinski pattern infinitely continued, suddenly at a magnification of 3.3 x 10Č8 the triangular pattern starts vanishing and a new, squarish 3D pattern says hello and it seems as if we are going to have a Menger Sponge! The animation has been wholly created in the Mandelbulb3D program and the music is composed of a number of mathematical sequences, all put together in the FractMus 2000 program. The animation can be viewed at:
https://www.youtube.com/watch?v=P5EkdJRtF-4 The animation and the abstract were presented at the Bridges 2013 and 2011 Generative Art conferences. Additional information about the creation process can be found in the “Sierpinski World” paper, published in the proceedings of ISAMA 2011 and accessible online at:
http://www.isama.org/hyperseeing/11/11b.pdf

JIREK KOČICA, VILMA DUCMAN
Ljubljana, Slovenia, Institute for Civil Engeneering, Ljubljana, Slovenia
SEEDKEEPERS

The installation consists of six sculptures and one projection in loop (less than a minute). Five sculptures are titled “Palmprints” and are made of two different gels (the

silica-gel and the polyacrylamide gel used for analyzing proteins with electrophoresis). The palm prints are actually cast hands (hands serve as a mould and are in the position of keeping liquid). The sculptures are illuminated from below and that makes the fingerprints visible. The sixth sculpture is titled "Seedkeeper". This sculpture is a simple geometric shape made of geopolymer within which there is a small statue made of bee wax. This little, *anthropomorphic* statue carries the seed of a cultivated plant (e.g. wheat). The little wax sculpture inside the geopolymer geometric form cannot be seen with the naked eye, but one can see it with the help of a microtomography-animated projection.

SINIŠA REBERSKI
Academy of fine arts, University of Zagreb, Zagreb
RHETORICAL FIGURES AND REPETITION IN VISUAL ART

In the "teachings of beautiful and good diction," as ancient rhetoricians used to call thetorics, or in the "methods of text analysis," as it is known today, we use the terms that are also present in the visual arts (genres, styles, composition, figures), which points to many other similarities between the two areas. Of course, these are not the only areas of art that overlap in many things. It is impossible not to notice a correspondence between speech and music, music and visual art, or visual art and literature. The source of all these connections and similarities is the nature of artistic creation, based on the premise that art is primarily a communication process and that, therefore, there cannot be any art without the sender-message-recipient chain. But whereas science seeks exactitude and clarity of information, art thrives on the distance of clarity. It can be said that science wants a completely clear and total communication chain whereas art yearns for the unfinished. Science does not set pleasure as its goal, but comprehension, so it requires clear and total communication. It seeks preciseness and breadth in a communication system. I wish to stress that my intention has not been not to explore the totality of connections between arts, but simply to indicate the possibility of applying the methods of textual analysis to the field of visual communication and visual arts.

VESNA ROHAČEK
Academy of fine arts, University of Zagreb, Zagreb
RHYTHM 4, INTERVAL, SPECTRA

I will present three installations.
Rhythm 4 (2010) is a mechanical device installation using a stethoscope and a microphone to create an image of the visitors' heartbeats and other sounds of their bodies. They are directly involved in the piece with their motion, prolonging its completion. The work started with a serigraph graphic print of my EKG results.
Interval (2014) is lumino-kinetic interactive work exploring the aesthetics of natural movement in water waves, light, reflection, and the movement of visitors. It consists of water pools on a sensitive floor that vibrates with the visitors' actions and creates waves on the water surface. Their light reflection is then projected on the surrounding walls, generating fluid and changeable ambiance.

Spectra (2015) is an installation that examines the structural laws of the color spectrum and the ability of changing it. It contains light breaking through the sculptural form of glass prisms, which are projecting a range of colors on the surrounding walls in different constellations. The visitors' action affects the schedule change and the position of the spectrum, running the entire surrounding area.

