



# The 10th Tensions of Europe Conference: Technology, Environment and Resources

Aarhus University, Denmark, 29 June to 1 July 2022  
Venue: Ny Munkegade 118, Building 1530, 8000 Aarhus C

## Full programme

### Wednesday, 29 June 2022

8:00-12:30 Registration (Entrance Hall)

9:00-10:30 **PLENARY SESSION 1**  
Location: AUD. E (1533-125)

Conference welcome and introduction

**Keynote: May Tan-Mullins (James Cook University, Singapore), Motives, modalities and mega projects - Reshaping the peripheries of China through BRI infrastructural projects**

10:30-11:00 Coffee break  
Get together of the ToE PhD/early career group in room Kol D (1531-211).

11:00-12:30 **PANEL SESSIONS 1**

**Panel 1-1: Historical Perspectives on Energy Resources, Session 1 (triple panel). (In)visible Actors, Agency, and Infrastructures**

Location: AUD E (1533-125)

Organizers: Ute Hasenöhr, Odinn Melsted and Jan-Henrik Meyer

Chair: Jan-Henrik Meyer

Timothy Moss (Humboldt University of Berlin), Ourania Papasozomenou (Arden University Berlin), Marik Shtern (Truman Institute/Hebrew University Jerusalem) and Sertac Sonan (Cyprus International University), Powering the divided island: Electricity supply in Cyprus, 1956 to the present

- *Abstract:* Providing and securing electricity services on Cyprus poses a double challenge: it is an island that is heavily reliant on external fuel resources and has, since 1974, been politically divided between the Republic of Cyprus (RoC) and the self-proclaimed Turkish Republic of Northern Cyprus (TRNC). This paper presents a unique insight into isolation, division and cooperation as characteristics of energy supply in Cyprus, exploring how electricity infrastructures act as a medium and manifestation of political contestation and collaboration. The narrative begins in the pre-partition era, when a unitary network served an island increasingly embroiled in intercommunal fighting, before analysing how division created asymmetries in generation capacity, strongly favouring the RoC, yet perpetuated grid interconnectivity buoyed by imaginaries of unification. When the RoC's principal power station exploded in 2011, however, inter-state dependencies were reversed. Throughout, geopolitical influence – primarily by the EU and Turkey – has further shaped responses to division and energy supply.

Ute Hasenöhr (University of Innsbruck, Austria), Shaping nocturnal Accra (Ghana): Policies, politics and (energy) resources of urban colonial lighting (1920s-1940s)

- *Abstract:* Building on recent research in urban colonial history that has challenged traditional views on the dualistic nature of colonial space and society, the paper disentangles the complicated *mélange* of actors, energies, and motives that shaped the history of artificial light in colonial Accra in the interwar period. Conceptualizing urban lighting as the hybrid result of municipal planning, capitalist market economy, and constant societal renegotiations, (modern) lighting emerges as a contested commodity, oscillating between “Tool of Empire” and “everyday technology” – and subject to a substantial amount of African agency. The importance of Africans as consumers, policy-makers (and sometimes also producers) of electric light and power was especially pronounced in West Africa. Processes of electrification differed significantly from the more rigidly controlled East and South African settler communities, emphasizing the need for place-specific narratives in colonial history of technology in general, and the history of electricity in the Global South in particular.

Paul Nygaard, Spillover from nuclear research to the oil industry: The development of software to control the flow of oil and gas subsea 1980-2000

- Abstract: Recent research has scrutinized spillover effects from the oil industry to computing and other industries.<sup>1</sup> This research further develops literature demonstrating public-private links in the development of computer technology.<sup>2</sup> In this paper another spillover effect is investigated. The paper uses interviews with key actors and archival documents from involved organizations to analyse how a group of nuclear researchers used their programming and systems engineering skills to develop a software called OLGA that enabled transportation of unprocessed oil and gas from below the sea directly to the shore for processing. This technology rendered the famous Condeep oil and gas platforms made of concrete unnecessary. By cutting costs, OLGA have turned out to be a game changer in offshore petroleum industry. The idea was pitched by the Norwegian nuclear research institute in 1978 in a meeting with Statoil, the state-owned Norwegian oil company. The project developing the software and use of it was carried out over two decades, and was financed both by a group of oil companies and the Norwegian state. How was the links between nuclear research, oil companies and computer technology established and nurtured to create this spillover?

**Panel 1-2: Environmental and Technological Legacies of Late Soviet Materiality**

Location: AUD D1 (1531-113)

Organizers: Elena Kochetkova and Julia Lajus

Chair: Per Högselius

Julia Lajus (St. Petersburg), Increase of biological productivities and its technologies in the Soviet Union

- Abstract: The demand for artificial increasing of biological productivity of ecosystems important for providing renewable natural resources such as forests, freshwater basins and seas was very strong in the Soviet Union. It was based on Marxist theory and agricultural practices. Ideas to fertilize marine environment were pronounced even in the late 1950s but with the rising of environmental agenda in the second half of the 1960s were left behind. However, the increasing of productivity remained a powerful slogan and was considered by Soviet scientists and managers as a tool to overcome the internationally developed concern on resource scarcity and 'limits to growth'. In this paper I will focus on

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<sup>1</sup> Cyrus C. M. Mody, "Spillovers from Oil Firms to U.S. Computing and Semiconductor Manufacturing: Smudging State-Industry Distinctions and Retelling Conventional Narratives," *Enterprise & Society* (2022), <https://doi.org/10.1017/eso.2022.6>.

<sup>2</sup> Mariana Mazzucato, *The entrepreneurial state : debunking public vs. private sector myths* (London, 2013); Martin Kenney, *Understanding Silicon Valley : the anatomy of an entrepreneurial region* (Stanford, Calif, 2000); Knut Sogner, "Creating and Protecting Paths: Learning in an Entrepreneurial State," *Enterprise & Society* (2021), <https://doi.org/10.1017/eso.2021.54>.

the rhetoric of “increase of productivity” as well as technologies for its implementation in the 1970s-80s with a main focus on fisheries.

