



# BOOK OF ABSTRACTS



**UNIVERSITY OF OSTRAVA**  
FACULTY OF ARTS

## Vítejte / Welcome

Dear Colleagues,

It is our distinct pleasure to welcome you—even if only online at the University of Ostrava—at the 49th Symposium of the International Committee for the History of Technology 2022 “Technology-based and Technology-generated decisions.”

The ICOHTEC 2022 conference theme has a unique relevance to the history of Ostrava. The Moravian-Silesian Region, today home of 1.2 million people, was once an industrial powerhouse of the Habsburg Empire and later one of the most industrialized regions of Czechoslovakia. Since the end of coal mining, the business structure has been steadily changing, and heavy industry was gradually replaced by various branches of services and manufacturing of high added value products. In this process new technologies and clean energy lead the way in and around Ostrava.

The University of Ostrava (OU) is one of the youngest universities in the Czech Republic, established in 1991. OU is an important facilitator of the Moravian-Silesian Region’s successful regeneration, and is a dynamic and intellectually stimulating institution with cutting edge research projects and research-driven teaching programs. Despite of the young age of our university it has been ranked #801–1000 in World University Rankings 2019 and QS Global World Ranking 2020, as well #301–350th in Young University Rankings 2021 and #30 Best Research Intensive Universities in New Europe.

At OU, we believe that the Moravian-Silesian Region is a place where “technology-based” and “technology-generated” decisions meet with inspiration and open-mindedness, and that the University of Ostrava is thriving on the power of creativity and individual approaches. Although your distinguished scientific meeting will take place online, we hope you will sense at least a bit the unique atmosphere of our institution and region, and we kindly invite you to visit our university and our region via the virtual-, and video tour links shared at the conference website. Thus we hope you will pay an in-person visit at the University of Ostrava in the near future.

We wish you a stimulating conference and productive discussions!

*Robert Antonín, Dean of the Faculty of Arts, University of Ostrava*

*Aleš Zárický, Vice-Rector for Studies and Lifelong Learning, University of Ostrava*

Co-chairs of the Local Organizing Committee

*Michaela Závodná, Centre for Economic and Social History*

*Viktor Pál, Centre for Economic and Social History*

Conference Scientific Secretary

*Anna Batzeli*



# CONFERENCE PROGRAMME

*(All times Central European Summer Time)*

**24 September 2022**

8:00–9:30

SESSION 1 – DECISION-MAKING IN MILITARY HISTORY AND TECHNOLOGY

TSZ HO WONG

Japan Wartime Expeditions on Rare-Earth and Chemical Elements and the Manufacturing of War-Related Technologies

YOEL BERGMAN

An exceptional 1982 downing of a fighter jet by the Vulcan Air Defense System- A possible combination of technological-based decisions and human agency?

ALLA LYTVYNKO

Scientific Activities of the National Academy of Sciences of Ukraine at the Russian invasion of Ukraine

9:30–9:45 BREAK

9:45–11:45

SESSION 2 – INDUSTRY AND TECHNOLOGY (1)

SIMONE FARI

Technology-based decisions or Fear-based decisions? Technological unemployment and economic policies to contrast it during the Fourth Industrial Revolution

SYMONE CAMPBELL

EdTech Across the Black Diaspora: Reexamining its Neoliberalist Foundations

JAN KUNNAS

Lessons From the Past: History in the Anthropocene

11:45–12:15 LUNCH BREAK

12:15–13:45

SESSION 3 – INDUSTRY AND TECHNOLOGY (2)

OLE SPARENBERG

Peat as an overlooked energy resource in 19<sup>th</sup> century Germany

HAILIAN CHEN

Encountering Western Technology and Engineers: The Failure of a Mining Enterprise in Central China, 1875–1880s

ANNA AGAFONOVA

The First World War and transition to hydropower in the Russian Empire

13:45–14:00 BREAK

14:00–16:00

SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY

ANDREW BUTRICA

“Industrial Nationalism and Napoleonic France”

CYRIL LACHEZE

Establishing a tile factory in 19<sup>th</sup> century France: technology, social tensions and power issues in commodo and incommodo surveys

CONNOR KA HEI AU YEUNG

Hungered by Thirst: Petrochemical Industry, Research and Security in Early 20<sup>th</sup> Century East Asia

TOMÁŠ GECKO

Negotiations on the Czechoslovak Patent Court: Power Dynamics, Litigation and Technology Transfers

16:00–16:15 BREAK

16:15–17:45

SESSION 5 – TECHNOLOGY, CULTURE AND DECISION-MAKING

HARALD KLEINBERGER-PIERER

Drawings in decision making – Designs and patents in the Chamber of Commerce Vienna 18<sup>th</sup> century

SŁAWOMIR ŁOTYSZ

Cinema musicians and transition to ‘talkies’ in Poland, 1920s–1930

KORNILIA PAPANASTASIOUS

Adding Artificial Intelligence to Artificial Reproduction: A Historical Perspective

17:45–18:00 BREAK

18:00–20:00

SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE  
TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER  
DE-INDUSTRIALIZATION

WAYNE COCROFT

Vanishing technologies – how do we respond to the legacy of late 20<sup>th</sup> century industry?

STEFAN POSER

Heritage of Rust and Oxidation? History and perspectives of industrial museums after de-industrialization

ROBERT BELOT

The Urbex, or the tribute paid to the industrial ruin

LUC ROJAS

Mining methods: From creation to management of underground mining landscapes in France (18<sup>th</sup>–21<sup>st</sup> centuries)

**25 September 2022**

08:00–09:30

SESSION 7 – DECISION-MAKING FROM SKY TO SPACE

MARION WECKERLE

A seaplane and its water – technological construction choices and seaplane use in interwar Europe

SABRINA LAUSEN

Decision-making in the cockpits of airliners – Pilots' perspectives on automation in Western Europe and in the Soviet Union, 1960s-1980s

OLENA ZOSIMOVYCH

Ukrainian Satellites for the Needs of Meteorology and the Study of Natural Resources in the 70's -80's of the 20<sup>th</sup> century

9:30–9:45 BREAK

9:45–11:45

SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945

MERCEDES FERNÁNDEZ-PARADAS, JUAN MANUEL MATÉS BARCO, ANTONIO JESÚS PINTO TORTOSA  
Prosopography of engineers in gas industry in Latin Europe until the 1940s

MERCEDES FERNANDEZ-PARADAS, ISRAEL DAVID MEDINA RUIZ, ANTONIO JESÚS PINTO TORTOSA  
Gas engineers, links between France and Spain (circa 1840-1920)

FRANCESC XAVIER BARCA SALOM; JOAN CARLES ALAYO MANUBENS  
Gas producer and gas engine in the second half of the 19<sup>th</sup> century

ALBERTE MARTÍNEZ LÓPEZ; JESÚS MIRÁS ARAUJO  
Engineers and the modernization of the gas industry in Latin Europe, 1874–1938

11:45–12:15 LUNCH BREAK

12:15–13:45

SESSION 9 – IT, AI, AND DECISION-MAKING (1):

DEEPAK PRINCE  
The Automaton and the mediator: an archaeology of two “Entscheidungsproblems”

SERHII ZHABIN  
Cybertonia and hacker movement: subcultures of programmers in USSR and USA

KONSTANTINOS SAKALIS  
Imagining a future of decisions made by artificial intelligence, 1940s–present

13:45–14:00 BREAK

14:00–15:30

SESSION 10 – TRACTORS, TRAINS AND DEATH RAYS– ADVANCED TECHNOLOGY AND HIGH MODERNISM IN EAST ASIA FROM COLONIAL ORIGINS TO COLD WAR FUTURISM, 1930–1980

ERNEST MING-TAK LEUNG  
Kolkhoz Under the Imperial Sun - East Asian Collectivisation and Planification, 1878-1978

BEN KLETZER  
Getting China Back on Track: Rebuilding and Unifying the Railways through War and Revolution 1945-1952

VIRGINIA L. CONN

Power Stations: Internationalist Scientism in *Death Ray on Coral Island*

15:30–15:45 BREAK

15:45–17:15

SESSION 11 – IT, AI, AND DECISION-MAKING (2)

AGNIESZKA DYTMAN- STASIEŃKO

Technology-driven resistance in Poland in the 1980s

LAILA ZWISLER

How computers came to know the world in two ways – making computer models in technical academia in Denmark

17:15–18:15

SESSION 12 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (1)

JOSE SOARES

We must save these waters: the urgency of technology in Portuguese industrial pollution control (1892-1974)

GREGORY AFANASIEV

“The oil inflection” in the energy consumption of the Russian Empire and environmental problems in the late XIX - early XX centuries

18:15–18:30 BREAK

18:30–20:30

KRANZBERG LECTURE

MARIA PAULA DIOGO

Time and Human Agency: how can historians of technology contribute to present day debates?

**15 October 2022**

08:00–10:00

SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES

MORITZ MEISTER

Comparative Walkthrough Analysis of CRIS User-Interfaces

FLORIAN BETTEL

Portfolio & Showroom. A hands-on history of technology of research information systems

AGAJA PRZYBORSKI

A praxeological model of media technical communication exemplified by focusing on practices of scientists with CRIS

HANNA LUCIA WORLICZEK

Quantification and Standardised Metrics as Historiographic Tools – The Power and Pitfalls of Bibliometric Analyses for Historical Epistemology

10:00–10:15 BREAK

10:15–11:45

SESSION 2 – EDUCATION AND TECHNOLOGY (2): TECHNICAL EDUCATION IN SPAIN. SOME EARLY EXPERIENCES

ANTONI ROCA-ROSELL

Early steps to technical higher education: a reflect of technological changes?

MARIA MONTAVA-GADEA

The beginnings of technical education in Barcelona: the school of mechanics designed by Francesc Santponç (1808-1821)

M. ROSA MASSA-ESTEVE

The teaching of practical geometry at the Barcelona Royal Military Academy of Mathematics in the eighteenth century

11:45–12:15 LUNCH BREAK

12:15–12:45  
POSTER SESSION

TAJANA JAKLENEC  
Historical and Contemporary Prefabrication in Croatia

12:45–14:45

SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN  
EAST-CENTRAL EUROPE UNDER THE COLD WAR

JOE DJORDJEVSKI  
The Technology and the Environment of Tourism in Cold War Yugoslavia

JÍRA JANÁČ  
Developing Green Infrastructures in a Red country: Harmonizing Environment and Development in  
Regional Planning in late-socialist Czechoslovakia

VIKTOR PÁL  
Science, Technology, and Recycling in State-socialist Hungary

MICHAELA ZÁVODNÁ  
Let them breathe. The technological and ecological aspects of urban transportation in Ostrava  
region during the Cold War

14:45–15:00 BREAK

15:00–16:30

SESSION 4 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (2): PERSPECTIVES ON THE ANTHROPOCENE

JAMES WILLIAMS  
Human agency v. nature's agency

DAVIDE SCARSO  
Agency and Political Representation in the Anthropocene

MARIA PAULA DIOGO  
The Who's who in the Anthropocene

16:30–16:45 BREAK

16:45–18:15

SESSION 5 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (3): TECHNOLOGY-BASED AND  
TECHNOLOGY-GENERATED DECISIONS

ANTHONY STRANGES

The Technological Transformation of the 1850s and its Environmental Consequences

PETER WULFF

Radioactive CO<sub>2</sub>: a Technology-Based Climate Controversy

ELENA HELEREA

Electrification and Environmental Issues

18:15–18:30 BREAK

18:30–22:00

SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION:  
TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES

HELGE WENDT

The colonial way into the global coal age

FELIPE TRUJILLO

Energy sources and energy transition discussions. The instituto de ingenieros de Chile's analysis of the future of the Chilean energy matrix (1888-1910)

NELSON ARELLANO

Solar energy techniques in XIX century for sustainability. Inventions, patents, and artifacts in Chile (1872–1930)

MARION STEINER

German hydropower in Metropolitan Chile in the first decade of the 20<sup>th</sup> Century: a local exception from AEG's global business model

**16 October 2022**

8:30–10:00

SESSION 7 – ARCHITECTURE AND TECHNOLOGY (1): THE DECISION TO BUILD WITH STEEL – PREFABRICATED STEEL HOUSES AND THE INNOVATION SYSTEM OF THE STEEL INDUSTRY (1920s-1970s)

THOMAS SCHUETZ

Steel means progress: Efforts to increase sales in the West German steel industry

SILKE HAPS

PLATAL Plastic-coated steel: from powder boxes to sandwich panels

TOBIAS NOLTEKLOCKE

Historical material research and role of the public materials testing administration (MPA) as element of sector-combining innovation systems

10:00–10:15 BREAK

10:15–11:45

SESSION 8 – ARCHITECTURE AND TECHNOLOGY (2)

HADAS NUR

The construction of a creative agency in the technological era – The case of architects and designers

MATTHIAS BRENNER

The Potential of Digital Fabrication for the Repair of High-Tech Architecture

11:45–12:15 LUNCH BREAK

12:15–13:45

SESSION 9 – INFRASTRUCTURES AND TECHNOLOGY

VLADIMIR KORENSKY

Inland Development of Early Reinforced Concrete in the Russian Empire in the Context of European Knowledge Transfer

LUDOVIT HALLON, MICHAL DURCO, MIROSLAV SABOL

Czechoslovak and Slovak technocracy and technology-based decisions in the interwar period

M. LUÍSA SOUSA

History of technology-based decisions: how recovering forgotten urban mobilities of the past might contribute to policies in cities with low cycling maturity

13:45—14:00 BREAK

14:00—15:30

SESSION 10 – “TO BE OR NOT TO BE.” SCHOLARS IN THE HUMANITIES INVESTIGATING TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS. HOW TO COPE WITH IDENTITY CRISIS

VALENTINA LIMINA

New Technologies for Ancient Landscapes. How technology impacts Archaeology

JACOPO PESSINA

How the Bastion Fort Changed Strategies during the Italian Wars, 1494–1559

SARA ERCOLANI

Catholic Voluntarism between the Fifties and the Seventies: The technological developments that changed the way of presenting the missionary field

15:30–15:45 BREAK

15:45–17:15

ICOHTEC Prize Session

Turriano ICOHTEC Prize

LAUDATION BY DARINA MARTYKÁNOVÁ

Maurice Daumas Prize

Laudation by ELVIRA CALLAPEZ

17:15–17:30 BREAK

17:30–19:30

GENERAL ASSEMBLY

**End of Conference**

## ABSTRACTS AND AUTHOR BIOS

24 September 2022

8:00–9:30

SESSION 1 – DECISION-MAKING IN MILITARY HISTORY AND TECHNOLOGY

SESSION 1 – DECISION-MAKING IN MILITARY HISTORY AND TECHNOLOGY,  
PAPER1

**Tsz Ho Wong**

**“Japan Wartime Expeditions on Rare-Earth and Chemical Elements and the Manufacturing of War-Related Technologies”**

Some rare-earth (kigenso 稀元素 or keu genso 稀有元素) and chemical elements like cerium and tungsten are essential for producing war-related technologies, like alloy steel and tracer ammunition. Japan launched at least three expeditions between 1942 and 1944 in unearthing rare-earth and chemical elements in Northeast China (Manchuria and Mongolia) and Southeast Asia (Burma, Jawa, Sumatra, Banda Island, Belitung Island, North Borneo and the East Coast of Malaya). Unlike the wartime scientific, ethnographic and geographical research conducted by other research institutions like the Ministry of Education’s Research Institute for Natural Resources (文部省資源科学研究), this essay argues that the expeditions on rare-earth and chemical elements were driven by the needs of manufacturing war-related technologies. Japan’s research on rare-earths can be traced back to the 1900s. They started to search for rare-earths in their colonies and neighboring countries after realising that their country only stored a few of it. For example the survey conducted by Iimori’s laboratory (飯盛研究室) in Chōsen in 1934; and Okada Ietake (岡田家武), a Shanghai Research Institute for Natural Science’s (上海自然科學研究所) researcher, explored the rare-earth and chemical elements in Southwest China in 1935 and 1936. Before 1941, Japan imported most of the rare-earths used in its industry, but was forced to self-supply it after the outbreak of the Pacific War; and thus they launched the aforementioned expeditions. According to the wartime newspapers, publications and military archives, these expeditions were supported by the army, and conducted by scientists and geographers from zaibatsu like Riken (理化学研究所) and the Science Mobilisation Council (科学動員協会). Also, the rare-earth and chemical elements that they aimed to explore were indispensable for producing war-related technologies, such as beryllium for high speed steel, neodymium for optical filter, tantalum for the vacuum tubes for wireless telegraphy, strontium and zirconium for the carbon rods of searchlights and thorium as the catalyst for liquifying coal. This essay examines Japan’s research on rare-earth and chemical elements in the early twentieth century; and how these 'academic-military-industrial' expeditions were motivated by the needs of manufacturing war-related technologies.

TSZ HO WONG is a master student at the London School of Economics and Political Science. He works as research assistant at the Department of International History at London School of Economics and Political Science and has published several papers at peer-reviewed journals.

## **SESSION 1 – DECISION-MAKING IN MILITARY HISTORY AND TECHNOLOGY, PAPER2**

**YOEL BERGMAN**

### **“An exceptional 1982 downing of a fighter jet by the Vulcan Air Defense System- A possible combination of technological-based decisions and human agency?”**

As recently shown, the portable, anti-aircraft guided missiles, fired from combat vehicles or individuals, can down jet fighters. Such were the US Chaparral missiles, mounted on an armored personnel carrier (APC), being introduced in the late 1960s, along with the Vulcan Air Defense System (VADS), another anti-aerial system. VADS was based on a fast-firing, 6 barrels rotary cannon and a radar, mounted also on an APC. Its Doppler radar could not acquire targets, but only assist the gunner in directing the cannon toward the expected striking point, taking into account the target's distance and speed. The radar tended to fail technically. This, together with the short upwards firing range of the cannon, made the VADS inefficient against high altitude and fast maneuvering jet planes, but still efficient against helicopters. Due to its wide firing angles (elevation of 85 to minus 10 deg), the VADS was much employed, from the early 1970s in the US and elsewhere, as a ground combat vehicle. In this new role, its high cannon firing angles were very useful in the Vietnam jungles as well as in crowded urban areas, hitting snipers in high apartment floors, where other heavy machine guns and tanks cannot target. To achieve such ground tasks, Israeli VADS units were made part of armored columns in the first Lebanon War (1982). At that time, when two Syrian MiG 21 surprisingly approached one armed column, attacking with their cannons, a VADS downed one of them. This was the only mentioned VADS fighter downing, in an internet source that reviews the weapon history. Others registered hits were scored against helicopters and boats. The presentation will explore the event as learned from Yoav Venkert, the Israeli officer of the VADS unit that scored this single hit and will compare to similar cases.

DR. YOEL BERGMAN obtained his PhD in Aeronautics Engineering at Tel-Aviv University. He is an associate in the Cohen Institute for history of science, Tel-Aviv University and has published multiple publications in the field of History of Technology.

## **SESSION 1 – DECISION-MAKING IN MILITARY HISTORY AND TECHNOLOGY, PAPER3**

**ALLA LYTVYNKO**

### **“Scientific Activities of the National Academy of Sciences of Ukraine at the Russian invasion of Ukraine”**

On February 24, 2022, the invasion of Russian troops on the territory of Ukraine began. It has caused environmental, social, economic, medical and psychological problems. The damage to Ukraine's economy from destruction of infrastructure exceeds \$ 105.5 billion. The total economic loss is \$ 564-600 billion. The work of institutions of the National Academy of Sciences of Ukraine was significantly complicated. Luhansk Nature Reserve, Black Sea Biosphere Reserve and Kherson Hydrobiological Station is now in the territories captured by Russia. Institutes in Kyiv, Kharkiv, Mykolaiv and Sumy, Chernobyl Institute for the Safety of Nuclear Power Plants were damaged.

On April 21, 2022, the National Council for the Recovery of Ukraine from the Consequences of War was established. On May 4, 2022, the Commission of the Academy for the restoration and

development of Ukraine in the war and postwar periods has been organized. Academy is conducting research deals with a strengthening the defense capabilities and security of the country and studying the social consequences of the war. The result was the creation of the first domestic models of transparent armor that meet NATO standards, X-band radar station and drone detection system, camouflage composite coatings, new elements of radio and optoelectronics for weapons. Developments are aimed at improving the tactical and technical characteristics of ammunition, missile systems, the level of ballistic protection, the survivability of equipment. Biomaterials for bone regeneration, modern cryopreservation technology for blood cells, hemostatic agents and bandages for complex burns and wounds have been developed for military medicine. Paton Electric Welding Institute handed the devices for welding living tissues, the Institute of Renewable Energy – an autonomous portable solar power plant for use in combat.