LOREN ŽIVKOVIĆ KULJIŠ
Arts academy, Split, Croatia
"SURROUNDING" (video animation), 2010

In my research, I focus on the mechanisms of interpretation and the forms in which it manifests itself as a separate reality.
In my work "Surrounding", I exploited a short film, which I first segmented into photographs as the smallest units that it is composed of. Decomposed in this manner, the film no longer possessed the dimension of time; instead, it became a mere sequence of photographs. The differences in the visual content of individual photographs are negligible. Next, I used each of the photographs as the basis for a pencil drawing. In this way, drawings based on photographs functioned as a kind of *interpretation of interpretation*, confronting one organised system with another. In the process of reinstallation, behind each photograph I placed a drawing based upon it. In the new set up, the photographic and drawing interpretations were counterbalanced, while the video was streamed in uninterrupted continuity – a loop.
The guiding principle was to bring two diverse processes and techniques of interpretation of reality into an equivalent coexistence within the third.

ROBERTO VDOVIĆ, MORANA PAP
University of Zagreb, Zagreb, CROATIA
WORKSHOP - AFFORDABLE 3D SCANNING AND 3D PRINTING

3D scanning and especially 3D printing are not a new discovery; on the contrary, the technology is more than 30 years old. Until recently, it was reserved for a small group of professionals (mainly mechanical engineers) and therefore unavailable. In 2007, the RepRap project was founded by Adrian Bowyer with the aim of producing a replicating machine, using ecological materials, and making all this available free of charge. RepRap is actually a very simple 3D printing device, cheap and affordable. The project has encouraged further development in open-source and commercial desktop 3D printers. Desktop 3D printers have become affordable and today they are used by various professions, as well as home users and enthusiasts. Printing 3D objects requires certain skills, as the user must model 3D objects on computer. But there is also an option to 3D-scan the existing objects and this field has attracted considerable attention. Thus, new 3D scanning solutions have been developed, such as scanning with structural light. This workshop offers an introduction into 3D scanning and 3D printing with affordable devices. The participants will try to 3D-scan, optimize 3D models on computer, and prepare them for printing on a 3D printer. Finally, the result will be materialized by using a 3D printer.
The objective of the workshop is to demonstrate an affordable and easy-to-use technology to the general population and the potential users.

Group of students from the Academy of Arts in Osijek, Osijek, Croatia
PERFORMANCE - “UNZIPP” - THE NEUTRAL THEATER COSTUME

The “Neutral Theater Costume” is an award-winning innovation owned by the Academy of Arts in Osijek, designed and engineered by Assistant Professor Jasmina Pacek, MFA. The innovation won the Grand Prix Nikola Tesla in 2014, the “International Inovation Show Inova 39.”, the gold medal for the Best Croatian Innovation in 2014, and the International AGEPI medal awarded by the State Agency of Intellectual Property of the Republic of Moldova. According to the “Inova 39.”’s organizers, it was the first time that the Grand Prix was awarded for an innovation with the application in arts rather than science. The innovation is protected as a Community Design (CD) with the OHIM Office for Harmonization in the internal Markets (Trade Marks and Designs) and has its Certificates of Registration. The innovation “Neutral Theater Costume” is a modular garment with a female (dress) and a male (pants and jacket) version. By operating a series of transformation mechanisms, a single costume can be easily transformed into an indefinite number of versions, visualizing and transforming what seems to be one neutral costume into many different historical costumes. It has a strong application in educational institutions that teach acting, as well as in theater performances where one actor needs to be quickly transformed into different characters and/or to present different historical periods.
The Academy of Arts in Osijek has also designed a dynamic 20-minute performance, in which ten actors/dancers on stage guide the viewer through several historical periods, thus displaying transformations on stage.

Exhibition in the Technical Museum
Heinrich Heidersberger, Institute Heidersberger, Germany
RHYTHMOGRAMS

The exhibition is showing Rhythmograms by the German artist and photographer Heinrich Heidersberger (1906 – 2006). The abstract photographs were taken by Heidersberger with a specially constructed machine. Four pendula move a point of light during a time exposure. Heinrich Heidersberger himself called these photographs “Rhythmograms“ and the mechanical analogue computer he built a “Pendelmaschine“ or pendulum machine, later a Rhythmograph. These phrases taken from the field of music describe the harmonic compositions as “pitched pictures”, based upon a specific relation of pendula frequencies. The Rhythmograms remind us today of digital art. In 2006 the Kunstverein Wolfsburg placed them within the history of generative art. The exhibition at Petra Rietz Salon Galerie in Berlin expanded this scope and interpreted the Rhythmograms as early media art.
Heinrich Heidersberger was born in Ingolstadt, Germany, in 1906 and grew up in Austria. He started his artistic career as a painter. From 1928 until 1931 he lived in Paris and studied painting at Fernand Leger’s École Moderne. There he became friends with many Surrealists. Rather accidentally he bought his first camera at the flea market and in the coming years devoted himself more and more to photography. As early as the end of the 1940’s he published his first reportages, among others in the German magazine “Stern”. In 1961 he moved to Wolfsburg. There he documented the life of the