Anna Petrova (St. Petersburg), Synthetic materials in the production of clothes: from a technological miracle to an eco-friendly and healthy lifestyle

- *Abstract*: The manufacturing of synthetic clothes is a process which is taken for granted today. However, during the mid-twentieth century, the possibility of obtaining material from synthetic fibers could be compared to a breakthrough. The use of synthetic fibers in clothing production in the 1950s-1960s was one of the ways to solve the problem of mass production of inexpensive clothes and expand the range of goods. Soviet government has set as a priority task to research institutes and factories to develop technology to produce clothes made of such materials. Despite the fascination with the new materials in the early years of its use, some of its imperfections had also become apparent over time. The experts considered these strengths and weaknesses as a crucial part of the discussions in the Soviet society about rationalization, improving technology, and healthy lifestyle. This knowledge transformed social life and evolved in response to changing global vision of synthetic materials.

Evgeniia Platonova (St. Petersburg), Gendered Resources: The Choice of Materials in Soviet Clothing Design, 1950-1960s

- *Abstract*: The social structure of Soviet society was gender-colored when women’s productivity was connected with the quality of their housekeeping and general domestic material environment. But Soviet men were also active members of material consumption. In Moscow, male citizens sent a lot of letters to fashion magazines, asking why they published just few men’s models of clothing and how male population should dress. However, clothing for men and women was different not only in terms of style and types of garment. This paper aims to discuss how fashion designers and experts explained resources and materials in clothing design by gender.

Kirill Chunikhin (St. Petersburg), Respiratory Safety and Late Soviet Biopolitics

- *Abstract*: Based on unpublished material from Russian archives, and on interviews with engineers and workers, this paper will explore, for the first time, the history of Soviet respiratory protective equipment (RPE). I argue that a distinct Soviet policy of occupational care emerged after World War II, when Soviet industry invented an array of original RPE devices. The annual production of millions of devices highlighted the development of a complex Soviet trans-institutional system for insuring safe occupational breathing. Tracing key premises of respiratory safety policies in the activities of Soviet organizations, in my paper,

I will analyze how industrial respiratory care emerged in response to the growth of Soviet mining and chemical industries after World War Two.

Elena Kochetkova (St. Petersburg), Food and Environment under State Socialism: From Food Wasting to Food Making

- *Abstract*: The industrial food making had been a paradox in the state economy of the USSR. While hunger and food shortage were Soviet realities, the leadership made them critically important too in terms of new technologies and modernization. In my paper, I will discuss the latter aspect particularly focusing on how the state and specialists of food industry reconsidered food waste during the 1960s—1980s. In these decades, the discourse of complexity and rationality in resource use were developing as imperatives of industrial production. In food making, it implied that specialists looked for ways of using food waste in industrial food manufacturing. Gradually, it evolved into a more environmental approach when professionals connected food wasting with wasting nature.

### **Panel 1-3: Technology, Resources, and The Value of Antarctica, 1959-1991**

Location: AUD D2 (1531-119)

Organizer: Peder Roberts

Chair: Christian Kehrt

Roman Khandozhko (Saint Petersburg), Mining the (Socialist) Future: Mineral Resources in Soviet Antarctic Imaginaries

- *Abstract*: In terms of raw materials, the Soviet Union in the 1970-80s was believed to be the most self-sufficient country in the world. Yet, it had developed one of the largest resource-oriented geological programs in Antarctica. Was Russia really going to mine minerals on the South Pole? This question does not have an unambiguous answer. In the post-WWII Soviet Union, the imagination of Antarctica with its resources was framed within a variety of contexts, such as colonial logic of frontier development, ambitions for global dominance, reactive nature of the Soviet Cold War politics and real intentions to secure energy resources for the (socialist) future. In this paper I will discuss how different Antarctic imaginaries and associated actors contributed to the “resource-making” process and vice versa, how geological research results and prospecting technologies provided a basis for resource-oriented Antarctic discourses behind the Iron Curtain.

Tayana Arakchaa (Tuvan Research Center, the Tyva Republic, Russia), The Soviet Krill Saga that was Supposed to Flourish

- Abstract: The Soviet Union was one of the leading countries in krill fishing in Antarctic waters, but this food experiment on Antarctic krill is not widely known or studied. Yet Antarctic krill were part of the goal of the Soviet government to improve the food supply, including making all its citizens eat krill protein on a daily basis. The Soviet government created a favorable environment for krill food experiment at every level – from research to marketing, engaging the service of fishing technologists, doctors, dietitians, and food technologists. It is considered that krill food production ended because of the collapse of the USSR. However, other factors contributed to discontinuation of the krill production program such as the introduction of 200 nautical mile exclusive economic zones, and also competition and corruption in the Soviet fishing industry and environmental concern in the part of Soviet scientists. The story of the Soviet Antarctic krill fishery is therefore a story about how a state's will to make a resource that its citizens would eat could not be achieved, despite the strong central power of the Soviet state.

Peder Roberts (KTH Royal Institute of Technology/University of Stavanger),  
Antarctic Minerals: A Question of Faith?

- Abstract: The extraction of Antarctic mineral resources was considered so inevitable in the 1980s that the question was often positioned as a choice between orderly or disorderly development rather than development or non-development. This resulted in the Convention on the Regulation of Antarctic Mineral Resources (CRAMRA) which was agreed by the Antarctic Treaty parties only to collapse when first Australia and then France withdrew their support at the end of the decade, to be replaced by a moratorium on Antarctic mining. The demise of CRAMRA is usually attributed to a recognition that science rather than minerals provided the continent's most valuable export. While this is important, it does not explain why the prospect of minerals extraction was considered so certain in the 1980s, and whether loss of faith in the inevitability of mining (and awareness of the technological challenges) was also important to the crumbling consensus around CRAMRA.

Janet Martin-Nielsen (Researcher—GRETPOL Project, Vilnius, Lithuania),  
Environment and Sovereignty in the Antarctic: The Terre Adélie Airstrip

- Abstract: This paper tells the story of the French effort to build an airstrip in the Antarctic territory of Terre Adélie. This airstrip was conceived of as both a necessity for French scientific work and a physical symbol of French sovereignty over Terre Adélie. But, in the end, the project failed and the airstrip was never used. Ultimately, the airstrip—its inspiration, construction, and even its collapse—was a performance of sovereignty. In the French case, as this paper argues, this performance took place at the nexus of political strategy and environmental authority. Over the period considered here, we see the construction of France's

identity as a claimant state and a leader in the Antarctic Treaty System—an identity

**Panel 1-4: Technological responses to crisis**

Location: AUD D3 (1531-215)

Organizer: Anique Hommels

Chair: Léonard Laborie

Ginevra Sanvitale (Eindhoven University of Technology), The (emotional) Limits to Growth. Conflicts and continuities in technopolitical responses to global crises

- Abstract: In 1972, the report on The Limits to Growth warned of an impending series of interconnected crises: ecologic, demographic, economic. The report notably employed computer simulations to show the long term, detrimental effects of the current model of development. Because of its combination of a radical political message with scientific authoritativeness, it had the potential to draw interest both within grassroots social movements and institutional politics. However, the report received fierce criticism from both sides. By analysing its Italian reception, I show that this criticism was informed by a conflict between different “cultural politics of emotions” (Ahmed 2004). Looking into this past conflict will evidence the historical continuity of a set of tensions which are reproduced in contemporary technopolitical responses to global crises based on the notions of “sustainability” and “resilience”.