ALLA LYTVYNKO is a Historian of Science and Technology at the G. M. Dobrov Institute for Scientific and Technological Potential and Science History Studies NAS of Ukraine, Science and Technology History Studies Department. Alla Lytvynko has received several awards and has been member of conference committees and scientific associations.

### 9:30–9:45 BREAK

### 9:45–11:45

### SESSION 2 – INDUSTRY AND TECHNOLOGY (1)

#### SESSION 2 – INDUSTRY AND TECHNOLOGY (1), PAPER 1

SIMONE FARI

#### **“Technology-based decisions or Fear-based decisions? Technological unemployment and economic policies to contrast it during the Fourth Industrial Revolution”**

The fourth industrial revolution (4IR) is a definition coined by the World Economic Forum and, in particular, by its founder and president Klaus Schwab. Often used as a synonymous of digital revolution and Industry 4.0, unlike the latter two concepts, the fourth industrial revolution includes innovations in fields other than the digital.

Both academic literature and public opinion have been mainly interested in the most fascinating inventions (big data, internet of things, driverless cars, ...) and the possible effects of the fourth industrial revolution on the job market. In the latter case, the attention is focused on unemployment or on the replacement of workers by robots and artificial intelligence.

Technological unemployment has a long history, dating back to Ricardo, Marx and others who were convinced the Industrial Revolution would have increased unemployment. The fear reappears with Keynes and it has recently resurfaced in the 2013 paper by Osborne and Frey who forecast a drastic loss of jobs caused by the technological revolution.

Today, this fear is pushing political party, entrepreneurs and academicians for proposing new economic policies like robot tax and UBI (Universal Basic Income). “Robot tax” consists in taxing robots in the industrial plants. In this way, the government could collect money to invest in favour of the unemployed people (UBI, subsidies, economic aids) which are the consequence of the introduction of robots. Alternatively, the main aim of UBI is protecting people from the technological unemployment giving them a minimum income in order to provide basic needs.

Using robot tax and UBI as case studies, the paper explore how economic policies are often shaped by our fears about the future effects of technological innovations.

SIMONE FARI is a Professor at the Universidad de Granada. Simone Fari has participated in several conferences and authored / co-authored several books and edited volumes, among them *Financing Telegraph Infrastructure: the case of Great Britain (1850-1900)* (in Youssef Cassis, Giuseppe De Luca, Massimo Florio, *Infrastructure Finance in Europe: Insights into the History of Water, Transport and Telecommunication*, Oxford University Press, 2016) and *The Bureaucratisation of the Telegraph Union: St. Petersburg (1875)* (in Gabriele Balbi, *Network Neutrality. Switzerland's role in th genesis of the Telegraph Union, 1855-1875*, Bern, Peter Lang, 2014).

## SESSION 2 – INDUSTRY AND TECHNOLOGY (1), PAPER 2

SYMONE CAMPBELL

### “EdTech Across the Black Diaspora: Reexamining its Neoliberalist Foundations”

During the Covid-19 pandemic, schools across the world were mandated to close due to public health concerns Covid-19 raised. Because of the mandated school closures across the world, in person schooling transitioned to remote schooling in which the primary mode of instruction was conducted through education technology (EdTech). An extensive body of literature exists on the ways traditional schooling and its primary modes of instruction have historically disproportionately affected Black students (Ladson-Billings & Tate, 1995). Systems of schooling have functioned as channels that have strategically reinforced White dominant ideologies that have marginalized students (Watkins 2001; Woodson 1933; Zimmerman 2010) across the African diaspora (Givens, 2016). Because the foundation of traditional schooling environments being racist has been extensively interrogated for decades, it is also important to investigate whether these same structures concerning racist dominant ideologies that disproportionately impact Black students show up in non-traditional modes of instruction, like the use of EdTech. This issue is especially important because as the use of EdTech increases globally and has potential to become a primary mode of educational instruction, it is important to understand how EdTech has been used and studied across the Black Diaspora. Using the theoretical framework of critical race theory and specifically its tenet of the critique of liberalism, this paper will examine a scope of selected literature that has analyzed how functions of liberalism have ultimately presented itself amongst the use of EdTech across the Black diaspora. Lastly, this paper will end with ideas for a fresh new approach on how I intend to further this scope of literature.

PhD candidate SYMONE CAMPBELL from Howard University has published several papers at conferences and co-authored two books. She has been a recipient of Herbert Aurbach Social Action Award (2016) and of Ronald E. McNair Scholar Award (2017). Currently she works at Howard University, SLMC, as Course Instructor.

## SESSION 2 – INDUSTRY AND TECHNOLOGY (1), PAPER 3

**KORNILIA PAPANASTASIOU**

### **“Adding Artificial Intelligence to Artificial Reproduction: A Historical Perspective”**

The paper will introduce to a symptomatic reading of texts on the integration of Artificial Intelligence (AI) into Artificial Reproduction (Assisted Reproductive Technologies – ART). These come from widely circulating international science journals (including Nature, Science, Scientific American) as well as journals publications from the assisted reproduction field. Employing STS perspectives,

I focus on the configuration of algorithms and big data for reproductive technologies, like embryo classification, embryo selection, embryo livability prediction, and artificial womb development. In 1978 the first ‘tube-baby’ was born through IVF (In Vitro Fertilization). Following this, artificial reproduction has been gradually turned into one of the most challenging fields of medical technology, in general. In this paper, I present research on the history of discourses by medical and related communities regarding possible biases in AI-ART configurations. This 'unravelling' will make biases and inequalities that are connected to algorithms and big data in reproduction visible. This is one of the key points of my overall dissertation, too. My main focus lies on biases connected to gender, race and class, and further, appropriating AI-ART configurations in the Global South. My paper aims at offering a historical perspective to these configurations, taking into account the discourse of the physicians and reproduction specialists.

KORNILIA PAPANASTASIOU is a PhD candidate at the Department of History and Philosophy of Science (National and Kapodistrian University of Athens). She is a recipient of a three-year dissertation fellowship from the Hellenic Foundation for Research and Innovation. Her dissertation title is *Contextualizing the integration of AI and Big Data into reproductive technologies*. She has received a Certificate from the International Master’s Program on Society, Science and Technology (2019) and has an MSc in Science, Technology, Society – Science and Technology Studies (Department of History and Philosophy of Science & Department of Informatics and Telecommunications, National and Kapodistrian University of Athens, 2019).

## SESSION 2 – INDUSTRY AND TECHNOLOGY (1), PAPER 4

**JAN KUNNAS**

### **“Lessons From the Past: History in the Anthropocene”**

Exceptional times such as the present with a multitude of global challenges needing immediate action invite us to reflect on the philosophical basis of our discipline. We might ask, what is the point of history looking backwards in a time, when our present actions define whether there is a future for humankind and other species on our planet? I claim that, in these circumstances, the value of history is defined whether and to what degree it can guide in this watershed moment of human history. In this essay, I will present a handful of examples of how history can provide this much-needed guidance. Historical parallels and past regularities can help us to understand and solve present global challenges, and by showing how we ended up in the current situation also help us to anticipate future problems. We must though get the direction and strength of the chain of causal links right, a task where counterfactual history can help us. History can also provide cautionary

tales so that we do not have to repeat past mistakes and hope igniting success stories. Finally, I propose a mutual debt swap: Developed countries' carbon debts versus developing countries' conventional monetary to settle past injustice and level the floor for a new equitable economic system within the planetary boundaries.

Dr. JAN KUNNAS is an independent researcher preparing a book for publication about an Ostrobothnian entrepreneur who delivered equipment to the CERN Large Hadron Collider and was the first Finn skiing to the South Pole. Dr. Jan Kunnas has served several post-doc research positions and has published 28 peer-reviewed scientific articles in scientific journals and edited collections (419 citations according to Google scholar), hundreds of opinion articles, book reviews and popularized science and some Youtube-videos.

### **11:45–12:15 LUNCH BREAK**

**12:15–13:45**

### **SESSION 3 – INDUSTRY AND TECHNOLOGY (2)**

#### **SESSION 3 – INDUSTRY AND TECHNOLOGY (2), PAPER 1**

**OLE SPARENBERG**

#### **“Peat as an overlooked energy resource in 19<sup>th</sup> century Germany”**

This paper argues that the contribution of peat (or turf) to Germany's energy supply during the 19th century has so far largely been overlooked and deserves greater attention. In a number of regions, peat acted as a stepping stone in the energy transition from wood to coal. The use of peat increased in the 19th century as energy demand grew in the industrialisation. Peat was available in many places in the North West and the East, but also in Wurttemberg and Bavaria. Its use was very localized since peat did not lend itself to transport over long distances due to its low energy density. However, in regions without easy access to mineral coal, peat served as a substitute for wood and coal and as the energetic base of local economic growth. Peat was thus used as a fuel for rural and urban domestic heating, railways, iron works, glass works and, in the early 20th century, even electric power plants. In the late 19th century, coal as a superior fuel became available throughout Germany and progressively displaced peat. Peat producers, however, reacted by technological innovation mechanizing the extraction process and improving the end product. After both World Wars, peat even experienced a short revival in times of coal shortages. Peat cutting left a lasting legacy in the landscape as Germany's once extensive moors have disappeared almost completely. Today, drained moors are also considered to be a major source of CO<sub>2</sub>-emissions.

Dr. OLE SPARENBERG submitted his Habilitationsschrift (habilitation thesis) at the Karlsruhe Institute of Technology, Karlsruhe, Germany and has published several papers at peer-reviewed journals, among them “Security of supply: The West German industry and the global markets for base metals, 1965–1980” (in: Christian Kleinschmidt/Mark Jakob/Nina Kleinöder (eds.), *Danger and Security in Business History. How Did Enterprises Represent and Negotiate Threats?*, Baden-Baden: Nomos 2021, p. 191–227) and “The commodity crisis of the 1970s: scarcity,

vulnerability, and the West German metal supply”(in: *European Review of History/Revue européenne d'histoire* 27 (2020), 3, p. 342–369).

### **SESSION 3 – INDUSTRY AND TECHNOLOGY (2), PAPER 2**

**HAILIAN CHEN**

#### **“Encountering Western Technology and Engineers: The Failure of a Mining Enterprise in Central China, 1875–1880s”**

The global desire for coal and iron (and later steel as well) in the nineteenth century was fuelled by rapid development of modern weapons, steamer engines, and railways. After 1850, Chinese mining industry called for urgent reforms by introducing new technology and knowledge. Previous scholarship has demonstrated that the German geologist Ferdinand von Richthofen’s expeditions in China (1868–72) impacted Chinese search for coal, and also tends to focus on examining the famous mining companies like Hanyeping iron-steel works. But, the failure of the earliest mining enterprise is seldom, if at all, mentioned by historians, especially in the Western scholarship.

This paper examines powerful official-industrialist Sheng Xuanhuai’s (1844–1916) earliest mining enterprise in Hubei Province, Central China, from 1875 to the mid-1880s. Sheng purchased Western mining machineries and hired foreign experts for prospecting. Although they succeeded in discovering coal and iron deposits, that mining enterprise failed due to its high cost and inappropriate management. This paper demonstrates Chinese local reactions, such as the fengshui (geomancy) and mining property disputes, to Western-style prospecting practices and analyzes the different aspects in the decision-making process besides technology. This study argues that Sheng’s failure directly influenced contemporary Chinese intellectuals’ trust and risk perceptions of Western (mining) technology and experts: the expensive labor-saving devices were not practicable or suitable for China; nor were the foreign experts always competent, which called for the birth of China’s own technical elites.

HAILIAN CHEN, Ph.D. (2018, University of Tübingen) is an engineer-sinologist trained at the Universities of Tsinghua and Tübingen. She is currently working at the University of Leipzig as the principal investigator on her second book project, *The Pioneers of China’s Rise to technological Power: Technical Educational Institutions and Their Students in the Age of Global Transformation, 1860–1911*, which is funded by the German Federal Ministry of Education and Research (BMBF). This project examines the role of technical education in the making of modern China.

### **SESSION 3 – INDUSTRY AND TECHNOLOGY (2), PAPER 3**

**ANNA AGAFONOVA**

#### **“The First World War and transition to hydropower in the Russian Empire”**

The report highlights the prerequisites for the emergence of Russian hydropower in the pre-revolutionary period. From the 1880s in the Russian Empire, entrepreneurs built small hydroelectric power plants for their industries. At the same time, at the state level, no attention was paid to these technologies for a long time, but they were the subject of research by the Imperial Russian Technical Society. The First World War aroused interest in the transition to hydropower in

public authorities. The fuel and financial crises forced the government to look for cheap sources of energy to provide, first of all, the capital of the state. The measures taken by the Government in 1915–1917 were continued under the rule of the Bolsheviks. The author analyzes the process of transition from discussions about the possibilities of using hydropower to the practical implementation of the first projects of hydroelectric power plants. The author notes the key role of the war in accelerating the transition to hydropower. The source base of the study consists of the records of the Council of Ministers, the Ministry of Railways, official statistics, press materials and scientific literature.

The study was supported by the Russian Science Foundation grant No. 22-28-01558, <https://rscf.ru/project/22-28-01558/>

Dr. ANNA AGAFONOVA works at HSE University (St.-Petersburg, Russia) and she is affiliated Cherepovets State University. Her research interests include the urban environmental history of Russian empire at the 19th –the early of the 20th centuries and has published several papers, among them “Sanitary trustees in the Russian Empire” (*Uralskij istoricheskij Vestnik*, 2021, Vol. 70(1), p. 30–38) and “Urban Pollution and Water Supply in Novgorod, 1870–1914” (*Historia Urbana*, 2020, Vol. XXVIII, p. 225–247).

### 13:45–14:00 BREAK

### 14:00–16:00

#### SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY

#### SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY, PAPER 1

ANDREW BUTRICA

#### “Industrial Nationalism and Napoleonic France”

Thesis: The Ministry of the Interior under Napoleon Bonaparte created the Société d’encouragement pour l’industrie nationale in order to broaden its scope and scale of operation in carrying out an implicit policy of industrial nationalism. The ministry and Société from the start (1801) attempted to replace imports with French industries by fostering technological innovation. The ministry’s bureaus (arts, agriculture, and commerce) worked with the Société to bring about technological solutions to economic problems: 1) foster and finance applied research (paper sizing); 2) manage innovation and create new enterprises (James Douglas; Honoré Pons); 3) realize fuel economy in various industries. The collaborations of the Ministry and Société also incorporated the efforts of the Société philanthropique (known for soup kitchens) under the rubric of économie domestique in areas such as fuel economy; and partnered with the Paris-based Société d’agriculture du département de la Seine in similar State/private ventures, such as in the sheep and wool research at Rambouillet outside Paris.

Dr. ANDREW BUTRICA completed his PhD studies at Iowa State University in History of Technology and Science and has published several books: *The Navigators: A History of NASA's Deep-Space Navigation*, 2014; *Single Stage To Orbit: Politics, Space Technology, and the Quest for Reusable Rocketry*, Johns Hopkins University Press, 2003; etc.

#### SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY, PAPER 2

CYRIL LACHEZE

##### **“Establishing a tile factory in 19<sup>th</sup> century France: technology, social tensions and power issues in commodo and incommodo surveys”**

Tileries activity, a relatively polluting industry, directly impacted the neighboring population, as a structured social system. *Commodo* surveys, conducted among the population of the municipality prior to the establishment of factories, allow to explore these issues for the 19th century. Many files containing no deposition implied a tacit acceptance of installations. Sometimes, local residents came spontaneously to give their agreement or even encouragement to the project, emphasizing advantages in terms of employment during periods of crisis, and drop in materials prices. More frequent however were the complaints, for risks of fire, inconveniences of the smoke, but also the increase in the wood price, or the risk of roads deterioration. To this could be added conflicts over access rights, or xenophobia against foreign workers.

Alongside these “material” reasons, surveys were regularly the occasion for opposition between pre-existing “clans” in local society. Family and friends of the tile maker typically supported him, even living in the factory’s immediate vicinity and therefore most inconvenienced, while his “adversaries” in local sociability put forward inconveniences that did not affect them. Authorities, very favorable to industrialization, took generally no account of negative opinions, and these quarrels therefore had no impact on the installation of tileries. However, these rivalries could have very real consequences on the project when the opposing group included politically influential notables. Important personalities, very tolerant of industries as bosses, did not hesitate to circumvent the procedure in order to have a competitive or annoying project prohibited, magnifying or even inventing its disadvantages, or resorting to pure and simple intimidation.

Based on several hundred surveys carried out mainly in Parisian, Loire et Burgundy regions between 1810 and 1880, we thus propose to highlight the complexity of these dynamics of opinion and decisions, which are only in theory purely linked to industrial and technological issues.

Dr. CYRIL LACHEZE is a teaching assistant at the Paris 1 Panthéon-Sorbonne University. Dr. Cyril Lacheze most recent publications include the following papers: “Racommoder trois ou quatre briques . Les réparations dans les tuileries de la fin Moyen Âge au XIXe siècle, entre sources textuelles et archéologiques” (in: Bernasconi, Gianenrico, Carnino, Guillaume, Hilaire-Pérez, Liliane, Raveux, Olivier (dir.), *Les réparations dans l'Histoire. Cultures techniques et savoir-faire dans la longue durée*, Paris, Presses des Mines, 2022, pp. 381–391; with Marion Weckerle, “Transmission de savoir-faire musicaux à l’époque moderne : la relation de maître à élève et l’évolution des techniques de jeu instrumentals” (in: Bière, Delphine, Gil, Marc, Prevost-Marcilhacy, Pauline, Sapienza, Valentina (eds.), *Apprentissage, travail et création. Lieux, communautés, réseaux, transmissions familiales*, Villeneuve d’Ascq, Publications de l’Institut de recherches historiques du Septentrion, 2021, online: <https://books.openedition.org/irhis/4302>.

## SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY, PAPER 3

CONNOR KA HEI AU YEUNG –

### “Hungered by Thirst: Petrochemical Industry, Research and Security in Early 20<sup>th</sup> Century East Asia”

In the wake of widespread application of internal combustion engines and synthetics, petrochemical industries gained strategic importance towards maintaining economic and national security in the backdrop of the early 20th Century. The fear of strategic inferiority due to petrochemical shortage within both the Republic of China and the Empire of Japan, as such, prompted researchers into using indigenous resources to synthesise fuel and synthetic materials, as well as their applications and conservation. However, the importation of fuel never entirely stopped, and even in place of embargo, the global exchange of knowledge to increase fuel supply remained in wartime East Asia. Given its strategic importance and relationship to geological knowledge, the planning and implementation of petrochemical plants also indicate the extent of bureaucratic control and development of an indigenous industrial chain.

This essay traces the evolution of petrochemical industrial development and research in modern East Asia before 1945. While geological conditions initially binded both ROC and Imperial Japan in terms of fuel shortage, strategic calculations and political conditions ultimately propelled and interfered with petrochemical development and research. By tracing the development and evolution of petrochemical institutions, corporations and monopolies, this essay attempts to draw a global history of fuel in early 20th Century East Asia, as a contesting history of Imperialism, anti-Imperialist resistance, autarky, state capacity construction and its legacy.

CONNOR KA HEI AU YEUNG is currently enrolled at the Asian Studies Master of Arts Program of the University of California, Berkeley. He has received several awards and scholarships and she is working as Graduate Student Instructor at the Political Science Department, UC Berkeley.

## SESSION 4 – SOCIAL HISTORY AND TECHNOLOGY, PAPER 4

TOMÁŠ GECKO

### “Negotiations on the Czechoslovak Patent Court: Power Dynamics, Litigation and Technology Transfers”

Industrial property protection is an integral part of the production and application of technology in a market economy. The smooth running of this process depends to a large extent on state interventionism, not only at the domestic but also at the transnational level. To protect industrial property, a complex institutional architecture is built, including so-called patent courts, used to adjudicate disputed cases of patent application and implementation. The presentation aims to outline the agency of the interwar Czechoslovak patent court, which was the institutional successor of the Austro-Hungarian patent court. The institution consisted of representatives of professional judges, ministerial officials, and technical experts. The latter were recruited from manufacturing practice, state administration and academia. Their recruitment was the subject of negotiations between academia and public authorities, including the Office of the President of the Republic. It was the President who officially appointed the members of the Patent Court. What were the circumstances surrounding this power dynamic, and to what extent did the specific staffing of the

patent court reflect the institution's agency? How has industrial property protection been implemented in the context of the institutional agency of the patent court? Methodologically, the presentation draws on theoretical concepts of institutional history and technology transfers. The research is based on printed sources as well as archival materials from the state administration, academic institutions, and the Office of the President of the Republic.