fast-growing industrial city. The photographs taken during this time are counted among the icons of German post-war-modernity. Heinrich Heidersberger's work is diverse and ranges from architectural and industrial photography to abstract photography and to documentary. Heinrich Heidersberger's works can be found in international museums, among others in the Museum of Modern Art, New York. It was shown in many exhibitions; in 2008 the Kunstmuseum Wolfsburg dedicated a solo exhibition to him.
Curators of the exhibition: Bernd Rodrian & Benjamin Heidersberger
Curator of the exhibition-Technical Museum: Markita Franulić

- NEVEN PEKO, City Museum Sisak, Sisak, Croatia
THE SISAK SCULPTURE PARK IN CAPRAG with sculptures created as a part of the Colony of Artists, "Sisak Ironworks" within the "Factory Heritage Sisak Ironworks". The conservation treatment on Josip Diminić's Object

In the period between 1971 and 1990, the Sisak Ironworks maintained an art colony as a part of its cultural policy. In these 19 years, many famous Yugoslav artists participated in the colony, producing almost 900 artworks (paintings, drawings, sculptures, reliefs, etc.). Today, its most impressive remnant is the Sisak Sculpture Park, consisting of thirty-eight outdoor sculptures placed in different locations within the Ironworks housing complex and in various other parts. The collection has been listed in the Croatian Public Register of Cultural Properties in 2012. In 2014, *Object II* by Josip Diminić was the first sculpture to receive a professional conservation treatment by a team of conservators and students from the Conservation and Restoration Department at the Art Academy in Split. The restoration of this sculpture was a challenge for the entire team as the usual conservation methodology was not applicable in this case. After many consultations and tests, a procedure was developed that included non-conventional conservation methods, such as dry ice blasting, TIG welding, and the use of modern resins and paints.

- MLADEN BURIĆ, AMIR OBHOĐAŠ, ŽELJKO MILAT
Croatian State Archive, Zagreb
EXHIBITION: COLLECTIONS OF PHOTO AND CINEMATIC TECHNOLOGY IN THE CROATIAN STATE ARCHIVES

Preserved at the Croatian Film Archive of the Croatian State Archives, this collection of filming and projection technology began with the very foundation of the Archives in 1979, with purchases and gifts from cinema professionals and enthusiasts such as O. Miletić, M. Paspa, V. Ilin, and others. Objects in the collection date from the period between 1897 and 1975, which probably makes it the largest collection of cinematic art and projection technology in Croatia.

MARIJAN CRTALIĆ, Sisak, Croatia
MOVIE - “INDUSTRIAL PARADISE”

Croatia, 2009, 20', color, video; Directed and Screenplay by: Marijan Crtalić
Cinematography: Josip Ivančić, Jure Černec, Marijan Crtalić
Edited by: Lovro Čepelak, Morana Komljenović, Vladimir Gojun
Producer: Magdalena Petrović; Produced by: Fade In

The today's treatment of the workers' cultural heritages illustrates the modern treatment of workers and work in general.
The art colony of Sisak Ironworks was organized in the period from 1971 to 1990. In total, 178 artists took part in it, creating 686 works of art, primarily paintings and sculptures, reliefs, drawings, objects and photographs. Today, some thirty sculptures can be seen in the plant's workers' village. In the days of the colony, works of art would be bought and presented to meritorious workers as a reward. 1,172 works of art were bought and presented as gifts. In those days, the ironworks employed some 15,000 workers. Today, the plant is owned by a U.S. company and has only 1,000 employees. The today's treatment of the workers' cultural heritages illustrates the modern treatment of workers and work in general.