Yannis Fotopoulos and Stathis Arapostathis (National and Kapodistrian University of Athens), Unbundling crisis: The Downfall of Greece's Economy and the riddle of Access in the Greek telecommunication regime

- Abstract: The 2007 global debt crisis created uncertainty on Greece's telecommunications regime, as well as nearly every other area of the Greek economy. Sudden reforms and austerity measures were deemed necessary for resolving the issue in a sustainable manner. In this presentation, we will discuss how changes in the architecture of the Greek telecommunications network and adaptations occurred in response to the 2007 economic crisis, as well as how the incumbent actors and the regulatory authority responded to the Crisis's pressures. The delayed and slow pace of the digital transformation of the Greek network triggered long lasting EU pressures and directives that urged for the increase investment in new digital infrastructures (electronic switching and in fiber optics and digital radio links in transmission) since the 1990s. Those pressures acquired a different meaning and agency during the economic crisis. The established pathogens of the Greek telecommunications system, such as the absence of an independent cable television network, exacerbated the 2007 economic crisis and the possible pathways to tackle it. We argue that due to realities shaped by the

debt crisis an existing technology acquired meaning and social legitimacy within a context of corporate priority to exploit the existing infrastructure built through public-funded projects rather than taking the risk of investing in an economic recession.

Anique Hommels (Maastricht University), Infrastructural responses to breakdown in cities: the Covid crisis and the introduction of temporary cycling infrastructure

- Abstract: During the corona pandemic in 2020 and 2021, many cities were in lock-down for at least a number of months. Due to high population densities, cities are often considered as hotspots of covid-19 infections and mobility of people in particular, is seen as a major factor contributing to the spread of the virus. As crises have often had a major influence on choices made in infrastructure governance, this paper seeks to investigate how (infrastructural) transformations and adaptations emerged in cities in response to the covid crisis, in particular the introduction of pop-up cycling lanes. Building on STS and historical infrastructure research, this paper analyses how the values, policy ideals, materialities and competencies embedded in urban infrastructure before the Covid crisis, became re-negotiated, challenged and (provisionally) changed during the crisis. Hence, it aims to make a critical contribution to the often-made claim that crises create excellent opportunities for planners and policy makers to take transformative actions towards creating cities that are more just, resilient and sustainable.

Niels van Dijk (Vrije Universiteit Brussel), Public Dissections of Networked Infrastructures for Post-Truth

- Abstract: Contestations of standards of truth coincide with declining authority of established societal institutions like science, government, courts and media. This sparked debate by STS scholars on whether their detailed descriptions of the networks and infrastructures of techno-sciences contributed to this post-truth situation. This presentation explores a neglected counter-question by symmetrically asking: What are the infrastructures for post-truth? How is fake news produced and distributed? It empirically investigates the crises around Brexit and the 2016 US presidential election, focusing on sites, networks and ICT technologies involved in the production and distribution of information. Crucially, it studies how actors, engaged by these crises, endeavor to expose the networks involved by tracking disinformation campaigns, including investigative journalism, digital media studies, but also traditional regulatory institutions reasserting themselves as sites for public dissections of these infrastructures. This controversy reveals a struggle for the assertion of control over median ICT infrastructures in the networked society.

**Panel 1-5: Land practices and environmental protection (PhD Session 1)**

Location: AUD D4 (1531-219)

Chair: Nina Wormbs

Israel Saibu (Anchor University, Lagos Nigeria), Beninese labour migrants and their contributions to agricultural development in Ogun State Nigeria, 1960-2000

- *Abstract:* Nigeria has played hosts to vast waves of migrants from the African continent, and particularly the West African sub-region. Immigration into Nigeria has been phenomenal due to the oil boom of the 1970s, the accommodating nature of Nigerians, porous borders and the concentric circles of Nigerian Foreign policy objectives pursued by various administrations in Nigeria over the years have immensely contributed to this influx. In Nigeria, many cities and towns boast of high immigrant population, which has contributed immensely to the socio-economic development of such areas. While the economic outcomes of such migrations have been the main focus of several studies; the specific labour migrants and their contributions to the development of the agricultural sector in Ogun State, Nigeria, have received little attention. The thrust of this research therefore, is to determine the impact of Beninese labour migrants on the development of the agricultural sector in Ogun State, Nigeria. The research employs empirical ethnographic research methodology.

Olga Belichenko (Ca' Foscari University of Venice and National Museum of Natural History, Paris), Ethnobotanical practices of the Setos across generations and borders

- *Abstract:* My research project aims at understanding the change in the local ecological knowledge (LEK) transmission and the role played by the Soviet economy, education and medicine in this process. Based on 77 interviews with the Setos, a Finno-Ugric minority in NW Russia, I describe practices related to wild plants in 1960s-2000s. These materials, together with Soviet archival documents, publications and ethnographic descriptions, help to demonstrate the transformation of LEK under the influence of centralized Soviet institutes: collective farms, schools, points of medical aid, and, most importantly, the procurement points. The latter were accepting forest resources such as berries, mushrooms and medicinal herbs from the local population. Inspired by the new materialism, my study helps to trace the hybridization of LEK thanks to the creation of the myth of the Soviet reader and the wild plant use propaganda.

Janne Mäkiranta (University of Turku, Finland), Clarifying the Air: Finnish Air Pollution Experts and the International Quest for Safe Air, 1940s-1970s

- *Abstract*: My PhD thesis examines the transnational development of air pollution research and its appropriation in Finland. It is shown how the scientific expertise on urban air was formed as part of the response from government officials to the rising anxiety and indignation about urban air. Measurements of air quality provided a way to address the complex issue with the apparent objectivity and rationality of numbers and science. With their ways of knowing deriving from industrial hygiene and toxicology, the new experts aimed to manage urban air by detailed analysis of its composition and the health effects of specific chemical components. Thus, the complex societal problem of urban air was turned into a seemingly endless scientific puzzle to objectively determine the optimal state of urban air.