Dr. TOMÁŠ GECKO completed his Ph.D. in Modern economic and social history at Charles University Faculty of Arts, Prague. Since 2018, he is a Senior Lecturer at the Institute of Economic and Social History, Charles University Faculty of Arts. His research focus on History of Science, Transfer of Technologies, Modern Economic and Social History and Business History.

### **16:00–16:15 BREAK**

### **16:15–17:45**

#### **SESSION 5 – TECHNOLOGY, CULTURE AND DECISION-MAKING**

#### **SESSION 5 – TECHNOLOGY, CULTURE AND DECISION-MAKING, PAPER 1**

**HARALD KLEINBERGER-PIERER**

**“Drawings in decision making – Designs and patents in the Chamber of Commerce Vienna 18<sup>th</sup> century”**

In this talk, I will discuss how (technical) drawings were used in the process for approval of machine designs to receive patents, remunerations, monopolies or similar permissions by the Viennese court (and subordinated entities) in the 18th century. The court's approval and subsequent decisions about (financial) support were based on detailed descriptions of the device with accompanying drawings, as well as expert opinions from various fields.

The relevant authority for the approval of designs, the chamber of commerce (which was restructured as “Mauten, Posten und Commerzien“ in 1714 and as “Universalkommerziendirektorium“ in 1746) undertook several reforms and shifts of responsibilities in the 18th century. Thus, the chamber has some things in common with the addressed drawings used in the process for approval: the appearance of the drawings also changed significantly in the 18th century.

To provide insights in the role of drawings in decision making, some records of applications from the 18th century (mainly from the state archive Vienna) and the different uses of drawings in the process of approval by the chamber of commerce (e.g. proof of concept, documentation, illustration) will be shown in the presentation.

Dr. HARALD KLEINBERGER-PIERER is affiliated with FH Joanneum, University of Applied Sciences Graz (WTZ Project: „Connecting.ideas4research“ – WP Lead: Crowdsourcing as a tool and method in medicine, physiotherapy, music and architecture (AWS)). His recent publications, include the following papers: “Intervention. Partizipative Forschung als Praxis einer globalen Technikgeschichte (?)”, in: *TG Technikgeschichte*, Jahrgang 88, 2021, Heft 2, p. 207–212. DOI: 10.5771/0040-117X-2021-2-207; with Beck S., Bercovitz, J. et al. “Experimenting with Open

Innovation in Science (OIS) practices: A novel approach to co-developing research proposals”, in: CERN IdeaSquare Journal of Experimental Innovation, Vol. 5, 2021, No. 2, DOI: <https://doi.org/10.23726/cij.2021.1328>.

## **SESSION 5 – TECHNOLOGY, CULTURE AND DECISION-MAKING, PAPER 2**

**ŚLAWOMIR ŁOTYSZ**

### **“Cinema musicians and transition to ‘talkies’ in Poland, 1920s–1930”**

The historians of technology consider introduction of sound in films, which happened in the late 1920s, as a major technological breakthrough, while film historians see that as a revolutionary shift in cinematic art. Both groups are right, but at the same time they overlook yet another aspect of transition to sound – the changing patterns of human labor resulting from it. On the one hand, technological progress creates jobs in new professions, on the other – old occupations disappear. There were actors and actresses, whose careers broke after introduction of sound revealed their imperfect articulation, foreign accent or sometimes even deafness. At the same time thousands of professional musicians, who accompanied otherwise silent shows in movie theatres, lost their jobs with the advent of the ‘talkies’. Their tragedies, sometimes leading to poverty or even suicide attempts, went generally unnoticed by the public concerned mainly with the broken careers of silent film stars, and are barely mentioned in current scholarship. In this paper, I will analyze what were the practices of resistance of cinema musicians to the upcoming change. Although they were not as radical as the Luddites in the early 19th century England, they also actively tried preventing, or, at least, slowing down the progress: from interrupting sound film shows by throwing stinky bombs into the cinemas, through street protests and social shield schemes, to stressing the esthetics of live music as an added value to film viewing experience. While the paper focuses on Polish case, it uses the American experience as a point of reference. While explain the local specificity, I will ponder on how the arguments of technological backwardness and limited comprehension of English language in Poland were seen as a sufficient barrier against inevitably approaching sound film era and the changes in labor market it carried.

ŚLAWOMIR ŁOTYSZ is an Associate Professor at the Institute for the History of Science of the Polish Academy of Sciences since 2014. He was the Andrew Mellon Fellow of the Netherlands Institute for Advanced Studies in Wassenaar, the Netherlands in 2014–15, the Charles Price Fellow at the Chemical Heritage Foundation in Philadelphia, the United States in 2007–08, and a Fellow of the Kosciuszko Foundation at New School University in New York City, United States in 2004. I was named the SHOT International Scholar (Society for the History of Technology) in 2007–08, and the ICOHTEC’s Secretary-General (International Committee for the History of Technology) in 2013–17, and subsequently its President in 2017–2021.

## SESSION 5 – TECHNOLOGY, CULTURE AND DECISION-MAKING, PAPER 3

**KORNILIA PAPANASTASIOUS**

### **“Adding Artificial Intelligence to Artificial Reproduction: A Historical Perspective”**

The paper will introduce to a symptomatic reading of texts on the integration of Artificial Intelligence (AI) into Artificial Reproduction (Assisted Reproductive Technologies – ART). These come from widely circulating international science journals (including *Nature*, *Science*, *Scientific American*) as well as journals publications from the assisted reproduction field. Employing STS perspectives,

I focus on the configuration of algorithms and big data for reproductive technologies, like embryo classification, embryo selection, embryo livability prediction, and artificial womb development. In 1978 the first ‘tube-baby’ was born through IVF (In Vitro Fertilization). Following this, artificial reproduction has been gradually turned into one of the most challenging fields of medical technology, in general. In this paper, I present research on the history of discourses by medical and related communities regarding possible biases in AI-ART configurations. This ‘unravelling’ will make biases and inequalities that are connected to algorithms and big data in reproduction visible. This is one of the key points of my overall dissertation, too. My main focus lies on biases connected to gender, race and class, and further, appropriating AI-ART configurations in the Global South. My paper aims at offering a historical perspective to these configurations, taking into account the discourse of the physicians and reproduction specialists.

KORNILIA PAPANASTASIOU is a PhD candidate at the Department of History and Philosophy of Science (National and Kapodistrian University of Athens). She is a recipient of a three-year dissertation fellowship from the Hellenic Foundation for Research and Innovation. Her dissertation title is *Contextualizing the integration of AI and Big Data into reproductive technologies*. She has received a Certificate from the International Master’s Program on Society, Science and Technology (2019) and has an MSc in Science, Technology, Society – Science and Technology Studies (Department of History and Philosophy of Science & Department of Informatics and Telecommunications, National and Kapodistrian University of Athens, 2019). She has attended the Feminist Technoscience Studies MA module and Summer School Ecologies of Emergency, Centre for Science Studies, Department of Sociology, Lancaster University (14/6/2021 – 18/6/2021), the Feminist Epistemology and Methodology, 7.5 ECTS, Doctoral School theme Gender, Knowledge and Methodology, Stockholm University, Sweden (02/2021 – 04/2021), and the Reading Group and Graduate Training History of AI: A Genealogy of Power, Cambridge University (05/2020 – 12/2020).

**17:45- 18:00 BREAK**

**18:00–20:00**

**SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER DE-INDUSTRIALIZATION**

**SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER DE-INDUSTRIALIZATION, PAPER 1**

**WAYNE COCROFT**

**“Vanishing technologies – how do we respond to the legacy of late 20<sup>th</sup> century industry?”**

Internationally much of the industrial infrastructure of the late 20th century is obsolescent and reaching the end of its economic working life, but it's a legacy that remains little understood and under-researched. In most industries the transitional period between closure and demolition represents an exponential loss of knowledge as the workforce is dispersed and sites are cleared; for many even recent industries few artefactual, documentary and photographic sources will survive. Recent losses include coal mines, coal and oil-fired power stations, whose end is being hastened by the move away from carbon-based fuels. First and second-generation nuclear power plants are being decommissioned, as are chemical works, car factories, steel works, offshore drilling platforms, and oil refineries. They stand as monuments to national and international stories of the development and diffusion of technology and the endeavours of tens of thousands of people. One of the greatest challenges facing those concerned with the protection of industrial heritage is to understand the significance of 20th century industry, especially the large and technically complex industries of the post-war decades. This paper will discuss Historic England's recent interventions during the decommissioning of oil and coal-fired power stations and civil nuclear sites and will argue for a more holistic heritage sector approach to their loss encompassing the historic environment, artefacts and archives.

WAYNE COCROFT, BA, MCIfA, FSA is a Senior Archaeological Investigator with Historic England. He has a degree in Archaeology and has been a Member of the Chartered Institute for Archaeologists since 1984 and was elected as a Fellow of the Society of Antiquaries of London in 2009. His current specialist role is focused on defence and industrial heritage, especially that of the 20th century. A notable early career highlight was the survey of the Royal Gunpowder Factory, Waltham Abbey, Essex.

**SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER DE-INDUSTRIALIZATION, PAPER 2**

**STEFAN POSER**

**“Heritage of Rust and Oxidation? History and perspectives of industrial museums after de-industrialization”**

The paper analyses the role of industrial museums for societies during de-industrialisation as well as in the present situation. Several European industrial museums were found in the 1980s and 1990s. The author argues that these new museums, situated on old sites of production, had the main tasks to attract tourists and to contribute to self-assurance of local inhabitants in a period of fast changes. Thus they contributed to stabilizing society by preserving pieces of the technological and cultural background of industrial society. Which tasks remained and what’s about their role for society today and in the future? Analysis is based on three case studies from Northrhine-Westphalia in Germany: 1) The Zeche Zollverein in the city of Essen, which was the biggest pit of the country and is an UNESCO World Heritage monument today. 2) The steel plant Heinrichshütte in Hattingen, which was converted to an important museum of steel manufacturing after stop of production, and 3) the Bergwerk Ramsbeck, a former metal mine in the South of the Ruhr region, which has become a tourist attraction and an industrial museum already in the 1970s. As several other industrial museums in Europe, these museums have to face challenges in maintaining the technical equipment and the built environment. Pointedly formulated: about 30 years after their transition from production sites to cultural heritage, they are more or less in a second process of transition – now from cultural heritage to storage yards of scrap iron. What are their perspectives about one generation after de-industrialization? The author argues, that industrial museums are important monuments of a period, in which living conditions and environment were changed tremendously. Although it is difficult to protect them as they are, new tasks of environmental-friendly building construction might be helpful: in order to delimit CO2-emission demolition of buildings needs to be replaced by careful preservation and modification of these items.

STEFAN POSER, PD, Dr., is a historian of technology and member of faculty at Karlsruhe Institute of Technology, Germany, president of the International Committee for the History of Technology, and vice chair of the history group of the Association of German Engineers, VDI, in Berlin. In his PhD thesis at Berlin Free University (1996) he is dealing with the history of social museums, his habilitation at Karlsruhe Institute of Technology (2019) is combined with a *venia legendi* for the history of culture and technology. His main fields of research are the societal handling of technology-based risks and the playful approach to technology. Currently he is working on the history of robots and AI and is a member of ICOHTEC since 1998.

**SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER DE-INDUSTRIALIZATION, PAPER 3**

**ROBERT BELOT**

**“The Urbex, or the tribute paid to the industrial ruin”**

Between the suppression of industrial buildings and their requalification, there is an intermediate space that is forgotten, despised, forbidden: the industrial ruin. It is in this space that a new heritage practice is unfolding: the Urbex. Its followers are seized by the emotional virtues of the ruin which were highlighted by the writer René-François de Chateaubriand (1768 –1848): “All men have a secret attraction for ruins. This feeling is due to the fragility of our nature, to a secret conformity between these destroyed monuments and the rapidity of our existence.” The ruin, “involuntary” and nameless heritage, becomes a promise of heritage thanks to these visitors who transgress the norms. The Urbex is a recent phenomenon that presents itself as a form of resistance to a certain fatality of abandonment. But it is also, as a poetic approach, a way to go against the current opinion that demonizes the factory as a negative symbol of the “anthropocene”.

ROBERT BELOT is full Professor of Contemporary History (Jean Monnet University, Lyon-St-Etienne). He holds the European Jean Monnet Chair “EUPOPA” and he is the scientific coordinator of the Erasmus Mundus Joint Master Degree DYCLAM+, a master's degree devoted to cultural heritage issues.

**SESSION 6 – INDUSTRY AND TECHNOLOGY (3): INDUSTRIAL RUINS, INDUSTRIAL HERITAGE, AND THE TRANSFORMATION OF INDUSTRIAL QUARTERS – PERSPECTIVES OF INDUSTRIAL SITES AFTER DE-INDUSTRIALIZATION, PAPER 4**

**LUC ROJAS**

**“Mining methods: From creation to management of underground mining landscapes in France (18<sup>th</sup>–21<sup>st</sup> centuries)”**

From the 18th century onwards, the extraction of underground resources was intensified in France. While an industrial landscape is being created that evolves according to operating methods, the environment is also being profoundly changed. The evolution of mining methods between the 18th century and the 1930s produced different effects on the underground environment but also on the above ground. The backfilling of the coal seams causes a change in the landscape at the bottom of the mine and it also causes quarries to appear on the surface. If these waste rocks are placed at the bottom of the mine, they move and regularly cause cave-ins. Indeed, there are interactions between the extraction processes used on the bottom and the installations built on the surface. The cessation of activity does not mark the end of the management of these landscapes because mining has produced a specific and unstable environment which must be managed by the post-mining actors. Thus, underground lakes appear that must be controlled by draining the water that feeds these lakes. In addition to flooding, the contamination of groundwater by the metal mine is a problem today. Thus the mining methods implemented since the end of the 18th century today produce underground landscapes and new environments that must be stabilized.

LUC ROJAS, Doctor of History, teacher at the Jean Monnet University (Saint-Etienne), within the History-Civilisation and Heritage Masters and the Erasmus Mundus DYCLAM+ Masters. editor-in-chief of the journal e-Phaistos (University of Paris I and Prague University of Technology) His scientific concerns focus on technological mutations and changes between the 18th and 20th centuries.

**End of Program on 24 September 2022**

25 September 2022

08:00–09:30

SESSION 7 – DECISION-MAKING FROM SKY TO SPACE

SESSION 7 – DECISION-MAKING FROM SKY TO SPACE, PAPER 1

MARION WECKERLE

**“A seaplane and its water – technological construction choices and seaplane use in interwar Europe”**

After an important development phase due to intensive military use during the First World War, European production of seaplanes, led by France, Great Britain and Germany, turned to passenger transport. It could just as well be local lines in Europe, as transatlantic lines competing with ocean liners making the connection with America, but also local lines set up on other continents and in sometimes difficult climatic conditions (jungle of Colombia, West Indies, Indochina, Congo). These different contexts of use did not have the same implications in terms of technological choices requirements, but also of economic and political issues. European local lines benefited from technical achievements of the war, and therefore posed well-known technological challenges since it was generally possible to continue to develop the same technical solutions. Conversely, transatlantic flights represented a major technological challenge, involving crucial choices in terms of aircraft design, weather resistance and autonomy. However, since it was an extremely luxurious means of transportation because it was very fast and prestigious, the economic importance could prove sufficient to justify a sustained research and development policy.

On the other hand, local connections in colonial or assimilated spaces, if they could put a strain on devices, did not present at all the same economic weight: companies then often reused inexpensive planes designed for European spaces, without further technological thinking, which could sometimes lead to makeshift modifications carried out on site at best, and at worst to real failures. Finally, one can evoke a last role occupied by the most imposing and technically complex seaplanes of the 1930s. Some extremely advanced and large transatlantic seaplanes, were in reality too expensive to be operated commercially, and therefore grouped together concentrates of technical choices made above all, even exclusively, for demonstration and propaganda purposes. Based on a complete review of the bibliography and printed sources available on this subject, we thus propose to highlight the complexity of the question of technological choices adequacy related to the use of these seaplanes.

Ph.D. candidate MARION WECKERLE is the Head of the airplanes collection at National Air and Space Museum, Le Bourge. Her latest publications include inter alia the following papers: with Cyril Lacheze, “Transmission de savoir-faire musicaux à l’époque moderne : la relation de maître à élève et l’évolution des techniques de jeu instrumentales “ (in: Delphine Bière, Marc Gil, Pauline Prevost-Marcilhacy, Valentina Sapienza (eds.), *Apprentissage, travail et création. Lieux, communautés, réseaux, transmissions familiales*, Villeneuve d’Ascq, Publications de l’Institut de recherches historiques du Septentrion, 2021, open access: <https://books.openedition.org/irhis/4302>); “Émergence et diffusion d’un sport mécanique à la Belle Époque,” dans Denis Jallat (dir.), *Transferts culturels en sport, actes du congrès Les transferts culturels en Sport. Origines et diffusion du sport en Europe, Histoire & anthropologie*, Strasbourg 2021, p.179–195.

## SESSION 7 – DECISION-MAKING FROM SKY TO SPACE, PAPER 2

SABRINA LAUSEN

### **“Decision-making in the cockpits of airliners – Pilots’ perspectives on automation in Western Europe and in the Soviet Union, 1960s–1980s”**

Flying was always highly technology-based. Even in the 1920s and 1930s, pilots had to depend on instruments to navigate their aircraft safely. Nowadays, flying a modern airliner without computer technology is almost impossible. Airline pilots are heavily reliant on their electronic flight instrument systems and so is their decision-making in their highly automated environment.

Pilots had an ambivalent attitude towards this development. They appreciated the benefits of automation but also pointed to its potential risks as a new source of error. It is generally agreed that accidents can be prevented by technology-based systems in the cockpit. However, it is also fact that there are new accident scenarios that were caused by mistakes in the human-machine interface or by the technology and its capability to generate flying decisions by itself.

But the process of automation and its decision-making technology in civil aviation did not occur simultaneously and to the same extent on a global scale. A comparison shows a significant and largely unknown difference between aircraft manufacturers in the political West and East. In my paper, I would like to demonstrate that automation and its perception depended less on national technological conditions than on different cultural and social human images and their impact on pilot training in Western Europe and in the former Soviet Union.

The paper is based on different sources. The corpus includes articles of aviation magazines as well as personal memories of pilots and documents of pilot unions such as member journals. The latter sources are of particular importance because they reflect the changing technological experience and perception of pilots.

Dr. SABRINA LAUSEN is a research assistant at the Chair for Contemporary History at Paderborn University, where she teaches cultural history and history and technology for undergraduate students.

From 2002 to 2008 she studied New and Contemporary History, Medieval History and Science of Education at Paderborn University. In 2008, she obtained a Master’s degree in New and Contemporary History from Paderborn University with a thesis on the Sobibór Museum, Poland.

Between 2008 and 2011 she was a doctoral fellow of Paderborn University. In 2009, she spent a semester abroad at Adam Mickiewicz University in Poznań, Poland. Further research stays in Poland lasting several weeks followed. From 2012 to 2019 she worked as a research assistant at the Chair of Modern History at Paderborn University.

## SESSION 7 – DECISION-MAKING FROM SKY TO SPACE, PAPER 3

OLENA ZOSIMOVYCH

### **“Ukrainian Satellites for the Needs of Meteorology and the Study of Natural Resources in the 70’s –80’s of the 20<sup>th</sup> century”**

Concise statement. The early remote sensing technologies appeared in the early 70’s of the 20th century. Meteorological studies were undertaken slightly in advance – since the late 60’s. At that time, Ukraine as a USSR union republic was a significant part of the USSR’s space industry. A

secret Design Office 586 and Plant 586 (now Yuzhnoye Design Office and Pivdenmash Plant), which produced space vehicles, including satellites for various purposes were established in the city of Dnepropetrovsk.

In the 60's–80's of the twentieth century, Yuzhnoye Design Office started the development of the Meteor satellites, which in 1969 were put into operation.

In 1977, the USSR launched the Resource state space exploration system for the study of the Earth's natural resources. Within its framework, Yuzhnoye Design Office designed the Ocean space subsystem for conducting a comprehensive study of the World Ocean with application of Cosmos and Intercosmos satellites.

Sources. The authors addressed to the works of Academician M. Keldysh 'Space Research' (1981), Academician V. Glushko 'Development of Rocketry and Astronautics in the USSR' (1981), articles by Ukrainian researchers Yu. Khramov, O. Koltachikhina 'Key Milestones in the Development of Rocket and Space Technology in Ukraine' (2014), Yu. Lugovsky 'On the History of Rocket and Space Technology in Ukraine in the 50-60s of the 20th Century'. (2017).