Croatian State Archives, Marulićeg trg, Zagreb, Croatia
Wednesday, May 27, 2015, 18:30h

LA RÉJOUISSANCE
The OTIUM Early Music Consort

Ivana BIČANIĆ, soprano; Taida PATAFTA, alto; Igor PETEH, tenor

Jacob Gallus	ERIPE ME DOMINE
Lionel Power	BEATA PROGENIES
Gilles Binchois	VIRGO ROSA
Anonymous	NOBILIS HUMILIS
Anonymous	NINNA ERGUIDE ME LOS OJOS
Anonymous	LAS TRISTEZAS NO ME ESPANTAN
Anonymous	ANIMA MEA CHE PENSI
Adam Gumpelzheimer	DIE NACHT IST KOMMEN
Orlando di Lasso	ICH WILL GOTT UNAUFHŐRLICH PREISSEN
Anonymous	IN TORNO AL FANCIULLIN GESU
Giovanni Pierluigi da Palestrina	AHI, CHE QUEST' OCCHI MIEI
Giovanni Pierluigi da Palestrina	DA COSI DOTTA MAN
Anonymous	LA VIOLETTA
Claudio Monteverdi	SON QUESTI I CRESPI CRINI
Luca Marenzio	OCCHI DOLCI E SOAVI
Luca Marenzio	AL PRIMO VOSTRO SGUARDO
Giacomo Gastoldi	IL RISENTITO
Willliam Cornysh	AH ROBIN, GENTLE ROBIN
Thomas Weelkes	THE NIGHTINGALE
Thomas Weelkes	SINCE ROBIN HOOD
Thomas Morley	THOUGHT POHILOMELA LOST HER LOVE
Giovani Domenico da Nolla:	CHICHILICHI CUCURUCU

The religious music of the Renaissance is one of the most important parts of the heritage of the civilization of older Europe. This is a music that also exerted a crucial influence on the development of secular music, which subsequently branched out into a broad range of different styles and trends.

Absolute music, through heterogeneous forms, crystallized out much later, and is defined as a theoretical concept in modern musical education. Universality and spirituality are also the basic characteristics of absolute music. The abundance of imaginative titles, indicating the programmatic features deriving from non-musical contents that are "just" described in the rnusic, do not modify neither do they diminish the original spiritual rnessage of absolute music. There is no boundary between religious music and pieces that are not serve as transmission of a devotional message. A single kind of rnusic cannot be exempted from the purpose of serving God. Glory to God is the ultimate goal and the cause of all rnusic. The most profound awareness and sense of responsibility to the rnusical substance suffuse the formal treatment of all pieces with no stylistic difference between ecclesiastic music and those pieces in which no connection with texts of a devotional character can be recognized.

Igor Peteh

SYMPOSIUM
CroArtScia 2015
TECHNOLOGICAL INNOVATIONS: ART & SCIENCE

Publishers

The Ruđer Bošković Institute, Zagreb, Croatia
Society of Culture and Art Ivan Filipović, Zagreb

For the publishers

Tome Antičić, The Ruđer Bošković Institute, Zagreb
Igor Peteh, Society of Culture and Art Ivan Filipović, Zagreb

Editors

Sonja Nikolić, Vesna Meštrić, Igor Peteh, Vesna Rastija

Translation and Language editing

Marina Miladinov

Printed by

LASERplus d.o.o., Zagreb

Print run

150

ISBN 978-953-57639-1-8 (The Society of Culture and Art Ivan Filipović, Zagreb)

Cover Image:
Vjenceslav Richter, Reliefmeter, 1963-69, the Richter Collection, Zagreb

Symposium is realized with the financial support of the Zagreb City Office for Education, Culture and Sport and the Ministry of Science, Education and Sports.

Acknowledgments:
Mayor of the City of Zagreb, Mayor of the City of Sisak, Croatian National Tourist Board, Zagreb Tourist Board, Sisak Tourist Board, Five Stars Ltd., Hotel Laguna, Croatian Brain Research Institute Dormitory, Quo Vadis d.o.o., Art-Jus studio, MBM d.o.o., A Molson Coors Company, NN - Narodne novine d.d.