12:30-14:00 Lunch

14:00–15:30 **PANEL SESSIONS 2**

**Panel 2-1: Historical Perspectives on Energy Resources, Session 2 (triple panel).  
Conceptual and Methodological Challenges**

Location: AUD E (1533-125)

Organizers: Ute Hasenöhr, Odinn Melsted and Jan-Henrik Meyer

Chair: Odinn Melsted

Trish Kahle (Georgetown University Qatar), 'Confidence in Our System': How an Electric Utility Reconfigured Consumption and Production in a Regional Energy System

- *Abstract*: This paper uses a case study of an US utility company, the Pennsylvania Power & Light Company (PP&L) to explore a problem of much wider significance: the historical production of the categories we use to make sense of our everyday energetic lives. As PP&L's service area deindustrialized in the second half of the 20th century, the utility profoundly reshaped the way people in their service area lived with energy. This transformation proceeded through changes in quotidian practices and changes to the categories and conceptual tools people used to understand those practices. Through a close archival reconstruction of how the categorization of energy practices helped PP&L's system function amid broader social and economic transformation, I develop a broader critique of the categories we use to conduct energy research and write energy histories.

Panagiotis Kazantzias (National and Kapodistrian University of Athens) and Aristotle Tympas (National and Kapodistrian University of Athens), From mythology to history of renewable energy: An Icarian experience

- *Abstract*: In 2019, the Greek government inaugurated an emblematic wind-hydro 'hybrid' power station on the island of Ikaria. According to the Public Power Company (PPC), the owner of the company, this hybrid station aims at covering approximately about 1/3 of the island's electricity needs, thereby reducing substantially the costs of the island's conventional plant—a plant expensive to operate due to its location on a remote island. The Ikaria hybrid station, unique around Europe, consists of two small hydropower plants in succession that take advantage of the natural flow of the water, and a relatively small wind farm that includes three wind turbines, which provide the energy for pumping water to one of three reservoirs. The history of this half-century long Ikaria hybrid station is, we argue, extremely suggestive when it comes to a critical definition of 'renewable energy' and, also, of sustainable energy transitions, because of the hybrid station's potential to fully replace fossil fuels by wind, without, however, having to reproduce the need for long transmission lines/networks that both traditional thermoelectric plants and present-day big wind farms/parks rely on.

Michiel Bron (Maastricht University) and Jelena Stankovic (Maastricht University), Actor agency in MLP: the case of oil actors in nuclear and solar energy

- *Abstract*: By tackling the question on how to place actor agency within the energy transition model, this paper proposes a new interpretation of the MLP framework with more agency for incumbent market actors. The term 'transition' is frequently used to describe a shift from one technology to another, or in the case of energy from one primary energy source to the next. The Multi-Level Perspective (MLP) refers to such an energy transition as a 'regime shift', a complex process in which incumbent socio-technical regimes give space to newcomers emerging from previously protected niches. Within this framework, incumbent market actors are often only acknowledged as embedded within existing regimes, only interacting with a new technology when a technology breaks out the niche and starts interacting with the existing regime(s). This paper challenges this view by showing that individual incumbent oil actors were already involved in developing technological niches like early solar energy and nuclear research before they broke out their niches.

## **Panel 2-2: Colonizing infrastructures and its technopolitics**

Location: AUD D1 (1531-113)

Chair: Stefan Esselborn

Nkemjika Chimee Ihediwa (University of Nigeria, Nsukka), Investigating the social and environmental consequences of British colonial resource exploitation: Extrapolations from Nigeria

- Abstract: British colonial rule affected many aspects of the life of the colonized peoples of Nigeria. Not only did it dislocate the peoples politically, it affected their social, economic, cultural and environmental wellbeing. Economic factor was central in encouraging colonization. The need to have access to resources led to the development of the necessary infrastructures that enable the realization of that goal. In Nigeria, the British quest for resource exploitation led to the building of roads connecting raw materials zones in the hinterland, railways, linking resource centres across the polity, and harbours to facilitate navigation of ships for the evacuation of raw materials and produce to England. In building these infrastructures of exploitation, the British did not consider the possible social and environmental consequences they would have on the people and nature. For example mining of coal, tin and gold, in the areas they occurred, affected the social equilibrium of the societies, creating work norms that never existed before, and migration and identity challenges unknown to the local peoples. For the first time, the concept of indigene and settler emerged which would become a threat to peace. The mining activities had negative impact on the environment which the colonizer never considered, in many instances communities were displaced as a result. Colonial infrastructures had consequences on the environment. The roads and railways constructed were arbitrarily done, without considering their environmental impacts; forests were hewn down to lay rail lines and natural and ancestral habitats were destroyed in the aftermath across the polity. The paper intends to examine the social and environmental consequences of resource exploitation by the British in Nigeria during the colonial periods, looking at the impacts of mining activities on the people and the environment, as well as roads and railways on the environment and how much these affected everyday life.

Serkan Karas (University of Cyprus), Promise of Water Abundance and Normalisation of Water-intensive Development in Cyprus

- Abstract: Cyprus is the most water-insecure country amongst the members of the European Union. This is despite the fact that the water landscape, as in surface, underground and coastal, has been developed almost to its maximum, with large and costly infrastructure works of dams, conveyors and desalination plants. The research aims to provide a historical and techno-political perspective in understanding this expensively built precarious water supply regime. The water supply regime has been considered to be central in the formation of the state of the Republic of Cyprus. Throughout the postcolonial, post-division and European Union integration periods, the state actors established water infrastructure as a material practice which aimed at the configuration of the economy's motive powers, i.e. agriculture and tourism, at critical turns for the Republic. The research unfolds the ways with which state actors and transnational experts promoted economic activities, especially irrigation agriculture and mass tourism, which particularly relied exclusively on water-intensive practices. This, in turn, allowed state actors to normalise large-scale, capital-intensive water supply projects that

targeted further scaling up of the water supply in order to consolidate popular consent. Repeatedly, the state normalised its technocratic intervention by defining the consequences of geographically specific and environmentally catastrophic practices, such as illegal drillings for irrigation in Kokkinokhoria and hotel resorts in Ayia Napa, and the supply of golf courses with subsidised agricultural water in Paphos, as 'natural'. As such, the state actors framed these consequences as existential threats to the Republic itself in need of immediate state intervention. This research concludes that, in effect, this material practice creates a long-term techno-political dynamic in water regime that downplays or excludes demand-side policies and ecological concerns.