Summary. 1. The end of the 60's till 80's of the twentieth century can be considered the period of conception and further development of Earth remote sensing technologies. 2. These technologies were used for the Meteor satellites for meteorological research and for the Cosmos and Intercosmos satellites for remote sensing of the Earth.

Mrs. OLENA ZOSIMOVYCH is a Senior Researcher at the S. Korolev, National Space Museum, Zhytomyr. She has participated in scientific conferences, including international ones and published articles on history of space explorations for scientific magazines.

### **9:30–9:45 BREAK**

#### **9:45–11:45**

#### **SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945**

#### **SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945, PAPER 1**

#### **MERCEDES FERNÁNDEZ-PARADAS, JUAN MANUEL MATÉS BARCO, ANTONIO JESÚS PINTO TORTOSA “Prosopography of engineers in gas industry in Latin Europe until the 1940s”**

In this paper we approach the biographies of engineers who worked in gas industry in Latin Europe, focusing on Spain, France, Portugal, and Italy, from mid-19th Century until mid-20th Century. For that purpose, we have analysed the obituaries and information about decorations to those engineers, which are mentioned in the *Journal des usines à gaz* between 1877 and 1945. In addition to that, we have studied other journals, too, including the yearbooks of engineering schools, as well as all the publications from the Société Technique de l'industrie du Gaz en France. Thanks to that we have been capable of studying the profile of engineers who moved a lot between countries and were interested in other activities different from the gas industry. Their contribution to gas companies was due not only to their studies in engineering, but also to their managing tasks in different companies. These were people who transformed the sector and led the process of technological

transference, as members of innovation networks. In fact, their will to participate in other activities and industrial activities tells about their constant need to acquire and share new knowledge. It is necessary to underline the role of French engineers in the introduction of new technologies, as well as in the gas production process, along the Mediterranean basin.

**SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945, PAPER 2**

**MERCEDES FERNANDEZ-PARADAS, ISRAEL DAVID MEDINA RUIZ, ANTONIO JESÚS PINTO TORTOSA  
"Gas engineers, links between France and Spain (circa 1840–1920)"**

In this paper we study the participation of French engineers in the Spanish gas industry, as well as the link between the Spanish engineers and France between the 1840s and the 1920s. The latter country pioneered capital and knowledge transference, together with the production and distribution of coal and gas technology, namely along the Mediterranean basin. It was also the biggest foreign investor in the Spanish gas industry at the beginning of the 1920s. In the 19th Century French gas companies felt attracted by Southern Europe and Northern Africa. That is why French engineers played a key role in the start of the gas sector in those regions. It is necessary to highlight the role played by Lebon et Cie, and by the Compañía Madrileña del Alumbrado y Calefacción por Gas, most of whose engineers studied in the École Centrale des Arts et Manufactures de Paris. The Compañía itself can be regarded as the first example of modern gas producing company, which triggered the development of other industrial, economic and industrial sectors by late 1840s. The sources on which we have built this research are publications and press specialised in the gas sector, especially the *Journal des usines à gaz*, as well as other secondary sources and recent literature on the topic.

MERCEDES FERNÁNDEZ PARADAS is a full-time lecturer in Contemporary History at the Universidad de Malaga. A specialist in the history of energy, namely in the history of gas and electricity, she has focused on entrepreneurial activity, technological innovations, and the biographies of the main businessmen, engineers, and technicians, as well as the circulation of knowledge and human capital. She has published her works in well-known journals, such as *Business History*, *Revista de Historia Industrial*, *Historia Contemporánea*, *Ayer*, *Hispania*, *Asclepio*, etc.

JUAN MANUEL MATÉS BARCO is a full-time Professor in History and Economic Institutions (Universidad de Jaén). He got his degree in History by the Universidad de Zaragoza, and his PhD in History by the Universidad de Granada. He leads the journal *Agua y Territorio / Water and Landscape* <https://revistaselectronicas.ujaen.es/index.php/atma>. He also collaborates with different international journals. He has published different studies on the economic evolution of contemporary Spain.

ANTONIO J. PINTO is a full-time lecturer in History of Thinking and Social Movements at the Universidad Europea. Though he got his PhD in Contemporary Spanish History, focusing on the impact of the Haitian Revolution on Spanish Santo Domingo, he has published several works on the history of gas industry and the Spanish industrial take off. Among other journals in which he has published his results, it is necessary to underline *Llull* and *Asclepio*.

**SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945, PAPER 3**

**FRANCESC XAVIER BARCA SALOM; JOAN CARLES ALAYO MANUBENS**

**“Gas producer and gas engine in the second half of the 19<sup>th</sup> century”**

One of the applications of the gas was, and still is, the power production. The history of the engines that use this source of energy is especially interesting and controversial since it represented a permanent conflict with steam engines, in addition to constituting an outstanding alternative in the production of electricity. In this paper we focus on the first gas engines and their competition with steam engines, from their appearance in the second half of the 19th century, to their use in the production of electricity. Through the information that appeared in the technical press of the time, we study the perception of the development, difficulties and transformations suffered by this technology during the second half of the 19th century and the first decade of the 20th century. The evolution from small power engines to the appearance and implementation of large engines and their dissemination in the various European countries is detailed with special reference to the case of Spain, where despite some local patents and the introduction of some low-power engines, the applications were scarce if we compare them with England, France or Germany, despite the fact that technical magazines gave news of developments abroad and encouraged technicians to sign up for this process. The importance of the use of other alternative gases and their application in the production of electricity has not been overlooked due to that the high price of lighting gas was the main obstacle to the competitiveness of gas engines.

Professor FRANCESC XAVIER BARCA SALOM is a Doctor in Industrial Engineering from the Universitat Politècnica de Catalunya (UPC), he obtained the Diplôme d’Études Approfondies of Energy Economics at the Université de Sciences Sociales de Grenoble (1977) and the Master of History of Science at the Universitat Autònoma de Barcelona (1995). Now retired, he had been an associate professor of History of Science and Technology at the UPC from 1991 to 2011 and professor at the Escola del Treball de Barcelona where he has given organization and energy projects until 2014. He is a founding partner and was the first secretary of the Catalan Society of History and Technology (SCHCT) branch of the Institut d’Estudis Catalans since its establishment in 1990 until 1998.

**SESSION 8 – ENERGY AND TECHNOLOGY (1): GAS, ENGINEERS, AND TECHNOLOGY IN LATIN EUROPE UNTIL 1945, PAPER 4**

**ALBERTE MARTÍNEZ LÓPEZ; JESÚS MIRÁS ARAUJO**

**“Engineers and the modernization of the gas industry in Latin Europe, 1874–1938”**

The gas industry was a key networked infrastructure during the nineteenth century. During the Second Technological Revolution the sector carried out important transformations. Initially, its area of activity focused on lighting, enjoying the monopoly in the urban lighting market until the early twentieth century. Yet, the irruption of electrical competition at the end of the nineteenth century forced it to improve the efficiency of its production processes and to seek new uses for gas, both in the industrial (engines) and residential markets (bath, heating, kitchen). This modernisation was made possible due to the decisive action of engineers. Their number and importance increased

significantly during this period. The aim of the paper is to analyse the engineers and their role in the modernization of the gas industry within the geographical framework of Latin Europe from the last quarter of the nineteenth century to World War II. In particular, the processes of technological diffusion between the main country (France, which was along with United Kingdom the leading country in innovation in this industry) and the rest of this area will be studied, as well as the main mechanisms that were used in that circulation of knowledge, as it was part of the internationalization of capital in public utilities during this period.

ALBERTE MARTÍNEZ is B.Sc. in History by the University of Santiago de Compostela (Spain), and Ph.D. in History by this university. Professor of Economic History at the University of A Coruña (Spain) since 2011. He has been Visting fellow in several European (Bordeaux, Tours, Prague, Leiden (Netherlands), Turku (Finland), Berlin, Glasgow, Rome, Lille (Lille 3), London (LSE), Paris (Paris XII and Sorbonne), Brussels, and Florence) and American (Mexico, Holguin (Cuba), Rio de Janeiro) universities.

JESÚS MIRÁS ARAUJO is B.Sc. in Economics by the University of Santiago de Compostela (Spain), M.Sc. in Economics by the University of A Coruña (Spain), and Ph.D. in Economics by this university. Senior Lecturer of Economic History at the University of A Coruña since 2012. Associate Editor of the International Journal of Economics and Business Modelling, and previously member of the Editorial Board of TST. Transportes, Servicios y Telecomunicaciones.

### 11:45–12:15 LUNCH BREAK

#### 12:15–13:45

#### SESSION 9 – IT, AI, AND DECISION-MAKING (1):

##### SESSION 9 – IT, AI, AND DECISION-MAKING (1), PAPER 1

**DEEPAK PRINCE**

#### **“The Automaton and the mediator: an archaeology of two “Entscheidungsproblems”**

This article undertakes an archaeology of the problem of decision across two discursive sites marked by the shadow of automation, from the early 20th century – firstly, the formalist mathematical paradigm inaugurated by David Hilbert and secondly, in jurisprudence. Formal mathematics encountered a stumbling block in the form of a theoretical problem called the *Entscheidungsproblem* or the Decision Problem, which sought to determine whether or not there existed a generalised procedure which could decide on the truth of a well-formed mathematical statement. The negative result to this problem came from the British mathematician Alan Turing (along with Alonso Church). Turing’s proof is also the first conceptualisation of what is now called the Turing Machine, an early computational automaton that grounds the theoretical and abstract-machinic essence for all modern computational systems. Turing’s automaton may have halted David Hilbert's ambitions of axiomatising mathematics but it lay the foundation for computer science and artificial intelligence. Around the same period, a different kind of problem of decision unfolded in European jurisprudence, mainly, between the formalist Hans Kelson and Carl Schmitt. The question here too, was about the limits of formalisability, and thereby the automatisability of juridical decision. Through an analysis that spans these two discursive formations, where the problem of decision comes up against the advent of automation, I show that two destinies remain

open to the human mediator – to *vanish*, or to *insist*. I then show how these problems from the early 20<sup>th</sup> century return to animate contemporary discussions on AI, automation and the ethics of decision.

DEEPAK PRINCE teaches sociology and anthropology at GITAM University Hyderabad. In August 2021, he defended his PhD Dissertation which is titled *Analytical Problems in the anthropology of technological screens and interfaces*. Deepak is interested in the anthropology and history of technology, STS and media, politic anthropology, the anthropology of violence and public art.

## SESSION 9 – IT, AI, AND DECISION-MAKING (1), PAPER 2

SERHII ZHABIN

### **“Cybertonia and hacker movement: subcultures of programmers in USSR and USA”**

Computer is a revolutionary invention of the XX century. In 1960s two great powers, USSR and USA, competed for the world dominance and at the same time each side struggled with its internal crisis. In 1961 hacker movement emerged in MIT Artificial Intelligence Laboratory and its values, at least in first period, were freedom, creativity and exploration of cyberspace. In 1960s the bureaucratic pressure on the population of USSR was slightly lowered by Khrushchev Thaw. In the closed research institution Soviet programmers, strongly influenced by the edge of computer development, united into their own unique subculture, they even printed “currency” of virtual country. Ten years Soviet scientists from the Institute of Cyberantics in Kyiv “lived, worked and played” in virtual country “Cybertonia”, “ruled” by Council of robots, with its own currency, laws, passports and values. The report will be based on interviews, graphic and text materials from private archives of participants of “Cybertonia evenings”. We will compare average portraits of American and Soviet programmers from 1960-s. And also we will try to find common and different features between two computer subcultures from different sides of Iron Curtain. The first one is well-known the world subculture, which in 1970-s evolved into aggressive counterculture. And Soviet subculture merely existed ten years in just one computer research institution, but also had its traces.

SERHII ZHABIN, Ph.D. (History of Science and Technology, 2013). Junior Research Fellow of the G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies NAS of Ukraine (2013–2014); Scientific secretary of the G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies NAS of Ukraine (2014–2018); Doctoral student in G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies NAS of Ukraine (2018–2020).

**SESSION 9 – IT, AI, AND DECISION-MAKING (1), PAPER 3****KONSTANTINOS SAKALIS****“Imagining a future of decisions made by artificial intelligence, 1940s–present”**

We will present research on the history of imagining that a whole series of important decisions would, in the future, be taken by artificial intelligence. Our broader argument is that this history has a deep past, reaching back to the emergence of capitalism. In this paper we focus on the electronic era, covering technologies that were presented as capable of artificial intelligence from the 1940s to the present. We will specifically follow the history of imagining a future of decision-making by artificial intelligence in connection to the history of a whole range of electronic computing artifacts, from the mainframes of the post-1940s and the home/personal computer of the post-1970s to the computers networks that made possible the internet, the web and the social media in the most recent decades.

A few pioneering studies on this topic refer to countries of the Global North, covering the US and Northern/Central Europe. Our focus on Greece – a country that relied, mostly, on the domestication – localization-reconfiguration of electronic computing technology because it did not lead in the introduction of new electronic hardware and software- promises to offer a valuable basis for international comparisons. Our primary sources are texts and images published in Greek science and technology journals and home technology journals, and, also, newspapers with wide circulation.

KONSTANTINOS SAKALIS works on a dissertation on the history of artificial intelligence (AI) in Greece at the Department of History and Philosophy of Science, School of Science, National and Kapodistrian University of Athens (NKUA), Greece, following undergraduate studies in electronics and telecommunications engineering (BSc, Hellenic Air Force Academy, 2005) and economics (BA, Aristotle University of Thessaloniki, 2010), and graduate studies in information systems (MSc, Hellenic Open University, 2015) and philosophy (MA, Aristotle University of Thessaloniki, 2016).

**13:45–14:00 BREAK****14:00–15:30****SESSION 10 – TRACTORS, TRAINS AND DEATH RAYS – ADVANCED TECHNOLOGY AND HIGH MODERNISM IN EAST ASIA FROM COLONIAL ORIGINS TO COLD WAR FUTURISM, 1930-1980****SESSION 10 – TRACTORS, TRAINS AND DEATH RAYS – ADVANCED TECHNOLOGY AND HIGH MODERNISM IN EAST ASIA FROM COLONIAL ORIGINS TO COLD WAR FUTURISM, 1930-1980, PAPER 1****ERNEST MING-TAK LEUNG****“Kolkhoz Under the Imperial Sun - East Asian Collectivisation and Planification, 1878–1978”**

Agricultural collectivisation in Northeast Asia is usually assumed to be a disastrous policy enacted by post-WWII socialist regimes, leading to catastrophes such as the People’s Communes and the Great Leap Forward. This paper argues that collectivisation here had its roots in fact in the State

Capitalist and total war ambitions of Imperial Japan, and was a pillar of the “1940 System” that lie at the basis of the so-called “East Asian Model”. In the late-Meiji years, German-inspired cooperatives were started by Hirata Tōsuke in Japan, and by 1918–20, nationwide cooperativisation was first proposed for Japan by Nishihara Kamezō and for China by President Hsu Shih-chang. During the 1920s–30s news of Soviet efforts aroused new interest in East Asia, and Korean Governor Ugaki Kazushige’s efforts at rural cooperativisation is now a classic case of “Colonial Corporatism”. Meanwhile, collectives were envisioned for Japanese emigrants to Manchuria by Tachibana Shiraki. Facing an impending war in 1937, leftwing intellectuals in the South Manchuria Railway Investigation Department led by Satō Daishiro, proposed a revamp of the Manchukuo agricultural economy through collectivisation. Their experiments in the Harbin-Suihua area, known as the “Pinchiang Course”, became a phenomenal success. Despite Kempeitai purges and the death of many leftists including Satō himself, the establishment of “Agricultural Revival Cooperatives” became Manchukuo national policy, completed by 1941. In 1940 the Colonial Korea Government set up “Hamlet Leagues” throughout with “Production Responsibility Systems” as part of a governing apparatus, the “National Totality League”. Meanwhile Tachibana’s influence on the New People’s Association (NPA), which oversaw the North China collaborationist regime, ensured that collectivisation was also tried in North China, following Kuomintang experiments elsewhere in 1936. The legacy of these experiments was enormous. Early Communist Manchuria under Chairman Gao Gang (1948–53), dismissed land redistribution and spearheaded cooperativisation, emboldening Mao’s claims that this was more progressive than small production. Cultural Revolution-era CCP Poliburo member Chen Yonggui, a successful People’s Commune leader, had worked in an NPA cooperative. Taiwan too, in the 1950s–80s, embraced cooperatives. In North Korea, colonial cooperatives were preserved intact. In South Korea it indirectly influenced the Saemaoul Movement of the 1970s.

Ph.D. candidate ERNEST MING-TAK LEUNG is a PhD candidate at the Chinese University of Hong Kong, where he also obtained his MPhil. His research concerns the European ideological origins of economic planning in East Asia, 1890–1966.

## **SESSION 10 – TRACTORS, TRAINS AND DEATH RAYS – ADVANCED TECHNOLOGY AND HIGH MODERNISM IN EAST ASIA FROM COLONIAL ORIGINS TO COLD WAR FUTURISM, 1930-1980, PAPER 2**

**BEN KLETZER**

### **“Getting China Back on Track: Rebuilding and Unifying the Railways through War and Revolution 1945–1952”**

Today, Shanghai Railway Station is a bustling train terminus, yet the same station in 1945 was a hellscape. The magnificent train sheds burned, buildings were flattened, and with no train service, railroaders lived in the wrecked railcars. The sight reflected the state of China’s railways, shattered by eight years of war. Yet, there was light at the end of the tunnel. While the end of one war marked the beginning of another civil conflict, soon the railways would be rebuilt and reopened. Under the guidance of the expanded Chinese railway technical intelligentsia, the railways would be a deciding factor in the future of China; through their work, the railroaders would act as agents of a new China. This paper explores the long postwar reconstruction of the Chinese railway system, asking how the CCP took over and unified the splintered railway system into China National Railways (CNR). In addition, this chapter exposes how the incorporation of China National Railways in 1945–1952

shaped the development of the PRC party-state by incorporating a professional technocratic elite into the politicized decision-making apparatus.

BEN KLETZER is a Ph.D. candidate in Modern Chinese History at the University of California, San Diego. He is supervised by Professor Karl Gerth and Professor Micah Muscolino. Ben is presenting his paper entitled *Getting China Back on Track: Rebuilding and Unifying the Railways through War and Revolution 1945–1952* at ICOHTEC 2022. This paper is part of his dissertation project entitled “China’s Dream of the Red Railway Professional Railroaders and The Making of an Industrial Power, 1945–1976,” which traces the historical and economic development of China National Railways (CNR), examining how the railways facilitated formation of the modern Chinese industrial state.

**SESSION 10 – TRACTORS, TRAINS AND DEATH RAYS – ADVANCED TECHNOLOGY AND HIGH MODERNISM IN EAST ASIA FROM COLONIAL ORIGINS TO COLD WAR FUTURISM, 1930-1980, PAPER 3**

**VIRGINIA L. CONN**

**“Power Stations: Internationalist Scientism in *Death Ray on Coral Island*”**

Adapted in 1980 from a 1978 short story of the same name, Tong Enzheng’s “Death Ray on Coral Island” (珊瑚島上的死光) was the first science fiction film developed in the PRC and played an important role in the discursive reconstruction of the country’s national identity following the Cultural Revolution and the ongoing Sino-Soviet split. The film, directed by Zhang Hongmei, focuses on a Chinese scientist’s humanitarian attempts to protect an atomic battery against shadowy Soviet and Western antagonists who seek to use it to gain power. By bringing the dual spectres of Soviet imperialism together with American neoliberal capitalism to bear on Chinese scientists removed to a deterritorialized locale in the Pacific, *Death Ray* critiques the market forces that made “pure scientism” impossible in international socialist efforts. Moreover, given that almost two decades prior (1961) the PRC had already officially denounced the “revisionist traitors” promoting a false Marxist science in the USSR, that China’s first science fiction film should focus on the shifting alliances between the PRC, Soviet Union, and the United States at a time when public opinion was newly relevant to policymaking is not inconsequential. In this presentation, I argue not only that *Death Ray* was inspired by and reflected ongoing sociotechnical conflicts in the Sino-Soviet world, but that it itself influenced subsequent technological policies.

VIRGINIA L. CONN is a lecturer at Stevens Institute of Technology. Her research interests are in socialist science fiction (particularly Mao-era Chinese, Soviet Russian, and East German science fiction), theories of the body in science fiction, and how speculation about human development shapes and is shaped by population management policies. She is currently finalizing her monograph on the development of a “new socialist human” in Sino-Soviet-GDR science fiction, which analyzes how science fiction authors utilized utopian ideals of technological advancement as blueprints for shaping individual citizens.

**15:30–15:45 BREAK**

15:45–17:15

## SESSION 11 – IT, AI, AND DECISION-MAKING (2)

## SESSION 11 – IT, AI, AND DECISION-MAKING (2), PAPER 1

AGNIESZKA DYTMAN- STASIEŃKO

**“Technology-driven resistance in Poland in the 1980s”**

The introduction of martial law on 13 December 1981 meant the loss of freedom for several thousand people in Poland. After the delegalisation of the first independent trade unions in the Eastern Bloc – Solidarity - the underground opposition continued its activities based mainly on technologies that were very often the result of DIY activities. Political (martial law) and economic (lack of access to technology, limited financial resources) factors contributed to the flourishing of the unique underground circulation of technology in communist Poland, one of the aims of which was to break censorship.

This talk describes the specific forms and the diversity of technological resistance in the 1980s: mainly analog before 1985, and hybrid or digital – in later years.

The technological history of resistance activities in communist Poland is perfectly reflected in Siegfried Zieliński's statement: “Instead of insisting on the current trends, leading media and logical products of convergence, it should be possible to search for individual variants. (...) discover phrases and cracks that could become a source of inspiration when navigating the maze familiar and recorded things.” This individuality, variability, and heterogeneity are deeply inscribed in the oppositional history of media technologies of the 1980s in Poland.

From media archeology perspective this alternative and creative circulation of technology was a side path of media development, paradoxically possible because of the imposing of martial law and related restrictions.

The research is based on in-depth interviews with Solidarity activists, analysis of the Security Service and other historical documents.

Dr. AGNIESZKA DYTMAN-STASIEŃKO is an associate professor in the Department of Media & Communication, University of Lower Silesia (Wrocław, Poland). Her field of research includes computer mediated communications, webstudies, infoactivism, digital activism, culture jamming, analog and digital liberation technologies, communication of protest, propaganda and persuasion studies. In addition to numerous articles she has published several books including *The Celebration of Overtaken Signifiers*, *The May Day in Communist Poland – Ideology, Ritual, Language* and *The “You and Me” Magazine*. *The Project of Alternative Lifestyles in Communist Poland*. Her current project is an analysis of the origins of digital activism within the field of media technologies in communist Poland. In-depth interviews conducted with the creators of computer programs, new analog and digital technologies serve as a research basis for the project Polish Solidarity and digital resistance.

## SESSION 11 – IT, AI, AND DECISION-MAKING (2), PAPER 2

LAILA ZWISLER

### “How computers came to know the world in two ways – making computer models in technical academia in Denmark”

In January 2022, the Danish magazine *Ingeniøren* professor of social aspects of artificial intelligence Thomas Bolander took stock of AI. He identified two individual paths. The first path is based on language, rules and logic. The other path is machine learning with statistical models and learning through examples. According to Bolander, these two paths are disconnected and have developed as individual paradigms.

In this paper, based on studies of technical academia and related companies in Denmark, I will discuss how these two paths developed, the risks in using these models and if these risks are familiar to us. The first path is the oldest. A link between science and engineering was cultivated in technical academia and mathematical scientific theory based on equations was used in predictive practices and, in turn, when making decisions. Technical academia and engineers would strive to create new measurables, define parameters and set standards to make stronger predictions. These were the basis of engineering models and technology-based decisions.

The second path opened up later as it is dependent on advanced machinery. In machine, learning the computer is trained through examples and experiences, while it looks for patterns. In technical academia, these practices are connected to example based teaching. In engineering training students were shown a wide range of pictures or studied samples in large numbers to train the feel for the good solution. Students also took part in numerous drawing exercises to train what Ferguson calls the mind's eye.

LAILA ZWISLER, History of Technology DTU, Technical University of Denmark: I head the History of Technology Division. My research area is the history and interpretation of technical academia, technoscience, knowledge and academic heritage. I am responsible for collecting and caring – physically and intellectually- for the historical heritage of DTU. I interpret the history of DTU and technical academia through different means. I teach history of technology and knowledge history.

17:15–18:15

## SESSION 3 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (1)

### SESSION 3 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (1), PAPER 1

JOSE SOARES

### “We must save these waters: the urgency of technology in Portuguese industrial pollution control (1892–1974)”

Portuguese water pollution surveillance was designed in 1892, with the creation of a national authority regarding public water management (Hydraulic Services). From then onwards, industrials had to submit a license to discharge wastewaters into the streams, regardless the fact the majority would ignore it, resulting in transgression cases. Nonetheless, complaints taken by professional

fishermen, tourism municipal commissions and aquacultural agencies led to a vast effort to ensure that industries introduced depuration projects, providing technology a crucial role to public health protection effectiveness.

Our study focusses Hydraulic Services activity in the Portuguese northwest, more specifically the river Ave basin, whereas the numerous watercourses allowed the region's growing industrialization to be hydraulic energy based. In fact, until 1974 hundreds of enterprises would settle in the river margins. Sources shows us that the first wastewater treatments were primitive, and that industry generally preferred to transgress and pay fines rather than prevent contaminations. Until late 1950's fining was a random and an arbitrary procedure, mainly based on river guards' perceptions of catching the flow of aquatic contamination. These perceptions consisted in the changing colors and odors of water and in community protests, the latter stressing out the impossibility of washing clothes and feeding their cattle. From the 1950's onwards, industries had to develop their own wastewater treatment projects, as the environmental damage became obvious.

However, the industrials' majority would break this strategy, claiming high costs of depuration plants, protracting their execution, and even throwing their sewers in the municipal collectors without the prescribed treatment. We will compare the complexity of technological projects over these years and discuss the evolution of water quality measurement, as well as the adoption of technology as a symbol of redemption, and its encouragement towards environmental restoration within the fight against pollution.

Ph.D. candidate JOSE SOARES: I was born in 1991. I've graduated in History (2014), specialized in Public Policies in the post-graduation course in Sociology (2015) and completed a Master's in History Teaching (2017), always at the University of Minho. I awoke to the themes of Environmental History during a Tropical Medicine course, taught by Casa Oswaldo Cruz, in partnership with the Institute of Hygiene and Tropical Medicine in 2016.

### **SESSION 3 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (1), PAPER 2**

**GREGORY AFANASIEV**

#### **“The oil inflection” in the energy consumption of the Russian Empire and environmental problems in the late XIX –early XX centuries”**

The rapid growth of technology in the Russian Empire in the middle of the 19th century became the impetus for the start of the process of global energy transition during the industrial revolution, had its specifics. The remoteness of the places of extraction of coal from the main centers of Russian industry, the underdevelopment of transport between them, coincided with the appearance of the oil fuels, the rich deposits in Russia were near the Baku. The emerging problems of depletion of wood fuel in the 1870s–1880s in the Central and Volga region as a result of the growth of industry and transport created the prerequisites for the rapid expansion of oil fuel into the industry of a number of regions. The orientation of Russian oil producers to capture the domestic market, the active development of technology of adaptation of the steam-based mechanisms for the use of by-products of oil refining (“masut”) as a combustible fuel has led to a rapid increase of oil as a new fuel in the Russian energy balance. The replacement of wood fuel with oil in the 1880–1900s, which took place in industry of many leading regions of the empire, was ahead of the process of carbonization, the basic trend for all industrialized countries of Europe at that time. This process was called the “oil inflection”. At the same time, the expanding demand for oils, which gave grounds to become a real replacement for wood in the industry of regions that have significantly depleted the natural

forest resources, contributed to the development of a predatory method of oil production, water transportation using vehicles that do not ensure its tightness, and consumption technologies that do not ensure its burning without harming the environment. All this contributed to the growth of environmental problems from the use of oil. In 1904, the Russian Empire adopted rules on the transportation of oil along the Caspian-Volga waterway and the protection of it from oil pollution, which became the first law aimed at protecting the environment from a new type of toxic fuel.

Ph.D. candidate GREGORY AFANASIEV: Saint-Petersburg State University, 2000–2005, Historic departure; Saint-Petersburg State Herzen University, 2005–2010, postgraduate.

PhD work: *Restoration of the Russian naval power in parliament discussions of the State Duma of Russian empire in 1906–1912*, June 2010.

Modules included: The history of parliamentarism and politics, of Russian empire at the end of 19<sup>th</sup> – beginning of 20<sup>th</sup> century; Environmental history of the empire and Soviet Russia 18<sup>th</sup>–20<sup>th</sup> century; The urban history of the Russian Empire 18<sup>th</sup>–20<sup>th</sup> century.

### **18:15–18:30 BREAK**

### **18:30–20:30**

### **KRANZBERG LECTURE**

**MARIA PAULA DIOGO**

**“Time and Human Agency: how can historians of technology contribute to present day debates?”**

Historians and philosophers of science and technology have been using extensively the concepts of “naturalization” of technology and “technologization” of nature. In the shadow of these two concepts—that actually always places technology as the driving force of the relationship either by imposing itself as “second” nature and reclaiming its status as a “form of life” or by domesticating and controlling nature by transforming landscapes and ecosystems into sources of supply on local and global scales—lurks an often dismissed assumption that is particularly relevant to the discussion on the Anthropocene: to “naturalize” technology, turning a human-generated process into one characterized as a set of unstoppable forces in motion beyond human control is, actually to deny human agency. And by denying human agency, the human origins and differentiated consequences of the Anthropocene are swept under the carpet, rendering the entangled histories of economic systems, political decisions, social asymmetries, and technological solutions opaque.

In this context, we have been developing a new concept to dissect the nature-culture/technology dichotomy and help reassess the nature of nature, which is central to the Anthropocene debate: the concept of *lumpennature*. This concept highlights the demise of nature as an independent entity and stresses its constitutive technological dimension. Maria Paula Diogo’s paper focuses on the entanglements between *longue-durée* and human agency in the Anthropocene.

MARIA PAULA DIOGO is a Full Professor of History of Technology and Engineering at the NOVA School of Sciences and Technology and a member of CIUHCT, which she coordinated/co-coordinated from 2007 to 2019. She publishes regularly in reputed international

journals and publishers. She is a founding member of international research networks such as STEP (Science and Technology in the European Periphery) and ToE (Tensions of Europe) and organized numerous national and international conferences and workshops, the last one being the Anthropocene Campus Lisboa: Parallax. She has been PI of national projects since 1995 and work package leader in four international H2020 projects. She is a member of the main professional societies in the field of History of Technology and History of Science and has served on the scientific board of ICOHTEC, SHOT and ESHS, and as associate editor and member of the editorial boards of national and international reputed journals.

**End of Program on 25 September 2022**

15 October 2022

08:00–10:00

SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES

SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES, PAPER 1

MORITZ MEISTER

**“Comparative Walkthrough Analysis of CRIS User-Interfaces”**

When researchers engage with CRIS in their everyday work, they do so by interacting with specific user interfaces (UIs). It is at this medial surface that far-reaching decisions regarding design and algorithmic structure materialise (how is ‘productivity’ visualised? Which symbols are used? What counts as ‘scientific activity’? Which data inputs are mandatory?). However, in most programs there is not solely one UI but various ones. A ‘simple’ researcher/user sees something else than a faculty manager. CRIS-programs offer privileged viewpoints to those who pay the charges, i.e., institutional heads. E.g., in Pure, a management-specific UI allows to sort research personnel by applied resp. granted funds and “compare departments or people by publication output” (Elsevier 2019). Altogether, the proliferation of commercial CRIS systems in institutional control centres provokes significant questions on the everyday production and evaluation of scientific knowledge, between audit control and creative scholarship. Moreover, research committees criticise a systematic tracking of researchers’ activities by big-data oriented publishing companies (DFG 2021). The walkthrough method is a participatory research approach of systematically stepping through user interfaces (Light et al. 2018). Its origins reach back to early HCI when programmers tested their software for ‘bugs’ (cf. Lewis et al. 1990). In recent years, this has been appropriated by digital media, culture and social-scientific scholars that are not interested in technical functionality but the social and ideological underpinnings of icons, animations, menus, text boxes etc. As researchers move along the UI, a data basis of screenshots and fieldnotes is created that can be the center of later interpretation and detailed analysis. Insights are deepened by contextual information such as programs’ updates, business models and marketing presence. In this paper, I want to share empirical insights and interpretations from walkthroughs on a diverse sample of CRIS-interfaces, from market-leading commercial programs to open-source public initiatives.

MORITZ MEISTER is research associate at Bertha von Suttner Private University St. Pölten and PhD candidate at University of Vienna. His work focuses on cultural psychology, dispositif analysis and qualitative research methods with a special emphasis on the investigation of digital interfaces and users’ practices with(in) them. Recently published: Meister, M. & T. Sunecko. “Digitale Dispositive psychischer Gesundheit. An analysis of the resilience app “SuperBetter”.” *ZQF – Zeitschrift für Qualitative Forschung*, 2021, 22(2): 242–265. DOI: 10.3224/zqf.v22i2.05 [online from February 2022].

**SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES, PAPER 2**

**FLORIAN BETTEL**

**“Portfolio & Showroom. A hands-on history of technology of research information systems”**

Scientific and artistic work at universities is increasingly measured in the form of metrics. Various digital systems have established themselves as the instrument of choice for creating these metrics, be it in laboratories with digitised work equipment, in the evaluation of courses or in the assessment of publications using the impact factor (IF). Although the past years of crisis caused by Covid-19 was accompanied by increased digitisation of research and teaching, the history of digital systems at universities is much older. The proposed lecture is a history of digital systems at universities, which are used to measure the “performance” of scientists. The focus is on the introduction of so-called current research information systems (CRIS), which have become an everyday work tool. Based on the “Portfolio & Showroom” research project, in which the genesis of CRIS was examined using the “thinkering” method, the lecture poses the questions of which management structures are used in the development of CRIS (actor–network theory), which logics are implemented in the software and the user interface and how these influence the work of scientists. The phenomenon of evaluation of scientific work through metrics and the associated allocation of financial resources at universities takes place against the background of a general social change, where Facebook became the “assessment centre of everyday life” (Carolin Wiedemann) and the visual worlds of the graphical user interface, which draw their terms and iconography from the bureaucracy (files, folders), indicate that the development of today’s predominantly web-based software is anchored in the history of modernity, capitalism and the post-industrial world of work. In 2019, the sociologist Armin Nassehi even understood social modernity as “always digital”. With this history of technology of the CRIS, the lecture would like to expand the current theoretical examination of the phenomenon of digitisation to include the aspect of the practice of scientific work. It wants to ask whether and to what extent scientists can emancipate themselves from the academic tools that carry the capitalist logic and what effects a science policy organised by metrics has on the critique of the “digital”.

Dr. FLORIAN BETTEL is a senior scientist at the department of Cultural Studies at the University of Applied Arts Vienna (Angewandte). His work is focused on aspects of the history of technology, cultures of dwelling, sepulchral culture, as well as artistic and curatorial activities. He is currently involved in “Locus Ludi: The Cultural Fabric of Play and Games in Classical Antiquity” (in cooperation with the University of Fribourg, funded by the European Research Council, 2019–2020) and, as project leader, is responsible for “Portfolio/ Showroom—Making Art Research Accessible” (funded by the Austrian Federal Ministry of Education, Science and Research, 2017–2021).

**SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES, PAPER 3**

**AGAJA PRZYBORSKI**

**“A praxeological model of media technical communication exemplified by focusing on practices of scientists with CRIS”**

A methodologically central axis in the study of digital technology and socially relevant decisions is the theoretical conception of the relationship between “humans” and “technology”. A principal and strict separation of “man” and “technology” remains, from my theoretical point of view, common sense, scientifically I consider it misleading. For everything technical, whether it is a microscope, a camera, or computer technology, can be understood as cultural manifestation in the Mannheimian sense. It has been created by people within and on the basis of certain cultural contexts inscribed in the media-technical manifestation. From the interaction of technical cultural manifestation with different people (groups), new aspects emerge time and again, some of which find their way into the corresponding technologies. From a praxeological informed methodological point of view it is essential not to conceptualise the technical as something fundamentally different or alien to culture. We could instead claim that humans “only” act or interact with themselves, e.g. when they use media-technical extensions of their capabilities. This is where the praxeological model of media technical communication comes in, a model I have developed in a multitude of empirical studies in the media technology field and which forms the basis of the empirical discussion of CRIS. The concern pursued by the model is to capture the mutual constitution of media and everyday life, or how humans produce themselves as cultural beings in and with their media-technological developments, meta-theoretically in such a way that a clear methodological access results from it. The idea is to investigate what is documented in media-technical things and what can then be related to them in what form – in terms of practical action. In his contribution, Moritz Meister deals with the analysis of the technical manifestation or rather technical dispositive, i.e. the inherent logic of different CRIS. In addition to the methodical aspects, my contribution sheds light on the orientations and the practice of action in dealing with CRIS within different scientific milieus on the basis of corresponding group discussions with scientists.

AGLAJA PRZYBORSKI, Ph.D., is full Professor of Psychotherapy at the Bertha von Suttner Privat University, St. Pölten, Austria. She is also teaching Psychotherapy at APG•IPS, Institute for Personcentred Studies, her work focuses on media theory and research, mental health and psychotherapy, milieu studies (youth, wealth, city) and the development of qualitative resp. reconstructive methods. Above all she has contributed to the development of Qualitative Methods and published a number of respective books and papers. Recently published: “Understanding Media Communication: On the Significance of Iconic Thinking for a Praxeological Model of Communication”. *SAGE Open*. <https://journals.sagepub.com/doi/10.1177/2158244020952064> (2020, with Thomas Slunecko); “Epistemische Aspekte der Medienverbundenheit des Wissens”. *ZQF (Zeitschrift für Qualitative Forschung)* 1/22.

**SESSION 1 – EDUCATION AND TECHNOLOGY (1): QUANTIFIED CRITIQUE – DIGITAL TECHNOLOGY AND THE CREATION OF SIGNIFICANCE AT UNIVERSITIES, PAPER 4**

**HANNA LUCIA WORLICZEK**

**“Quantification and Standardised Metrics as Historiographic Tools – The Power and Pitfalls of Bibliometric Analyses for Historical Epistemology”**

Historical epistemology of the life sciences after 1950 is frequently confronted with phenomena of abundance. This concerns not only the sheer amount of published scientific papers and the number of scientists, but also a steadily increasing quantity of interdisciplinary research fields and scientific journals. This abundance raises the question of how to retrospectively address the historical impact of an author, a scientific paper, an institution, or a journal within and beyond a given research field. One strategy to tackle this challenge is to use bibliometric measures such as citation frequency, impact factor and various metadata for investigating the impact of scientific literature, as well as for mirroring historical debates on prestige and exclusion dynamics from perceived “elite” institutions with data from outside the archive. Already in 1964 Eugene Garfield, the creator of the Journal Citation Index, probed citation data as historiographic tools. In the digital humanities, elaborated and resource intensive technologies are nowadays applied along and beyond these lines. However, such high-end tools are not available to all, e. g. due to resource limitations and lack of highly specialised expertise. Therefore, low-threshold strategies to investigate publishing dynamics by exploiting existing indexed databases appear as a practical way to provide a systematic historical insight for non-scientometrists. I will discuss such a strategy and exemplify its inherent biases and explanatory limitations, including the highly selective indexing of journals, the overrepresentation of English periodicals, incomplete (historically uncured) metadata, and the potential blindfold for historical epistemic and social details created by quantifying science. As opposed to CRIS, data input and curation appear disconnected from the historical agency of actors covered by the used databases.

A historiographic critique might therefore ask about the consequences of reducing historical actors to potentially distorted data entries and present threats of imposing current metrics on historical phenomena.

Dr. HANNA LUCIA WORLICZEK currently holds a postdoctoral research scholarship of the Gerda Henkel Foundation for her project “Merely descriptive and therefore dismissed. A history of descriptive research and the imperative of mechanistic explanation in modern cell biology.” As a historian of science, she is associated with the Department of History, University of Vienna (AT), and guest researcher at the Max Planck Institute for the History of Science, Berlin (DE). In October 2022 she will commence a postdoctoral position in the research group “Practices of Validation in the Biomedical Sciences” at the MPI for the History of Science, Berlin (DE).