Hugo Silveira Pereira (New University of Lisbon), Visual Criticality: Photography and Colonial Critical Infrastructure (Angola and Mozambique, 1880s-1930s)

- Abstract: In the early 1880s, Portugal began the construction of railways in its colonies. The main goals were to reinforce Portuguese influence and to increase colonial revenues. In this paper, I analyse the railways built by Portugal in its colonies of Angola and Mozambique, between the 1880s and the 1930s, as critical infrastructure, following the theoretical framework provided by Engels (2018) and Högselius & al. (2013). I argue that the lack of railways in those domains fostered a sense of urgency, as it could jeopardise the Portuguese imperial project. Railways were considered critical to assert Portuguese sovereignty, to exploit local resources, and to attract traffic from neighbouring territories. Once built, the lines evinced two vulnerabilities: the competition of South-African harbours and the dependence on British capital. A few episodes involving Portuguese and British agents highlighted these vulnerabilities and motivated Portuguese policymakers to correct them. Additionally, I offer that photography was a key instrument to enhance the criticality of colonial railways (and the dangers of their absence) and to contain their vulnerabilities, both amongst Portuguese stakeholders and at an international level. I argue that, drawing from its alleged and fallacious objectivity, photography contributed to reinforce the symbolic role of imperial rail tracks and to underpin the ideology that Portugal possessed an imperial leaning such as other European colonial powers (cf. Ryan 1997). This paper balances between a literature review and the use of primary textual and visual sources to provide a novel approach to Portuguese colonial railways.

Oleksandr Polianichev (Södertörn University), Tsar under the Palms: The Making of the Subtropics in the Late Imperial South Caucasus

- Abstract: Starting from the very first decades of tsarist rule in the South Caucasus, many representatives of the imperial officialdom and intellectual elites were captivated by the idea that the seemingly endless supply of sunshine in the region made large parts of it suitable for cultivating tropical vegetation and, thus,

able to produce “colonial” commodities for domestic needs. In my paper, I am going to talk about how, by the late 1880s, decades of research and botanical experimentation resulted in reinvention of the eastern Black Sea coast, from Sochi to the Ottoman border, as the Russian empire’s own “subtropics.” According to the ideologues of the “subtropical” project, due to the region’s specific conditions, such as humidity, the amount of precipitation, the average yearly temperature, soil, and topography, it possessed nearly all characteristics of the tropics. The project envisaged the correction of the historical “injustice”: since the Ice Age eliminated nearly all species of the tropical flora that the area once possessed, the empire’s task was to re- introduce (sub)tropical vegetation to bring the region’s “authentic” appearance back—with the aim to assert the Tsarist empire’s self-sufficiency in exotic plants by transforming the South Caucasus into Russia’s own Ceylon, Darjeeling, or Java. The paper will particularly focus on the governmental subtropical expedition of 1895-6 to China, Japan, Ceylon, and India to bring seeds and saplings of hundreds of stains of tropical and subtropical plants. The project led to an astonishing success, resulting in the establishment of the Chakva “subtropical” imperial estate near Batum and many other experimental acclimatization stations that turned the Black Sea coast into an area of cultivation of mandarin oranges, bamboo, Japanese persimmon and, most importantly, tea, the vast plantations of which were implemented by Chinese laborers, settled in the region.

**Panel 2-3: ChaReTaPot – a network for forest by-products charcoal, resin, tar, potash**

Location: AUD D2 (1531-119)

Organizer: Anna Varga

Chair: Ole Sparenberg

Jiří Woitsch (Czech Academy of Sciences), ChaReTaPot – Heritage

- *Abstract:* Themes of the contribution are: The production processes of ChaReTaPot products bear both similarities and differences to each other (unfortunately still not yet identified and not described on a European level), as well as concerning the areas of their application. The production processes of ChaReTaPot are not only traceable through archaeological research and in written historical sources, but their production, at least in part, continues today. Their survival is primarily maintained by local producers, NGOs, and associations taking care of intangible cultural heritage etc. This traditional knowledge of the production has a high cultural value and should therefore be preserved for posterity. This also includes the various habits and customs associated with this craft and the stories and memories that surround it. It is also important to make the people who still practice these professions visible and to identify the cultural landscapes where these activities were carried out.

Oliver Nelle (Landesamt für Denkmalpflege Stuttgart), ChaReTaPot –  
Archaeology

- Abstract: Themes of the contribution are: The production of charcoal and tar has left innumerable traces in the soil in many European cultural landscapes, while the production of resin and potash is hard or impossible to trace archaeologically, sometimes only surviving as field names. Though many studies already exist which identify and assess the historical production sites in the field, there is a lack of studies on a European level. Thus, to know the size, extent and intensity of production both in space and time, it is essential to get an overview about the amount of production sites. This characterization necessitates archaeological prospection and targeted excavations, but also geodetic methods involving statistical methods out of the field of machine learning. Lidar Scans today provide a huge potential of assessing site occurrences and distribution patterns incl. data mining.

Anna Varga (University of Pécs, Hungary) and Katja Tikka (University of Helsinki),  
ChaReTaPot – Environmental history

- Abstract: Themes of the contribution are: In the last century, the living practice and knowledge of ChaReTaPot production nearly disappeared from Europe. Our experience shows that the importance of these raw materials is somehow known, but mainly in grey literature. These publications show the role of the environment to produce raw materials, and also how the environment was affected by these production types around Europe and worldwide. Historical evidence highlights that there was knowledge and practice exchange between countries and even continents. We would like to examine the environmental history of the ChaReTaPot from three perspectives (Environment, Society, Sustainability), roughly exploring socio-ecological systems and related changes from the Middle Ages to the end of the 20th century, with special regard to the 18th-19th centuries from local to global levels.