**10:00–10:15 BREAK**

10:15–11:45

SESSION 2 – EDUCATION AND TECHNOLOGY (2): TECHNICAL EDUCATION IN SPAIN. SOME EARLY EXPERIENCES

SESSION 2 – EDUCATION AND TECHNOLOGY (2): TECHNICAL EDUCATION IN SPAIN. SOME EARLY EXPERIENCES, PAPER 1

ANTONI ROCA-ROSELL

**“LEarly steps to technical higher education: a reflect of technological changes?”**

In the XVI-XVIII centuries, there was a series of developments that transformed technical education, from a private activity, involving master and disciple, to an institutional one in the early schools for training engineers and architects. These two ways of technical education have been denominated as “workshop culture” and “school culture”. By a close study of several experiences, we propose a more complex process in several steps from the workshop to the school culture. This complexity can be seen in the existence of private training and the preparation of handbooks oriented to the technical education generally called “mathematical courses”, in which there were pure and mixed mathematics.

Our paper would present a model of four steps and analyse some cases from the French and Spanish experiences. First, studying some mathematical courses and their context. Second, focusing on some early attempts to organise technical education in military and civil institutions.

Our sources are the main mathematical courses published in the period. Also from courses not published, such as the course taught in the Military Academy of Mathematics of Barcelona (set up in 1720) or the private course of the Minorcan painter Pasqual Calbó, written probably in 1804.

It seems clear that the technological advances in the period we consider were the reference to the institutionalization of technical education. Nevertheless, this “reference” should be understood in a complex of social relationships. Engineers and architects formed part of new social groups playing an increasingly relevant role in society, as servants of the State or as promoters of technological challenges.

ANTONI ROCA-ROSELL (born in Barcelona, 1951) currently lectures at the Universitat Politècnica de Catalunya – Barcelona Tech (UPC). He gained his degree in Physics from the University of Barcelona in 1975 and obtained his PhD from the Autonomous University of Madrid in 1990. In 1996, he co-founded the Centre for History of Technology of the UPC, which publishes the international journal *Quaderns d’Història de l’Enginyeria* since 1996. In 1991 he was one of the founders of the Catalan Society for the History of Science and Technology (SCHCT), being its president from 1993 to 2009. In 2010 he was elected corresponding member of the International Academy of History of Science. In 2014 he was elected member of the Institut d’Estudis Catalans.

**SESSION 2 – EDUCATION AND TECHNOLOGY (2): TECHNICAL EDUCATION IN SPAIN. SOME EARLY EXPERIENCES, PAPER 2**

**MARIA MONTAVA-GADEA**

**“The beginnings of technical education in Barcelona: the school of mechanics designed by Francesc Santponç (1808–1821)”**

Francesc Santponç i Roca (1756–1821) was a doctor from the City of Barcelona who promoted the development of mechanics by encouraging technological innovations. When he was director of the Statics and Hydrostatics section of the Royal Academy of Sciences and Arts of Barcelona, he accepted the challenge of leading a team of craftsmen to build a steam engine to put spinning mills into operation. The running of the steam engine generated admiration and Santponç got a Chair to teach Mechanics. This chair was funded by the Barcelona Board of Trade, which was an institution that represented the interests of the commerce and industry of Catalonia. One of its aims was to raise the level of the industry by promoting an important teaching task by opening several schools to train professionals and technicians. It is remarkable the curriculum proposed by Santponç for his lessons which was mainly practical. The School of Mechanics that Santponç founded was linked to the Machine Cabinet, which was also financed by the Board of Trade and created in 1804. In the list of material that Santponç details as expenses generated by the School of Mechanics there is material for cleaning and tuning machines, as well as various materials for drawing plans and conducting experiments. It is noteworthy that Santponç knew how to adapt to his classes procedures and didactical materials from the highest educational institutions, with the use of synoptic paintings inspired by the Polytechnic School of Paris, to the most practical education, with the translation of two French textbooks of basic concepts of Mechanics and Geometry. The French influence in the diffusion of the technological knowledge is not only given. in his classes, but also in the edition of Mechanics section of the technological magazine *Memorias de Agricultura y Artes*. Santponç’s didactic work at the School of Mechanics was remarkable and represented the first steps in the teaching of Mechanics in Barcelona. This school can be considered the origin of the Industrial School of Barcelona, founded in 1851.

MARIA MONTAVA GADEA (Cocentaina, 1977) holds a PhD in History of Science from the Autonomous University of Barcelona and is a professor of mathematics in secondary education. She holds a degree in Physics from the University of Valencia and is a member of the Catalan Society for the History of Science and Technology. Her research has focused on the contribution of Francesc Santponç i Roca (1756–1821) to the diffusion of technology in Catalonia, promoting foreign technological innovations and also his own designs

**SESSION 2 – EDUCATION AND TECHNOLOGY (2): TECHNICAL EDUCATION IN SPAIN. SOME EARLY EXPERIENCES, PAPER 3**

**M. ROSA MASSA-ESTEVE**

**“The teaching of practical geometry at the Barcelona Royal Military Academy of Mathematics in the eighteenth century”**

In the seventeenth and eighteenth century many changes occurred in the practice of mathematics. An essential change was the establishment of analytic methods and symbolic language as a formal language in mathematics, so that the new language of symbols and techniques could be used in

operations to obtain new results and procedures in several parts of mathematics. In this period, new disciplines such as algebra, analytical geometry, logarithms, and the analysis of infinities emerged, introducing new procedures. Thus, practical geometry, including trigonometry and logarithmic calculus, underwent a major development throughout the eighteenth century. All these subjects proved their utility for solving problems in natural philosophy or physics, in architecture and over all in military fortifications. In fact, military engineering was a field *par excellence* for the application of this new mathematical knowledge. In Spain, as in other countries, the origins of “scientific” engineering lay in the Army, where officers acquired their training informally. After the War of Succession (1701–1714), the Spanish Bourbon Monarchy played a relevant role in the scientific and technologic development by establishing several institutions to promote a higher education for the officer corps, and mathematics constituted a pillar of Academy’s curriculum. In 1739, a Royal Ordinance established the contents of the course in mathematics to be taught in the academies. This course, prepared by Pedro Lucuce (1692–1779), consisted of eight treatises with a total of approximately 2,200 pages long on the main fields of mathematics, including “pure” mathematics (arithmetic and geometry), and “mixed” mathematics (cosmography, statics, hydraulics, architecture, artillery, and fortification). In this communication, we wish to analyse the treatment of practical geometry in engineering education at the Royal Military Academy of Mathematics of Barcelona for using this mathematical knowledge in military fortification.

M. ROSA MASSA-ESTEVE has a degree in Mathematics from the University of Barcelona, and obtained her PhD. on History of Science at the Autonomous University of Barcelona. She is full Professor of Applied Mathematics from January 2021 at the Department of Mathematics, Universitat Politècnica de Catalunya – Barcelona Tech. Her research focus on the history of mathematics through three main axes: The first one deals with the algebraization of Mathematics that took place from the 16th to the 18th century. The second axis is mathematics in the training of engineers of the 18th century and focus on the characteristics of pure and mixed mathematics courses contributing new ideas on the formation of military engineers and on the development and diffusion of 18th century mathematics. Finally, she researches on the History of Science and its relationship with Science Education. The History of Science provides resources that allow us to successfully grasp scientific concepts and that help us understand mathematics as a useful, dynamic, humane, interdisciplinary and heuristic science.

## **11.45–12.15 LUNCH BREAK**

**12:15–12:45**

**POSTER SESSION**

**TAJANA JAKLENEC**

**“Historical and Contemporary Prefabrication in Croatia”**

When a strong earthquake hit Croatia in 2020, prefabricated architecture came into the first plan again. After each crisis in history, there was a similar response. The thesis of the poster is that a common response to the crisis in Croatia is the application of prefabricated systems which moves technology forward but has a solid historical background. Despite the rich history and knowledge of prefabricated systems in Croatia, it was omitted from the curriculum of the Faculty of Architecture,

at the University of Zagreb for almost 15 years. After the earthquakes in Zagreb and Petrinja, the topic became current, and the prefabrication became an elective topic within the compulsory course Architecture and Technology. Two seminar groups during two semesters were researching prefabricated systems using three methodologies. First method: using professional magazines and construction company magazines students analysed historical prefab systems from various decades, and using catalogues, lectures and field studies to production plants they analysed current contemporary prefab systems in Croatia. Second method: designing a small living unit using prefab systems by studying contemporary prefab systems. Third method: mapping of prefab buildings using digital tools with the result of the interactive map – a conceptual bridge between the knowledge and technology. All three methods showed: during 1950 mostly concrete and panel prefab systems were used in housing, during 1960s wooden panel prefab systems were used in crises responses, during 1970-80s and 1990s again concrete systems. From the 2000s onwards dominate wooden and steel systems which use high IT technology that allows greater customization and individual design approach. Conclusion: application of prefab systems in crisis situations is indeed the best practice in such situations. Mentioned case studies confirm technology generates forward relying on the foundations of historical systems (knowledge) and individualization.

TAJANA JAKLENEC is an architect and a lecturer at the University of Zagreb, Faculty of Architecture. She was a member of ARCHIsquad, a non-profit organization of architects for social architecture, and is the editor of numerous publications, associate managing editor of the scholarly journal PROSTOR and vice-president of the FA Publishing Committee. Collaborates on numerous projects of various characters. She is a Ph.D. student in the Interdisciplinary Humanities Program at the University of Zadar.

**12:45–14:45**

**SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN EAST-CENTRAL EUROPE UNDER THE COLD WAR**

**SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN EAST-CENTRAL EUROPE UNDER THE COLD WAR, PAPER 1**

**JOE DJORDJEVSKI**

**“The Technology and the Environment of Tourism in Cold War Yugoslavia”**

Yugoslavia was one of most market-orientated states in communist Eastern Europe, yet it strived to reach a new modernity, rapid industrialization. By the 1960s, however, the introduction of tourism in beautiful—and fragile—environments began to pose challenges to rapid industrialization in Yugoslavia. The development of tourism, which was predicated upon perceived “pristine” natural settings, presented socialist leaders with two major dilemmas: on the one hand, mass tourism had the potential to destroy the very natural resource base on which it depended: the environment itself. On the other hand, industry was seen as a major hindrance to the pursuit of tourism, and the two were bound to clash as tensions between them mounted. How then did the leaderships of these two countries seek to strike a balance between industry and tourism to avoid conflict, develop tourism without destroying their respective environments, and what were some of the major consequences of these processes? By looking at the Kvarner Bay region in the Socialist Republic of Croatia (Yugoslavia)—one of the most significant regions where industrial development and tourism were simultaneously pursued—this paper argues that while industry and tourism continued to conflict

throughout the state socialist projects, the authorities initiated some impressive, albeit flawed, measures at sustainable development in order to ensure the success of increasingly tourism-based economies.

JOE DJORDJEVSKI is an environmental historian specializing on transformations of the Eastern Adriatic seaside during the period of Yugoslav socialism. He received his PhD in History at the University of California in San Diego, where he defended his dissertation, titled *A Seaside for the Future: Yugoslav Socialism, Tourism, Environmental Protection, and the Eastern Adriatic Coastline, 1945-2000s*. He is currently a postdoctoral fellow at the University of Graz's Dimensions of Europeanization Field of Excellence program.

### **SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN EAST-CENTRAL EUROPE UNDER THE COLD WAR, PAPER 2**

**JÍRA JANÁČ**

#### **“Developing Green Infrastructures in a Red country: Harmonizing Environment and Development in Regional Planning in late-socialist Czechoslovakia”**

In state-socialist Czechoslovakia, a system of central economic planning had been in place since the 1950s. Its basic component, the long-term development plans of the state and its individual economic sectors, were subsequently “projected into space” on the level of the state, regions and districts. This practice, was based on Soviet traditions of rayon planning and aimed at proportional development of society, nature and economics and strived for the most efficient arrangement of social and especially productive activities in space. However, already by the second half of the 1950s it was clear that the system was failing, and the most obvious consequence was the widespread devastation of the natural environment, generally attributed to the over-concentration of industry and settlement. In the context of the relatively liberal 1960s, there was discussion not only at the expert level about how to optimize the planning system to ensure a quality environment. Of the various models, the least ambitious ultimately succeeded most significantly, and even this was only after the collapse of state socialism. In my contribution I will deal with the development and promotion of the so-called “Territorial system of ecological stability”, a planning tool that aimed to integrate ecological and landscaping considerations into state-socialist planning practices.

JÍRA JANÁČ teaches Comparative and Transnational history at Charles University in Prague and is a researcher at the Institute of Contemporary History of the Czech Academy of Science. In his research he focuses on environmental history, especially on history of environmentalism and environmental expertise during the period of state-socialism.

### **SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN EAST-CENTRAL EUROPE UNDER THE COLD WAR, PAPER 3**

**VIKTOR PÁL**

#### **“Science, Technology, and Recycling in State-socialist Hungary”**

The Soviet bloc has often been interpreted by social scientists as “dirty”, placed in opposition to the “clean” and “superior” West when it comes to the environment. While it is true that the Soviet Union and its Eastern European allies such as East Germany, Poland, Czechoslovakia, and Hungary

committed terrible ecological crimes while pursuing extensive and rapid economic growth, Eastern European states also developed and employed complex environmental protection and recycle systems. First this talk discusses the attitudes and discourses of scientists towards the natural environment in modern Hungary while focusing on an especially vibrant period of scientific discourse under the Cold War, between the 1950s and 1970s. I will explore the development of Hungarian scientific ideas related to the environment, as well, what foreign influences made their impact on the development of a Hungarian scientific thought which eventually combined Western and Soviet science. In the second part of the talk, I will analyze the professional, political and popular discussions of recycling by focusing on paper waste in state-socialist Hungary. I will connect this case study with the changing cultures of waste, discards, and recycling around the globe.

Viktor Pál is the Title of Docent at Tampere University, Finland and Research Fellow at the Centre for Economic and Social History at the University of Ostrava.

### **SESSION 3 – ENERGY AND TECHNOLOGY (1): TECHNOLOGY, MODERNIZATION, AND THE ENVIRONMENT IN EAST-CENTRAL EUROPE UNDER THE COLD WAR, PAPER 4**

**MICHAELA ZÁVODNÁ**

#### **“Let them breathe. The technological and ecological aspects of urban transportation in Ostrava region during the Cold War”**

With the growing industrialization of the Ostrava region, the ecological burden of this region also grew. Significant migration of the population to this area also brought with it deteriorating living conditions. The spontaneous construction of workers' colonies, together with the polluted environment, also significantly affected the lives of the local population. Very quickly, the need to leave the unhealthy environment at least one day a week and spend it in a family circle in nature began to show. The surroundings of Ostrava offered these possibilities, but it was a question of how to achieve them and how to use them. In this paper, we will focus on the following topics: 1. Whether the municipalities of the Ostrava region used their location as a counterpoint to the industrial center and whether they thus promoted it when requesting transport connections with the center 2. During the Cold War, did the way in which the city and state management viewed environmental aspects changed and to what extent did they adapt transport policy to them? 3. Whether ecological transport factors were also taken into account when planning transport in the Ostrava region.

MICHAELA ZÁVODNÁ is the Deputy Director of the Center for Economic and Social History, and Vice-Dean of the Faculty of Arts at the University of Ostrava. Dr Závodná earned her PhD in 2016 and focuses on the spatial, cultural, social and economic ties of the history of public transport in regional and global perspective. She has published a number of peer-reviewed articles and chapters of edited volumes, as well as a monograph book. Dr Závodná has participated in scientific projects at the national level, and organized a number of conferences. In 2008 she received the Rector's Award, and in 2017 the Josef Pekař Award for the best scientific monograph of an author under 35 years of age.

**14:45–15:00 BREAK**

15:00–16:30

SESSION 4 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (2): PERSPECTIVES ON THE ANTHROPOCENE

SESSION 4 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (2): PERSPECTIVES ON THE ANTHROPOCENE, PAPER 1

JAMES WILLIAMS

“Human agency v. nature’s agency”

Humankind’s relationship with nature has been evolutionary. Nature’s agency initially overpowered human agency, limiting what people could do in their quest for survival. Ever so slowly people domesticated material things, such as fire and wood, and they made tools to assist them from bones, wood, and stone that gradually became more sophisticated. These tools became the principal link between humankind and the material world, and as human communities became more complex, people produced sophisticated tools worthy of being called technologies. Ships, mills, weapons, buildings—each invention and innovation increased human agency, and nature slowly gave way before it as evidenced in the multitude of landscapes created by humankind with their technologies. Between the sixteenth and twentieth centuries, human commodification of nature and the side effects of their technologies became increasingly complex and ultimately so complete that, guided by capitalism’s quest for cheap resources (nature) and cheap labor - both attained through the plantation system - they ate away at the planetary ecosystem on which their own existence depends. Today, while the Anthropocene encapsulates the idea of the age of humans, the Plantationocene driven by the Capitalocene appears to have eclipsed much of nature’s agency. Human agency has transformed nature into something that exists only as a result of human actions, something we might well call *lumpennature*.

JAMES WILLIAMS received a doctorate in Public History and the history of technology from U.C. Santa Barbara in 1984. He taught at two community colleges in California from 1971 to 2008 and at Stetson University (Florida) from 2014–2015. He was executive director of the California History Center & Foundation from 1978 to 2002 and worked during these years as a public historian in cultural resources, management, historic preservation, and litigation support. A long-time member of ICOHTEC, he served on the board in the 1990s, as vice president from 2001–2008, as president from 2008–2011, and as editor of ICON from 2011–2015.

SESSION 4 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (2): PERSPECTIVES ON THE ANTHROPOCENE, PAPER 2

DAVIDE SCARSO

“Agency and Political Representation in the Anthropocene”

The term Anthropocene was popularized in 2000 by the atmospheric chemist Paul Crutzen to acknowledge that humans have become a dominant and disruptive factor on our planet to such an extent that its future is in danger, or more precisely, our future on it. Climate wars, unbridled exploitation of natural resources, asymmetric distribution of wealth, massive population shifts/migrations, security, data management, unexpected and extreme natural disasters, and

beyond-measure/unimaginable loss of biodiversity are some of the more evident faces of the Anthropocene predicament.

As historians and philosophers of science and technology, we argue that the concept of Anthropocene provides a platform to connect/discuss different issues across various societal groups, and at different levels. Serving as an “uncommon ground” and a “trading zone”, the Anthropocene notion may allow for new intertwinements and confrontations, ranging from academic topics to activism, from artistic engagement to growth (and degrowth) theories, from environmental policies to deforestation in Amazonia, from gender and race issues to privacy and security. Furthermore, it, but also allows for a fresh look at traditional approaches to history and philosophy of science and technology, namely concerning the binomial naturalization of the technology/technologization of nature and the tensions between the need to politicize nature and the always-impending risk of naturalizing politics. This is the topic addressed “Agency and Political Representation in the Anthropocene.”

DAVIDE SCARSO is an Adjunct Professor of History and Philosophy of Science and Technology at the NOVA School of Sciences and Technology and a researcher at CIUHCT. With a background in Philosophy, his recent work deals with the conceptual and political implications of the debate on the Anthropocene. He recently co-edited the volumes *Gardens and Human Agency in the Anthropocene* (Routledge, 2019) and *Antropoceno, Biopolítica e Transhumanismo* (Pontes Editores, 2021) and was part of the coordinating committee of the “Anthropocene Campus Lisboa: Parallax” initiative, that took place in Lisbon in January 2020.

#### **SESSION 4 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (2): PERSPECTIVES ON THE ANTHROPOCENE, PAPER 3**

**MARIA PAULA DIOGO**

##### **“The Who’s who in the Anthropocene”**

Historians and philosophers of science and technology have been using extensively the concepts of “naturalization” of technology and “technologization” of nature. In the shadow of these two concepts—that actually always places technology as the driving force of the relationship either by imposing itself as “second” nature and reclaiming its status as a “form of life” or by domesticating and controlling nature by transforming landscapes and ecosystems into sources of supply on local and global scales—lurks an often dismissed assumption that is particularly relevant to the discussion on the Anthropocene: to “naturalize” technology, turning a human-generated process into one characterized as a set of unstoppable forces in motion beyond human control is, actually to deny human agency. And by denying human agency, the human origins and differentiated consequences of the Anthropocene are swept under the carpet, rendering the entangled histories of economic systems, political decisions, social asymmetries, and technological solutions opaque.

In this context, we have been developing a new concept to dissect the nature-culture/technology dichotomy and help reassess the nature of nature, which is central to the Anthropocene debate: the concept of *lumpennature*. This concept highlights the demise of nature as an independent entity and stresses its constitutive technological dimension. Maria Paula Diogo’s paper focuses on the entanglements between *longue-durée* and human agency in the Anthropocene.

MARIA PAULA DIOGO is a Full Professor of History of Technology and Engineering at the NOVA School of Sciences and Technology and a member of CIUHCT, which she coordinated/co-coordinated from 2007 to 2019. She publishes regularly in reputed international journals and publishers. She is a founding member of international research networks such as STEP (Science and Technology in the European Periphery) and ToE (Tensions of Europe) and organized numerous national and international conferences and workshops, the last one being the Anthropocene Campus Lisboa: Parallax.

### **16:30-16:45 BREAK**

### **16:45–18:15**

#### **SESSION 5 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (3): TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS**

#### **SESSION 5 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (3): TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS, PAPER 1**

**ANTHONY STRANGES**

#### **“The Technological Transformation of the 1850s and its Environmental Consequences”**

The United States and European countries, such as England and Germany, underwent a technological transformation in the mid-1800s. The discovery and application of new laws and principles in physics and chemistry made possible the transformation of existing low technology chemical processes, such as steel making, into advanced technological processes and the invention and development of new advanced technology processes, such as elemental aluminum’s separation and the alternating current electrical and communication industries. The transformation also resulted in the emergence of unhealthy and dangerous industrial workplaces that numerous critics justifiably condemned. But little improvement in the industrial workplaces resulted.

Few authors, scientists and non-scientists, commented on the atmospheric pollution that accompanied the technological transformation. Most of the scientific community and the public accepted atmospheric pollution as an inevitable consequence of the technological transformation. The proposed solutions, specifically coal washing and switching from burning soft smoky bituminous coal to hard cleaner burning anthracite coal, were effective when applied but required little understanding and application of the newly discovered laws and principles of physics and chemistry.

Scientists also recognized at this time that application of the new laws and principles of physics and chemistry could reduce atmospheric pollution that arose as a consequence of the technological transformation, and they invented the Cottrell electrostatic precipitator in 1907-08 and the flue gas scrubber tower in 1931. The precipitator and scrubber were the first technologically advanced anti-pollution inventions and have remained instrumental in reducing atmospheric pollution. This paper examines their significance in combatting atmospheric pollution.

ANTHONY N. STRANGES is a history professor at Texas A&M University. He teaches the historical aspects of scientific discovery in several history of science classes. Stranges earned a Master's degree in Chemistry from Niagara University and the PhD in the History of Science from the University of Wisconsin (Madison). During his career, his research has focused on the history of chemistry; the history of synthetic fuels, specifically the synthesis of petroleum from coal in World War II Germany and England, and its postwar development in the United States; the history of solar and wind energy as alternative energies; acid rain, and the three-stage history of global warming. He has presented papers on these topics at meetings of the History of Science Society, The Society for the History of Technology, The American Chemical Society, ICOHTEC, and other scientific societies. Stranges has published articles in *Isis*, *Technology and Culture*, *Annals of Science*, and in other journals. He published four books on the history of science. *Electrons and Valence*, a history of the chemical bond; *Science Changed the World* which traces scientific discovery from ancient times to the present; *Transforming America* and *Technological Transformation of Gilded Age America* which focus on the historical development of American science and technology.

**SESSION 5 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (3): TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS, PAPER 2**

**PETER WULFF**

**“Radioactive CO<sub>2</sub>: a Technology- Based Climate Controversy”**

Bearing in mind the conference theme “Technology-Based and Technology-Generated Decisions,” this presentation will discuss an important trait of the 1950s nuclear bomb tests. The trait considered is the radioactive carbon dioxide (CO<sub>2</sub>) produced by the nuclear tests. It can be seen as a “technology-generated side effect,” and it has come to have a certain interest for climate science.

Radioactive CO<sub>2</sub> was found to be a versatile tool. It could be used for dating archeological specimens and could also be used for keeping track of total CO<sub>2</sub> emissions. Both uses presupposed a constant level of the radioactive constituent (CO<sub>2</sub>) in the air. But a variable level of the constituent CO<sub>2</sub> also could be informative, as it could clarify how the rise or decline in radioactivity moved across the globe, which indicates how air masses circulated.

A special case occurs when a variation in radioactivity was only temporary. Then the way the radioactivity returned to “normal” could indicate how fast atmospheric the oceans take up CO<sub>2</sub>. The special case applied to the atmospheric bomb tests, which rather abruptly ended in 1962. The presentation will concentrate on this special use of radioactive CO<sub>2</sub>, and how it has come to be interpreted in a way controversial to mainstream climate science.

PETTER WULFF born 1944 was employed at the Swedish Defence Research Agency (FOI) 1969–2010. He has studied History of Technology and Military History at the Royal Institute of Technology, Stockholm, and at the Swedish National Defence College respectively. He has also done several presentations at ICOHTEC conferences, among them the following: 2021 “Falsification as a Scientific Tool. The Case of Climate Science” (Prague; Skype), 2020 “The Techno-Science of Outsider Groups. Another view on climate change”, etc.

**SESSION 5 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (3): TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS, PAPER 3**

**ELENA HELEREA**

**“Electrification and Environmental Issues”**

The United States and European countries, such as England and Germany, underwent a technological transformation in the mid-1800s. The discovery and application of new laws and principles in physics and chemistry made possible the transformation of existing low technology chemical processes, such as steel making, into advanced technological processes and the invention and development of new advanced technology processes, such as elemental aluminum’s separation and the alternating current electrical and communication industries. The transformation also resulted in the emergence of unhealthy and dangerous industrial workplaces that numerous critics justifiably condemned. But little improvement in the industrial workplaces resulted.

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ELENA HELEREA received the M.Sc. Degree in Electrical Engineering at *Transilvania* University of Brasov in 1970. In 1987 her postgraduate research in the Polytechnic University of Bucharest was awarded with PhD Degree, for the thesis: *Study on the quality of plastics electroinsulation used in automotive and aviation*. Beginning with 1999 she is full professor in Dept. of Electrical Engineering and Applied Physics, Faculty of Electrical Engineering and Computer Science, *Transilvania* University of Brasov.

**18:15–18:30 BREAK**

**18:30–22:00**

**SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION: TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES**

**SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION: TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES, PAPER 1**

**HELGE WENDT**

**“The colonial way into the global coal age”**

Coal is a more relevant fuel than ever, and the age of coal is more complicated to unwind than it seems. In some regions of the world, the “global age of coal” began earlier; in other parts of the world, coal became a part of the energy system centuries later. The presentation aims to illustrate the colonial fundamentals of energy systems linked to coal, which until today satisfy the global hunger for coal. During the imperial and colonial age, many new coal exploitation works and coal including energy systems developed in indifferent timeframes and in different velocities. Often, European mining experts were involved in the process of transforming earlier forms of exploiting coal deposits and they often were the first to report about them to a global public.

In most cases, the transformations are connected with colonial relations of domination and signify the beginning of a lasting formative development, because their incorporation into the imperial energy supply structures usually followed directly after the discovery of the deposits. Expert knowledge was important for locating and evaluating the value of coal deposits, as well as for mining them.

Two examples will be used to illustrate these structures: The Philippines under Spanish rule and southern Africa under Portuguese rule and with British explorers. Archival and published sources show that the beginnings of coal mining in the second half of the 19th century laid the foundation for stabilizing imperial power spaces and for a long-lasting economic dynamic of feeding these coals into various energy systems around the world.

HELGE WENDT is a Doctor of Philosophy in History, Universität Mannheim, and holds a M.A. in Latin American Cultural Anthropology and in History from Freie Universität Berlin. She is a Research Scholar at the Collaborative Research Center 980 “Episteme in Motion”, project: B06, Max Planck Institute for the History of Science (MPIWG), Berlin (Germany) and has served as Research Scholar “Global History of Coal”, MPIWG and at the Collaborative Research Center 644 “Transformations of Antiquity”.

**SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION: TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES, PAPER 2**

**FELIPE TRUJILLO**

**“Energy sources and energy transition discussions. The instituto de ingenieros de Chile’s analysis of the future of the Chilean energy matrix (1888–1910)”**

In this paper, we will present the debate that existed within the Chilean Institute of Engineers around the problem of energy provision for the country, between 1888 – the year of its creation – and 1910 when several medium-sized hydroelectric projects began their building or execution along

with the country.

Our interest in this period and in this group lies in the fact that the *Annals of the Institute of Engineers of Chile* were published on the basis of the Institute of Engineers, the main academic and technical discussion publication for local engineers. In addition, this journal served as a platform to communicate important transformations within the union, as well as to present political concerns mainly focused on the role that engineers should have for the future and the development paradigm that Chile should follow. Based on the notion of epistemic cultures on the one hand and energetic transitions on the other, we hope to present these discussions under the wing of historical processes that later spread throughout the 20th century. In addition, we hope to show that engineers thought of themselves as some form of a hybrid professional who moved comfortably between their roles as technicians and scientists, in a process typical of what the most recent literature conceives as scientific diplomacy.

FELIPE TRUJILLO holds a Ba in social anthropology and a Master's Degree in Contemporary Chilean History. He is currently developing his PhD research at the Instituto de Historia, Pontificia Universidad Católica in Santiago de Chile. His main interest areas are epistemic cultures, engineering in twentieth century in Chile and the problem of water and energy production at the cold war.

#### **SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION: TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES, PAPER 3**

**NELSON ARELLANO**

#### **“Solar energy techniques in XIX century for sustainability. Inventions, patents, and artifacts in Chile (1872–1930)”**

Contributions by solar energy to the mining process in the Atacama Desert were demonstrated since 1872 hitherto. The use of solar energy technologies was developed for desalting water, motors, scientific measurements, among others. Also, some patents for artifacts were designed to work with renewable energy between 1880 and 1910. Archives from Chile, the United States of America, the United Kingdom, Mexico, and Spain consolidated a landscape about the circulation of inventions, patents, and artifacts able to use solar energy as a source. A solar motor invented in Cape Cod, Massachusetts, three desalting water built in the Atacama Desert, a device invented, patented, and implemented in Chile to harvest honey was introduced in Cuba and USA are some of the cases to study the circulation of knowledge. The information indicates that, as Edgerton says, creole technology was a significant contribution to the evolution of the technology. Nevertheless, the intersected scales of modernities did not allow the lockout of the techno-institutional complex to incorporate solar energy and develop technical lines capable to spread their use.

The analysis shows how the final quarter of the XIX century was a time for the beginning of the thinking of sustainability. Nevertheless, as Julia Thomas wrote, crossing the history of economy, environment, and technology, in this case, did not have a happy end.

Dr. NELSON ARELLANO: Ph.D. in Sustainability By Barcelona Tech (upc.edu). He is a Professor at the Institute of Humanities of the Universidad Academia de Humanismo Cristiano (UAHC). He was the researcher responsible for the Fondecyt Initiation project n°11180158 (2018–2021) “The solar borders of Chile: Desert, Antarctica, Polynesia and Space. A history of governance and social

values of solar technologies in extreme areas (1976–2011)” and Postdoc 3160197 (2015–2018) of solar energy in the Saltpeter industry.

**SESSION 6 – ENVIRONMENT, POLLUTION AND DECISION-MAKING (4): THE ENERGY KNOWLEDGE CIRCULATION: TECHNOLOGICAL TRANSITIONS AND TRANSBOUNDARY PERSPECTIVES, PAPER 4**

**MARION STEINER**

**“German hydropower in Metropolitan Chile in the first decade of the 20<sup>th</sup> Century: a local exception from AEG’s global business model”**

With the Electric Revolution starting around 1880, the German Reich, in competition with the United States of America, defied the British Empire as emerging hegemonic world powers. Founded in Berlin, AEG and Deutsche Bank were the German pioneers in the run for conquering the global electricity market, successfully transferring their technology to hundreds of cities around the world. My paper explains why, as a great exception from the general rule on the global scale, in the two most important cities of Chile, the world port city of Valparaíso and the national capital Santiago, located on the west coast of South America, water power was installed by the Berlin actors, despite the fact that their global business model was based on the use of coal. The analysis highlights the roles that global players, local stakeholders and intermediate actors played in this technology transfer process, as well as their respective technical, economical and cultural perceptions and convictions. The interpretation of geopolitical contexts, in combination with environmental history approaches, makes it possible to understand the conflicts that arose from these constellations of interest and the reasons why local actors finally won their fight for the implementation of water instead of fossil-fuelled electric infrastructure systems in Valparaíso and Santiago. From an international comparative perspective focussed on heritage values, in addition, we can conclude that the hydropower system installed by Berlin actors in Valparaíso in the first decade of the 20th century is particularly important and significant on a global scale. This, together with the short upwards firing range of the cannon, made the VADS inefficient against high altitude and fast maneuvering jet planes, but still efficient against helicopters. Due to its wide firing angles (elevation of 85 to minus 10 deg), the VADS was much employed, from the early 1970s in the US and elsewhere, as a ground combat vehicle. In this new role, its high cannon firing angles were very useful in the Vietnam jungles as well as in crowded urban areas, hitting snipers in high apartment floors, where other heavy machine guns and tanks cannot target. To achieve such ground tasks, Israeli VADS units were made part of armored columns in the first Lebanon War (1982). At that time, when two Syrian MiG 21 surprisingly approached one armed column, attacking with their cannons, a VADS downed one of them. This was the only mentioned VADS fighter downing, in an internet source that reviews the weapon history. Others registered hits were scored against helicopters and boats. The presentation will explore the event as learned from Yoav Venkert, the Israeli officer of the VADS unit that scored this single hit and will compare to similar cases.

MARION STEINER is a cultural geographer, specialized in global industrial heritage interpretation. She holds a degree from Humboldt Universität zu Berlin, a Master in Geopolitics from Université Paris 8 and a PhD in Urban Heritage from Bauhaus Universität Weimar. During her professional career, she participated in two World Heritage site nominations of former industrial regions in Europe. Since 2018, she has been Associate Professor at the Institute of Geography at Pontificia

Universidad Católica de Valparaíso, Chile. Since 2019, she has been Secretary General of The International Committee for the Conservation of the Industrial Heritage (TICCIH).

## **End of Program on 15 October 2022**

## **16 October 2022**

**8:30–10:00**

**SESSION 7 – ARCHITECTURE AND TECHNOLOGY (1): THE DECISION TO BUILD WITH STEEL –  
 PREFABRICATED STEEL HOUSES AND THE INNOVATION SYSTEM OF THE STEEL INDUSTRY  
 (1920s–1970s)**

**SESSION 7 – ARCHITECTURE AND TECHNOLOGY (1): THE DECISION TO BUILD  
 WITH STEEL – PREFABRICATED STEEL HOUSES AND THE INNOVATION SYSTEM  
 OF THE STEEL INDUSTRY (1920s–1970s), PAPER 1**

**THOMAS SCHUETZ**

**“Steel means progress: Efforts to increase sales in the West German steel industry”**

In the second half of the 20th century, there was a consensus within industrial nations that steel production was to be considered an indicator of progressiveness. Increasing production capacity was therefore seen as a task of national importance, and there was also widespread agreement on this issue between different political and social groups. However, the promise of technological change inherent in these ideas was at odds with considerations within the steel companies regarding economic ambidexterity, i.e., the necessary balance between the use of existing investments and spending on innovations.

From a macro-historical perspective, the decision of West German steel corporations to adopt the construction of prefabricated steel houses as part of their own diversification efforts can only be understood against the background of long-term ideological convictions and political framework conditions. Based on the analysis of the social and economic framework conditions, it can be shown that the discrepancy between the innovation cultures and concepts in the sectors involved had a significant relevance for the long-term failure of the concept. Conversely, this finding implies that it was not a dominant cultural hegemony in the sense of Gramsci, but specific narratives and networks that determined the decision of the relevant actors.

THOMAS SCHUETZ (\*1971) studied History of Science and Technology and History at the Universities of Stuttgart and Frankfurt, where he received his doctorate in the History of Science. The topic of his dissertation was the intercultural transfer of knowledge between the Latin-Christian Occident and the Islamic cultural area, using the example of construction technology, the thesis was supervised by Prof. Dr. Moritz Epple. His teaching and research in the field of history of technology is focused on intercultural knowledge transfer, industrial espionage and technology transfer in a comparative perspective.

**SESSION 7 – ARCHITECTURE AND TECHNOLOGY (1): THE DECISION TO BUILD WITH STEEL – PREFABRICATED STEEL HOUSES AND THE INNOVATION SYSTEM OF THE STEEL INDUSTRY (1920S-1970S), PAPER 2**

**SILKE HAPS**

**“PLATAL Plastic-coated steel: from powder boxes to sandwich panels”**

In the mid-1950s the German steel company Hoesch invested in the diversification of their products and started to develop plastic-coated steel. This composite material was promoted under the name PLATAL – a trademark that had already been registered in the early 1930s and is valid until today, now a wordmark of thyssenkrupp Steel Europe. With diversification of its production, Hoesch aimed at compensating for locational disadvantages in the eastern part of the Ruhr area. Here, poor accessibility to larger waterways hampered bulk transport of increasingly demanded foreign ore. The innovation of plastic-coated steel was a decision, based on (new) technologies that allowed to enter new markets and inspire new ways in construction.

PLATAL was produced in several colors and textures, the products ranging from powder boxes to sandwich panels for buildings: Early in this process, Hoesch started cooperation to develop a program of prefabricated houses with roofs and walls covered with PLATAL. From a micro-historical perspective, our research concentrates on the examination of existing houses, so-called bungalows: single-story, one-family homes with flat roofs and different standardized floor plans, the process of their development and possibilities for their preservation. The production of these “bungalows” lasted for only a few years in the first half of the 1960s. In this time, both the material and construction was consistently developed. Ongoing research aims at examining the knowledge, the steel company had to gather to realize the buildings and, in reverse, the impact, manufacturing conditions had on architecture and construction.

SILKE HAPS (\*1976) studied architecture at the former University of Dortmund, where she also completed her doctorate (*Industriebetriebe der Baukunst – Generalunternehmer des frühen 20. Jahrhunderts. Die Firma Boswau & Knauer*, <https://eldorado.tu-dortmund.de/handle/2003/33887>). For three years she was employed at the Swiss Federal Institute, Zurich, she was a research assistant at the Technical University of Dortmund, and worked as a building archaeologist in projects of the German Archaeological Institute, Rome Department, and the Asia Minor Research Unit in the Department of Ancient History/Institute of Epigraphy at the Westfälische Wilhelms-Universität (WWU) Münster. Since 2021, she has been working on a research project at the Montanhistorisches Dokumentationszentrum, Deutsches Bergbau-Museum Bochum (<https://www.bergbaumuseum.de/forschung/forschungsprojekte/projekt-detailseite/bauen-mit-stahl>), which is embedded in the DFG Priority Programme 2255 "Construction as cultural heritage – Principles for engineering-based and interlinked conservation strategies for the built heritage of the high modern era".

**SESSION 7 – ARCHITECTURE AND TECHNOLOGY (1): THE DECISION TO BUILD WITH STEEL – PREFABRICATED STEEL HOUSES AND THE INNOVATION SYSTEM OF THE STEEL INDUSTRY (1920S-1970S), PAPER 3**

**TOBIAS NOLTEKLOCKE**

**“Historical material research and role of the public materials testing administration (MPA) as element of sector-combining innovation systems”**

Public material testing, technical approval and standardization had not only in the building industry a significant role in the 20th Century in Germany. After the Second World War German industry companies and the Administration were profoundly reorganized. For example the central material testing institute Kohle- und Eisenforschung GmbH of the Trust Vereinigte Stahlwerke AG was in kind of personal and equipment a predecessor of the new founded public materials testing administration (Materialprüfungsamt) of the newly founded federal country of North-Rhine Westphalia in Dortmund.

Role, research and testing tasks of the building departments of the MPAs during the period of reconstruction and economic recovery of Germany are a desideratum. Prefabricated steelhouses seems to be a fitting example of scholarly research. Different sections of industry like steel, chemistry and building/housing had to deal with the demands of markets and public conditions.

New materials and construction procedures led to scientific study groups and institutes for standardization. For that reason, the research and testing tasks of the building departments of the MPAs are examined. Furthermore, the concrete innovations of the companies in the field of new structural materials are examined by applying the historical materials research concept, such as technology, building physics and chemistry.

TOBIAS NOLTEKLOCKE studied History of Technology and Environment at the Ruhr-Universität Bochum, where he achieved a Bachelor of Arts degree in History and Sociology and a Master of Arts degree in History. His master thesis dealt with the war importance of structural air protection and the role of research in the field of reinforced concrete. Fields of further interests are Stainless Steel, the role of Trusts Real Estate politics and Ore Mining.

**10:00–10:15 BREAK**

10:15–11:45

**SESSION 8 – ARCHITECTURE AND TECHNOLOGY (2)****SESSION 8 – ARCHITECTURE AND TECHNOLOGY (2), PAPER 1****HADAS NUR****“The construction of a creative agency in the technological era – The case of architects and designers”**

Regarding to the topic of “Inspired technology based/generated decisions artistic oeuvre”, this lecture will describe how architects and designers (interior designers and industrial designers) construct their creative agency as part of working with advanced technological tools.