Johannes Tintner (University of Natural Resources and Life Sciences),  
ChaReTaPot – Future perspectives

- Abstract: Themes of the contribution are: The WG studies how the circulation of the forest products could answer the global challenges. There is a limited number of sources of renewable chemicals capable of competing with fossil ones. The metallurgical industry traditionally requires fossil coal and coke as reducing agents in the reactions required to purify the metal ores. Biochar can improve soil quality and serve as a negative carbon emission. Tar and resin have important perspectives as raw materials in the chemical industry as well. Restrictions in terms of profitability, on-site emissions, and sustainable forest management must

be taken into account. Both products – resin and tar – are traditionally used for medical, veterinary, and cosmetic applications. Quality definitions are not available comprehensively. Potash has probably the fewest applications in the modern economy. We will discuss future perspectives of using it as fertilizer or as input in the chemical industry.

**Panel 2-4: Perceptions and constructions of environments: Enviropolitics in different regions**

Location: AUD D3 (1531-215)

Chair: Martin Schmitt

Janne Mäkiranta (University of Turku), Managing Urban Air: American and Soviet Ideas of Clean Air in the 1960s

- *Abstract:* Clean air is one of the most fundamental environmental resources for society and life in general. During the twentieth century, the increasing concerns for polluted air gave rise to the discipline of air pollution research in Europe and in the United States, a new form of scientific expertise which aimed to manage urban air with the apparent objectivity of science and medicine. At the heart of this discipline was the effort to devise universal numerical standards for urban air. This would enable air to be managed in the same way as drinking water was. However, defining objective standards for clean air proved to be a difficult task. In addition to the technical difficulties, the matter was further complicated by the fact that the Soviet Union had already devised its own set of standards for urban air. In addition, these standards were by far lower than the ones suggested by American research. Thus, the question of how to objectively define clean air was actively debated during the 1960s. The purpose of this presentation is to examine the debate and the differences in the Soviet and American approaches to define clean urban air. The aim is to show how the clash of the two points of view highlighted the impossibility to define clean air without resorting to value judgements. Despite the shared ethos of science and objectivity, Soviets and Americans had markedly different ideas about urban air and its regulation. This shows the limits of scientific expertise in the management of the most fundamental environmental resources such as the air around us.

Alexandra Ciocănel (University of Bucharest and University of Manchester), The temporality of resources as a matter of concern in climate change skepticism

- *Abstract:* Achieving the net-zero goals set as a way of tackling climate change will involve a fundamental reconfiguration in the production and consumption of fundamental resources at the individual and societal levels. If opinion pools reveal a large public support for addressing climate change, the cost on taxpayers and the imperative to change long-held consumption habits is beginning to shed

doubts on what individuals can and should do, reconfiguring climate change scepticism. In this paper we examine contestations of the political measures proposed to achieve a net zero future, by drawing on social media comments in the UK and Romania during 2021, a year with a significant impact on constructing climate change as a matter of concern given the European Green Deal, Leaders' Summit on Climate, IPCC report Climate Change 2021 and COP26 conference. Methodologically, we use argumentative time-work as a tool for analysis in order to unravel the different temporal dimensions at play in such contestations. Climate change scepticism has been usually explained as being driven by ideological, group-based, religious, and self-protective and self-enhancing convictions and scholars have differentiated between epistemic scepticism, i.e., contesting the scientific evidence and consensus, and response scepticism, i.e., doubting the value of actions taken to tackle climate change. Through our focus on time and temporal agency, we move forward the analysis focused on social and cultural values and convictions by pointing to how climate change poses various challenges to people's temporal agency, i.e., their ability to be in and make time. We argue that specific temporal frames – natural sequentiality, fatalistic future, and preserving the status-quo – play an important role in rationalizing and legitimizing the current usage of resources in contrast with the changes envisaged in political net-zero goals.

Jesper Zeuthen (Aalborg University), Authoritarian Bargaining of Greening in Chinese Land and Resource Politics

- Abstract: In the paper, I argue that while vested and not officially expressed interests of profit undoubtedly play a central role in part of this development, development plans bargained by political elites in relatively public process and with transparent policy goals, often of developing a greener society, also play a very important role. Such policies appear to be playing an increased role, and since these are elite bargaining processes lead to a decrease in public participation in development directions, because informal urbanization becomes almost impossible. This does, however, not imply that formal rights of citizens in these processes are decreasing, on the contrary compensation while still only corresponding to a small fraction of what governments earn on changing the status of land are increasing.

**Panel 2-5: Grounding Histories of Europe and Beyond: Soil-forming processes from the 20th century**

Location: AUD D4 (1531-219)

Organizer: Nina Toudal Jessen

Chair: Hanna Vikström

Roberta Biasillo (Utrecht University), Colonial and authoritarian soil in North Africa: the case of fascist Italian Libya (1922-1943)

- Abstract: This presentation analyses the role of soil in the making of fascist authoritarian and colonial regime in North Africa between 1922 and 1943. Discourses on soil fertility and agrarian production, fascist conceptualization of soil, soil-forming processes based on science and technology changed physical and chemical properties of the original matter were embedded within specific ideologies of oppression and modernization. Indeed, in national and colonial settings, fascist reclamation projects bled the rejuvenation of land into the regeneration of communities. Such attempts at landscape transformation through agricultural activities and strategies of fertilization represented unescapable features of the authoritarian and colonial regime in Libya under fascist rule. Based on primary sources and scholarship in environmental history and STS, this presentation adopts a comparative approach to introduce the Italo-Libyan case and critically reviews the fascist understanding of soil, its propagandistic achievements and its limits. Moreover, it explores social and political dimensions of soil and soil policies, besides economic and scientific aspects.

Noémi Ujházy (Research Centre for Astronomy and Earth Sciences, Budapest), Soil science, amelioration and land ownership in interwar Hungary

- Abstract: This paper explores how soil science in interwar Hungary was contributing to rearranging the nation's landscapes and international science simultaneously. Enhancing cultivated areas through soil improvement became a cultural imperative for the interwar Hungarian state, diminished in its territory after World War I. In the interwar period, the state became an increasingly influential actor in the production of soil improvement technologies. Besides sponsoring of national research institutions and experimental stations, the Hungarian state promoted the application of amelioration technologies for municipalities and private landowners. Soil scientists operated in a web of interests of different landowning actors and made their understanding of the complex interactions between living organisms, and non-living matters of the soil an instrument in the state- building. In the meantime, however, they were participating in the internationalization of soil science and the creation of a scientific community beyond borders.

Nina Toudal Jessen (University of Copenhagen), Soil improvement schemes as material reconfiguration

- Abstract: The majority of Danish agricultural soils have been modified through state supported drainage in the 20th century. In particular, the Danish soil improvement law „Lov om Grundforbedring” from 1940 supported drainage, land reclaims and marling. The background for the law was fear of unemployment and

social uproar in the wake of WWII. The story of the keynesian economic approach in Danish social history is well known. However, the materiality of the soil improvement schemes remain understudied. Therefore, this paper follows the material consequences of the law. By focusing on a specific case of soil improvement, the paper analyses the effect the scheme had on landscapes and sites, thereby connecting material and discursive changes to the land. These insights shed light on the effects past land use and soil improvement may have on current and future decisions in i.e. rewetting or rewilding agricultural land.

15:30-16:00 Coffee break

16:00-17:30 **PANEL SESSIONS 3**

**Panel 3-1: Historical Perspectives on Energy Resources, Session 3 (triple panel).  
Industry and Institutions Managing Scarcity and Transition**

Location: AUD E (1533-125)

Organizers: Ute Hasenöhr, Odinn Melsted and Jan-Henrik Meyer

Chair: Ute Hasenöhr

Odinn Melsted (Maastricht University), Running out? The Construction of Oil Scarcity in the 1970s

- *Abstract:* Following the oil shocks of the 1970s, the notion of an impending oil scarcity shaped energy and resource debates, as general considerations about the availability of resources converged with the lived experiences of oil price surges and (temporary) shortages. Already at the time, experts argued that the oil issue was not about geological limits but political relations and supply security. Why then, was oil perceived as a scarce resource? This paper examines the construction of oil scarcity with a special focus on oil companies on both sides of the Atlantic. The fact that oil companies made spectacular profits has given rise to conspiracy theories about them “orchestrating scarcity” to ramp up the price. While oil companies were not almighty nor acting in unison, they did shape perceptions and anticipations of contemporary and future scarcity/abundance by providing the production and reserve data and communicating forecasts and scenarios as part of their business strategies.

Jan-Henrik Meyer (Max Planck Institute), Constructing energy futures after the oil crisis. How the European Communities tried to advance and regulate energy transitions

- *Abstract:* When the oil crisis hit Western Europe, the European Communities responded quickly. For many European policy makers this seemed the moment to finally realize the long-held vision of a common energy policy, a promise implied

in both the Coal and Steel and the Atomic Energy Communities (Euratom) Treaties. Already these two Communities had been set up in the 1950s to address energy scarcity of the early postwar years. Hence, the goal to combat “energy dependence” – and the reliance on nuclear – were part of the European Communities’ DNA. Against this backdrop, this paper examines the post-oil-crisis visions of energy futures promoted by the European Parliament and the European Commission. In the face of growing environmentalist critique of an all-out nuclear future, the supranational institutions attempted to better regulate nuclear energy – in particular at national borders – through ambitious law making and institution building. In addition, over time, they started to include renewables – at least as objects of energy research. The goal of the paper is to demonstrate how contingent responses to scarcity were – depending importantly on (competing) visions of energy (and societal) futures as well as institutional and legal contexts, and how they underwent change in the course of the 1970s.

Cyrus Mody (Maastricht University), Complementary Scarcities, Complementary Transitions: Oil, Food, and International Development in the Long 1970s

- Abstract: In this paper I trace the complementary scarcity of oil and food in the long 1970s. Long before then, oil firms promoted agricultural uses for their product while oil philanthropies stimulated an energy-intensive agricultural “revolution.” Those efforts were inspired by worries about overpopulation that gained currency after 1968 with publication of The Population Bomb and the founding of Zero Population Growth and the Club of Rome – events associated with influential oil executives. “Oilmen” stoked a global debate about resource scarcity through those organizations and the Aspen Institute, UN Environmental Program, and other think tanks, NGOs, and IOs. In tandem, oil firms addressed energy scarcity through development of various technologies (nuclear, solar, geothermal, biofuels, etc.). But the larger debates about scarcity and overpopulation also led oil firms to buy seed and animal feed companies, invest in agricultural biotech start-ups, and commercialize “petroprotein” in collaboration with governments and international organizations.

**Panel 3-2: Data in Jeopardy**

Location: AUD D1 (1531-113)

Organizers: Frank Veraart, Irene Niet, and Valérie Schafer

Chair: Irene Niet

Alain Sandoz (Universities of Neuchâtel) and Léa Stiefel (University of Lausanne), Data at risk. A twofold reflection, in agriculture and in research, on the risks related to data

- *Abstract:* We address the issue of data at risk in two areas of both practice and investigation: agriculture and research. We start from an attempt to platformize farmers' data launched in 2015 in Swiss agriculture. The risks for farmers, of being made accountable for both the results provided by the platform (following the provision of their own data) and the consequences of their usage, are presented. Findings are discussed in light of the literatures of platform studies and critical studies on digital agriculture. Next, we report on the experience of the first author (LS), who's results were questioned as to their scientific validity. The critique, formulated by a prominent actor of the sector, claimed that data co-constructed with a former actor from the field - in this case the second author (AS) – must be biased. This experience provides an opportunity to reflect on charges related to objectivity that researchers may encounter, to identify their epistemological foundations and to explore how they can be countered when data are at stakes. The reflection will draw on a body of work from anthropology, history and STS that has critically examined the principle of “epistemological rupture” as a privileged path to objectivity.

Vasilis Argyriou and Aristotle Tympas (National and Kapodistrian University of Athens), *Borders, Big Data, No Data: On Datafication Odysseys*

- *Abstract:* A wealth of studies from historians of recent technology and STS scholars, including researchers from the ToE and the STS MIG TEC research networks, have pointed to the co- shaping of electronic technologies for big data and borders that extend beyond a geographical line/limit. Combining a critical synthesis of these studies and our own primary research, we argue that facilitating the accumulation of big data regarding borders and migration has not been a uniform process. In recent years, borders have not been only redefined by some legal and smooth high tech travelling of electronic big data about migrants; they have also been redefined by the pursuit of a no data policy regarding the illegal end dramatic migrant push- back of the low (or even no) tech migrant boats. For an additional 'no data' case, we will refer to migrant border-crossing on land through the use of crypts in all kinds of vehicles. To elaborate on the shaping of borders through the simultaneous advance of big data and no data practices, we will finally introduce to the limited (or even no) data regarding migrants who have lost their lives while trying to cross-borders.