In the field of cultural production, the creative agency of the actors is an essential part of the profession and the definition of their personal and professional identity, and it also has a significant impact on the perception of their authorship.

Based on semi-structured in-depth interviews with sixty architects, interior designers and industrial designers (about twenty from each profession), and participant observations in various advanced 3D software courses in design and architecture academies, I will demonstrate how architects and designers struggle to preserve and present a creative agency within the technological framework.

I will show how they emphasize their professional choice-making between the multiple alternatives that the technological tools offer as a skill that demonstrates creativity alongside professionalism. This perception stands out in the light of studies that describe how multiple-choice options in algorithms framework may actually lead to impaired choice and frustration (D’Angelo & Toma, 2017). I will also describe their claim that in working with A.I technology they no longer design objects but experiences and interactions.

Finally, I will show how they describe their work with advanced technology as an arena of struggle. This is contrary to the common perception in STS (science, technology, sociology) theories in which relationships between human and non-human actors are presented as areas of cooperation (Latour 1999, Callon 2004).

Ph.D. candidate HADAS NUR: Doctoral dissertation in sociology, majoring in society and culture. Theme: Constructing a creative agency in the technological and postmodern era – the case of the design and architecture professions. Advisor: Prof. Uri Schwartz.

**SESSION 8 – ARCHITECTURE AND TECHNOLOGY (2), PAPER 2****MATTHIAS BRENNER****“The Potential of Digital Fabrication for the Repair of High-Tech Architecture”**

Recent advances in digital fabrication techniques have fundamentally changed the design and production processes in architecture. Since the turn of the millennium, numerous research projects have focused on the use of this technology for the realization of new designs. Despite efforts in curbing resource consumption through geometry and process optimizations, little attention has been paid to the possibilities of repair with digital fabrication. Investigating the potential of digital

fabrication for the repair of existing constructions is critical to avoiding the irresponsible waste of resources.

According to the “Document of Madrid”, the buildings of the second half of the 20<sup>th</sup> century pose new challenges to conservation. [ICOMOS 2011] In the 1980s, new technologies and materials were used, particularly around innovative façade and supporting structures, to realize novel architectural designs. These buildings are commonly referred to as *high-tech architecture* because their design concept is based on the use and display of advanced technology. Due to their construction, production, and materiality, these objects are particularly suitable as case studies for this investigation. The rapid obsolescence of technical innovations compared to the overall lifespan of a building and their resulting replacement, call for a holistic and appropriate strategy for the repair of the *high-tech architecture*.

Digital fabrication techniques offer new solutions for the production of bespoke building components. This enables a more selective and minimally invasive approach to the repair of individual elements as opposed to complete façade replacement. Therefore, a repair strategy leveraging digital fabrication methods (e.g., 3d printing, robotic fabrication) offers a less resource-intensive approach for the repair of building components. As a first use case, the repair process of a *high-tech* façade in Switzerland is meant to illustrate this process. Subsequently, the possibilities of applying this resource-efficient method to different kinds of building stocks around the world will be investigated.

MATTHIAS BRENNER, M.A. Architecture (TUM) CAPM, studied architecture at Technical University of Munich, Università di Roma 'La Sapienza' and Ryerson University Toronto. Master thesis 2019 with Prof. Dr. Rainer Barthel: *Stadium for Toronto based on lightweight construction principles*; Bachelor thesis in the studio of Prof. Max Dudler: *New Central Library for Berlin*.

## 11:45–12:15 LUNCH BREAK

12:15–13:45

### SESSION 9 – INFRASTRUCTURES AND TECHNOLOGY

#### SESSION 9 – INFRASTRUCTURES AND TECHNOLOGY, PAPER 1

VLADIMIR KORENSKY

#### “Inland Development of Early Reinforced Concrete in the Russian Empire in the Context of European Knowledge Transfer”

Wide introduction and implementation of reinforced concrete technology in the Russian Empire during its early development phase from 1886 onwards were deeply influenced by European expertise. Foreign knowledge was mainly applied into practice by European specialists, who were based in the Russian Empire at that time. These early phases of foreign impact on the development of reinforced concrete were described in several publications of the author.

But before European experts began to actively implement reinforced concrete, Russian engineers were also preoccupied with thorough studying of this new construction method. This activity might be traced in the local technical literature of that period. The processes of theoretical study of the material and its technical testing went hand in hand with the first practical applications of reinforced concrete by foreign colleagues. The following period, which was characterized by the active

application of the new construction method by the Russian specialists, is the subject of the present paper.

The adaptation of the new construction method during this period was a complex process and took place in different sectors such as economy, science and administration. The private construction industry was a pioneer in the implementation of the reinforced concrete. Scientifically educated engineers were revising calculation methods and performing various material tests. In its turn, governmental bodies enabled using the new construction method at a state-level and enacted corresponding building laws for its wider use. Representatives of these important sectors have been keeping a close look at the development of reinforced concrete abroad and contributed to its adaptation to the local conditions.

The aim of this paper is to reconstruct and characterize this complex process, discuss in detail the mechanisms involved and analyse the contributions of influential representatives of the construction industry and relevant institutions. The result of this process will be underpinned by the exemplary presentation of the built constructions.

Ph.D. candidate VLADIMIR KORENSKY, Research Associate at the Department of Construction History of Prof. Dr.-Ing. David Wendland, Brandenburg University of Technology, in Cottbus, Germany.

## SESSION 9 – INFRASTRUCTURES AND TECHNOLOGY, PAPER 2

LUDOVIT HALLON, MICHAL DURCO, MIROSLAV SABOL

### **“Czechoslovak and Slovak technocracy and technology-based decisions in the interwar period”**

In our paper, we want to contribute to technocracy and analyze its role in the decision-making process in interwar Czechoslovakia. Shortly after the new state was established, the first Czechoslovak minister of the public works, František Staňek declared, that in comparison with the former Austria-Hungary, new projects will be technology-based, planned only by the engineers and experts, and thus politically neutral. We will be focusing primarily on the decisions which were made in infrastructure (transport, electrification). For instance, in 1920 ministry of public works finished a plan for the new road network, which will be suitable also for motor transport. Engineers used just maps to seek the regions where good roads were missing and so planned the new ones. Especially in Slovakia, the plan also had a political background because the road network needed to be reoriented from Budapest to Prague. However, the next development showed how useless were some of the road constructions. It was because of the lack of data. Between 1929 and 1931, the ministry of public works made the first road transport statistics on all state roads. As historians often present the plans as anonymous, we will be talking about the technocrats at the top of the decision process. We are using primary sources from the archives, contemporary journals, etc. This is still an underresearched issue in our historiography, and we can reveal new research perspectives.

PhDr. LUDOVIT HALLON, CSc. (Slovak Academy of Sciences, Institute of History) I was born on the 19th of July, 1958, in Žilina. I obtained my professional education at the Faculty of Philosophy of Comenius University in the study program Slovak — History. After graduating in 1983, I shortly worked in the Slovak National Museum. In 1985 I obtained the academic title of PhDr. From 1986 I was an internal scientific aspirant of the Historical Institute of the Slovak Academy of Sciences in Bratislava, where I work until the present time. In 1992 I defended my

dissertation on *The development of the energy sector in Slovakia in 1918–1938*. In 1993, I obtained the title Candidate of Historical Sciences (CSc.). In the same year, I became a scientific researcher, and from the year 1996, I became an individual scientific researcher of the Historical Institute of SAS.

MICHAL DURCO, PhD. (Slovak Academy of Sciences, Institute of History) I was born on May 26th, 1991, in Brezno, Slovakia. I studied History at Constantine the Philosopher University in Nitra (Slovakia) from 2010 to 2015. Here I obtained a Magister degree in 2015. I defended my PhD. at the Slovak Academy of Sciences, Institute of History, Department of the History of science and technologies in 2019. The topic of my dissertation was aimed at the development of the road infrastructure in Slovakia during the interwar period

PhDr. MIROSLAV SABOL, PhD. (Slovak Academy of Sciences, Institute of History) I was born on the 12th of June, 1974, in Prešov. I obtained my professional education at the Faculty of Arts of Comenius University in the study program Slovak language – History. After graduating in 2002, I worked in the Historical Institute of the Slovak Academy of Sciences (SAS) in Bratislava. Between 2003–2007, I worked on my Ph.D. thesis at Historical Institute of the Slovak Academy of Sciences in Bratislava. In 2007, I defended my dissertation on *Electrification in the economic and social life of Slovakia 1938–1948*. In 2008, I obtained the title Philosophiae doctor (Ph. D.). Since 2009, I have been working at the Department of History of Sciences and Technology of the Institute of History of SAS. In 2012 I obtained the academic title of PhDr.

**SESSION 9 – INFRASTRUCTURES AND TECHNOLOGY, PAPER 3**

**M. LUÍSA SOUSA**

**“History of technology-based decisions: how recovering forgotten urban mobilities of the past might contribute to policies in cities with low cycling maturity”**

If “technology has always been involved in the decision-making process of humankind in every field” (CfP ICOHTEC 2022), we also know, as it is stated in two of Melvin “Kranzberg’s laws”, that “technology is neither good nor bad; nor is it neutral” (first law) and that “although technology might be a prime element in many public issues, nontechnical factors take precedence in technology-policy decisions” (fourth law) (Kranzberg, 1986). In this paper, I want to discuss how apparently pure technical decisions are not neutral and consider the importance uncovering the technical and non-technical factors that have historically shaped decisions on the socio-technical system of urban mobility in twentieth-century Lisbon. This research agenda is part of the project Hi-BicLab. History Lab for Sustainable Urban Mobilities: Lisbon's cycling policies, which aims at contributing with insights from Lisbon’s mobility history to current policies based on sustainability and inclusivity. Understanding the city, its materiality, agency and fluxes, in a historical perspective and in an interdisciplinary scope, from urban planning to bike lanes and transport investment, is necessary to understand the “path-dependency” generated by the current car-centred socio-cultural-technical arrangement. Hi-BicLab draws from the experience of previous history labs (e.g. on the lessons of the British railways, 1955-1975, co-facilitated by Colin Divall in 2014, a Hi-BicLab consultant) and research projects (such as the project “Cultural Politics of Sustainable Urban Mobility, 1850-present”, coordinated by Ruth Oldenziel, a Hi-BicLab consultant; and the book that resulted from it, “A U-Turn to the Future. Sustainable Urban Mobility since 1850”, edited by M. Emanuel, F. Schipper and R. Oldenziel in 2020), and will contribute to the Cycling Cities book series (coord. by R. Oldenziel). Hi-BicLab will set a history lab by mobilising history of technology (Divall, 2010) for academic and non-academic audiences, engaging them in historical thinking for identifying key socio-cultural-technical factors that have shaped how people moved

(and did not move) and how these might suggest ways to intervene in the present to promote more sustainable urban mobilities, particularly in cities with low cycling maturity.

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M. LUÍSA SOUSA is a historian of technology and mobility and researcher at the Interuniversity Centre for the History of Science and Technology (CIUHCT), and assistant professor (adjunct) at the NOVA University of Lisbon. In her PhD in History, Philosophy, and Heritage of Science and Technology (Universidade NOVA de Lisboa, Université Sorbonne Nouvelle, 2013, awarded a Special Mention of the 2017 DHST Prize for Young Scholars) she has worked on how the construction of the socio-technical system of automobility shaped the practices of mobility and the uses of public space, transforming streets into thoroughfares, crossing history of technology, urban history, mobility history and STS. She is currently working on the materiality of colonial infrastructures and its engineering, which she started to develop in her post-doc. She also is contributing to research in a project on heritage policies of glass and plastic and the Anthropocene, and is the principal investigator of the project Hi-BicLab. History Lab for Sustainable Urban Mobilities: Lisbon's cycling policies that focuses on the history of urban mobility in Lisbon, for which she recently obtained funding from the Portuguese Research Council (FCT).

### **13:45-14:00 BREAK**

### **14:00–15:30**

**SESSION 10 – “TO BE OR NOT TO BE.” SCHOLARS IN THE HUMANITIES INVESTIGATING TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS. HOW TO COPE WITH IDENTITY CRISIS**

**SESSION 10 – “TO BE OR NOT TO BE.” SCHOLARS IN THE HUMANITIES INVESTIGATING TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS. HOW TO COPE WITH IDENTITY CRISIS, PAPER 1**

**VALENTINA LIMINA**

**“New Technologies for Ancient Landscapes. How technology impacts Archaeology”**

This paper aims to demonstrate how a global approach to Landscape Archaeology using ITC engenders beneficial consequences both in the practice and the archaeological research theory. Applying “hard-science” methods to archaeology has increased in the last fifty years. The development of ITC has simplified data management and prompted new research questions and

approaches to reconstruct ancient economies, societies, and cultures. The fast-developing of ITC could be the cause of precarious situations. The archaeologist's frustration due to poor skills in dealing with the new technologies could lead to their total rejection despite the great informative potential. Moreover, the illusion that the application of new technologies could evade the traditional procedures of archaeological research, thus creating no historically well-founded projects. Archaeometry and the application of different high-resolution remote sensing techniques such as satellite (optical and radar data), aerial (photographic, infrared, and lidar data), and land acquisitions (geophysical techniques, field walking) are currently applied in Archaeology. They proved to be resolute when dealing with material provenance, chronology, site localization, infrastructures, Etc. To investigate San Gaetano di Vada (northern Tuscany, Italy), integrating traditional and new technologies has adopted a global approach. It is an archaeological site on the Tyrrhenian coast connected to the harbor system of Volterra in Roman times. Here, the application of geophysics allowed new investigations. Through Archaeometry, it is possible to reconstruct trade and productive networks. Paleobotanic, archeozoological data, and GIS systems provide a new understanding of ancient landscapes. Undeniably, technologies appear to be central in current archaeology research, even if there is the need to correct any distortions and adapt them to the specific needs. Thus, more insightful reconstructions of past landscapes could be achieved by integrating new technologies with traditional methods and directing them with focused research questions.

VALENTINA LIMINA graduated in Archaeology at Pisa University with a thesis on landscape analysis and pottery production in northern Etruria. In 2019, she earned her Ph.D. in History at the University of Pisa with a dissertation concerning the integration of Etruscan elites into the Roman Empire and the development of family strategies to maintain power in the centuries 1<sup>st</sup> BC–5<sup>th</sup> AD.

**SESSION 10 – “TO BE OR NOT TO BE.” SCHOLARS IN THE HUMANITIES INVESTIGATING TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS. HOW TO COPE WITH IDENTITY CRISIS, PAPER 2**

**JACOPO PESSINA**

**“How the Bastion Fort Changed Strategies during the Italian Wars, 1494–1559”**

The paper aims to demonstrate that the introduction of the *trace italienne* changed strategic thought during the Italian Wars (1494–1559). The bastion fort (best renowned as *trace italienne*) was a low and deep fortification that could be considered the turning point for the Renaissance European art of war: it deeply changed the strategic thought of generals.

During the first phase of the Italian Wars (1494–1500), the governments based their campaigns on fast offensives whose climax would be a short siege won by besiegers thanks to artillery fire. Charles VIII's descent into Italy (1494–95) was considered exemplifying. During the second phase (1501–59), the progressive introduction of the bastion fort changed the strategic thought of generals from offensive to defensive. The fortresses were impregnable by assault and needed more time to be conquered. This forced besiegers to adopt strategies to cut off forts' supply lines, waiting until defenders were short of food, and forced them to surrender: the sieges lengthened from many months up to years. Consequently, generals became more prudent during sieges, worried by frustrated what was done in previous months for a strategic or tactical mistake.

The paper considers the War of Siena (1552–55), during which the Marquis of Marignano, Gian Giacomo Medici, faced the siege of Siena (1554–55) following the new strategic thought of

prudence. The Duke of Florence, Cosimo de' Medici, deeply criticized this conduct, but Marignano succeeded because he conquered Siena on 21 April 1555.

JACOPO PESSINA is a Ph.D. in early modern history (Pisa, 2017). Currently, he is a post-doc fellow at the University of Pisa. He is specialised in early modern military history with a specific account of the military organisations of Lucca and Siena in the sixteenth century. His research interests are Fortifications; Italian militias; the development of military organisations in Italy; military technologies and tactics.

**SESSION 10 – “TO BE OR NOT TO BE.” SCHOLARS IN THE HUMANITIES INVESTIGATING TECHNOLOGY-BASED AND TECHNOLOGY-GENERATED DECISIONS. HOW TO COPE WITH IDENTITY CRISIS, PAPER 3**

**SARA ERCOLANI**

**“Catholic Voluntarism between the Fifties and the Seventies: The technological developments that changed the way of presenting the missionary field”**

How has the way of presenting Catholic missionaries changed in the technological turn? The history of missiology was often limited in the Modern Age, describing voyages of religious people possessing a specific technological culture that allowed them to cross the Atlantic Ocean or the Mediterranean and live there. In the 18th century, missionary activities seemed destined to end, but they returned with renewed dynamism one century later. The first change to the way Catholic aid was performed occurred in the last part of the 19th century when missionaries arrived in Africa thanks to an ingenious and novel use of technology and geographical technology. This technology-enabled entrance to sparsely inhabited lands into which geographers and ethnologists had previously opened roads. However, how did technology change the way of carrying out missionary activities? The Italian case is interesting because of the importance of Catholic change, the embrace of new technology, and the adoption of modern machinery in missions. Between the fifties and the seventies, religious people approached a new sphere of medical aid, means of transport, and, in general, technological development. This progress changed both the mechanism of Catholic voluntarism as well as the point of view through which the Catholic sphere interpreted this new technology and, accordingly, the New World, where it was integrated entirely and became a standard and current necessity.

Dr. SARA ERCOLANI after graduating in Modern History at the University of Pisa, Sara Ercolani attended the Ph.D. in Global and International Studies at the Department of Political and Social Sciences of the University of Bologna (2014). She completed her Ph.D. in 2018 with a thesis relating to the traffic in women between 1885 and 1946. She is currently a Postdoctoral Researcher at the Department of Civilization and Forms of Knowledge (University of Pisa), where she studies Humanitarian Aid, Catholicism, and Italian politics in the field of cooperation.

**15:30–15:45 BREAK**

**15:45–17:15**  
**ICOHTEC Prize Session**

**Turriano ICOHTEC Prize**

**LAUDATION BY DARINA MARTYKÁNOVÁ**

**Maurice Daumas Prize**

**Laudation by ELVIRA CALLAPEZ**

**17:15–17:30 BREAK**

**17:30–19:30**

**GENERAL ASSEMBLY**

**End of Conference**

# **Historica. History and Related Sciences Review**

**is a SCOPUS listed periodical of the University of Ostrava that welcomes article submissions by ICOHTEC 2022 paper presenters!**

**For further details please contact the managing editor via the contacts marked below**

Historica is anonymous peer semi-annual journal issued by the University of Ostrava, the Faculty of Arts under redaction of the Centre for Economic and Social History and with the support of the Department of History. Our journal is open-access and without any publication fees.

The foundation of Historica is related to the establishment of the Pedagogical Institute in Ostrava, which in 1959 built upon the earlier Higher Pedagogical School in Opava. The journal, which 2010 changed its name to Historica: History and Related Sciences Review and new semi-annual periodicity, builds on the peer-reviewed anthology Historie/Historica (a part of the series Acta Facultatis Philosophicae Universitatis Ostraviensis), issued since 1993 through the care of the Department of History of the Faculty of Arts of the University of Ostrava. In 2013 was Historica included among the periodicals listed in EBSCO Publishing database, in 2015 in ERIH PLUS database and in 2022 in Scopus.

The journal as anonymous peer reviewed provides studies and materials; we intend to publish irregularly a section of prospects called “Horizons” (peer reviewed overviews of research results on the resolution of topical issues of historical science at home and abroad), further reviews, literature reports and chronicle. We do not anticipate any chronological or regional limitation. We see the focus of the journal in printing texts on historical issues, but we have the intent to publish particularly texts that were created on the boundaries of various scientific fields, e.g. history and sociology, history and economics, history and demography, history and art history, or culture, history and ecology etc.

Considering that contemporary Czech historiography suffers from a lack of awareness of historical science in some previously carefully observed states, we focus prospectively on the national historiography of Slovakia, Hungary, Poland, Russia, Ukraine, the Baltics etc. particularly in the section “Horizons”, in reviews and reports on the literature.

Naturally, the languages of the journal are Czech and English however we accept texts written in Slovak as well.

For more informations about our journal (guidelines, statutes, previous volumes, academic board) look at on our website: <https://historica.osu.eu/>.

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