**Panel 3-3: Deep-sea mining: Resources, Technology, and the Environment at the Last Frontier on Earth**

Location: AUD D2 (1531-119)

Organizer: Ole Sparenberg

Chair: Peder Roberts

Mats Ingulstad (Norwegian University of Science and Technology), A European Job? European integration and Deep Sea Minerals

- *Abstract:* The European Union and Deep Sea Mining (DSM) are both projects perpetually in-the-making, imbued by teleological narratives of emergence and future growth through crisis. Already in the early 1970s the European Commission insisted on participating in the negotiations on the Law of the Sea, expecting to represent the main market for the minerals harvested from the deep ocean floor. In Brussels, the nodules represented a chance to reduce its import dependency on minerals, challenge US economic preponderance, and to strengthen its relationships with the Global South, thereby claiming a central position in a new, Blue International Economic Order. As the Green Shift drives future demand for raw materials, the European Union, for now, maintains a position of studied ambiguity. This paper investigates the entwined histories of the EU and DSM, elucidating how and why the European institutions have turned to the ocean floor, and how DSM has been seen as a possibility, a responsibility and a liability.

Susanna Lidström (KTH Royal Institute of Technology, Stockholm) and Tirza Meyer (KTH Royal Institute of Technology, Stockholm), Deep Sea Mining – The Green Turn and the Blue Economy

- *Abstract:* Resource extraction on land has a long and destructive history, while efforts to mine the deep ocean floor have been tested and developed since the 1960's. The ocean has long been seen as a last frontier. Once again, societies in the global north are looking to the ocean to solve climate change. This paper explores dreams of the 'green turn' made possible through 'blue economy' in a global perspective. Subsea minerals are central in this imaginary of a greener world economy. Efforts to expand the range of available and governable resources are made with the BBNJ discussion at the UN which seeks to expand available intergovernmental frameworks for marine resource exploitation. This paper seeks to explore the challenges and pitfalls that come with imaginaries of a blue economy driven and directed by a governmental framework that stems from a vision of a New Economic World Order that originated in the 1960s.

Ole Sparenberg (Karlsruhe Institute of Technology), Metals we can all feel good about"? Resources, Technology, and Environment in the Deep Sea

- *Abstract:* The potential environmental change caused by deep-sea mining was already addressed in the early 1970s with impact studies accompanying the first mining test. It was, however, not seen as a decisive issue, although it was long known that the deep sea is not a lifeless place. Only in the 1980/90s, when commercial interest in deep-sea resources had hit rock bottom, research focussed on the environmental impact of deep-sea mining. In the 21st century, ecology has moved to the centre of the debate over deep-sea mining. While opponents call

for a stop of all projects due to the expected impact on the ecosystem, companies engaged in this field claim that deep-sea mining is coming at lower environmental and social costs than conventional mining. Furthermore, proponents stress the contribution of the metals from the seabed would for green technologies and, therefore, the energy transition. This presentation will examine the place of ecological arguments in deep-sea mining projects from the 1960s to the present.

**Panel 3-4: Fears, phobias, and their implications for STS**

Location: AUD D3 (1531-215)

Organizers: Irina Fedorova (Friedrich–Alexander University Erlangen–Nürnberg), and Ekaterina Rybkina (Friedrich-Alexander University)

*Special format: roundtable/brainstorming session*

- *Description:* As many of us focus on the historical role of technology and science, we often come to explore the history of something invisible and odd, since scientific knowledge is mysterious in itself and is often surrounded by assumptions, misinterpretations and fears connected to real and imaginary threats. The 20th century witnessed many such cases, and we keep witnessing them now during the pandemic and climate crisis. The ambition of this panel is to invite colleagues from different fields of expertise to building a new research agenda, which is a discussion of new approaches to studying various scientific practices related to the production of knowledge through debates about phobias and fears of the “ordinary people” on the local and global levels—that is, the reactions of disapproval, hatred, and discrimination against any unusual activity, including new technologies and scientific innovations. We are eager to bring up a new perspective and look at the practices of creating, governing, regulating, promoting, and disseminating the new knowledge and technology through the prism of fear. One of our hypotheses is that fears and phobias could be and often are a starting point of an intellectual activity. What is, in fact, the driving force behind the scientific discovery and research itself? We suggest putting the category of fear in the centre of our research and making it a lens of our analysis, because it was simultaneously the stop signal and the momentum for many scientific discoveries. This perspective allows social scientists to provoke various questions related to trust, expertise, and governance of science and explore them at different scales and in various geographical settings. Who is responsible for making the general public trust scientific knowledge? How can the knowledge be made less frightening and more tangible? And what might be the role of social scientists?

17.45-19:00 **PLENARY SESSION 2 Celebration of the Tensions of Europe Anniversary**

Location: Location: AUD E (1533-125)

**Keynote by Glenda Sluga (European University Institute, Florence) and Jens Boel (former director of UNESCO Archives)**

**Tensions of Europe plenary communications and discussion: Looking backward**  
Welcome reception in the canteen

## **Thursday, 30 June 2022**

9:00-10:30 **PANEL SESSIONS 4**

**Panel 4-1: Global Histories of Technology & the Environment: Current insights and future directions, Session 1 (triple panel)**

Location: AUD E (1533-125)

Organizers: Jonas van der Straeten, Evelien de Hoop and Erik van der Vleuten

Chair: Erik van der Vleuten

Animesh Chatterjee (TU Darmstadt), Matthias Heymann (Aarhus University), Evelien de Hoop (VU Amsterdam), Prakash Kumar (Penn State), Jethron Akala and Erik van der Vleuten (TU Eindhoven)

- *Description:* This research panel brings together scholars from diverse research projects/ teams/ networks aiming to write and promote more inclusive, plural, and transdisciplinary global histories of technology and the environment. The panelists will share their insights and experiences, e.g. regarding what kind of global histories they envisioned and how they addressed research challenges involved (how bring in diverse perspectives e.g. in terms of sources, research methods, collaboration amongst historians with diverse backgrounds and expertises, etc.?). They will also discuss questions, imperatives and directions for future research. We have invited panelists of different academic age.

**Panel 4-2: Toxic Waste: Historical Approaches to Evasive and Mobile Matters**

Location: AUD D1 (1531-113)

Organizer: Bettina Wahrig

Chair: Franziska Neumann

Bettina Wahrig (Technische Universität Braunschweig), The uncertainty of a presence: Arsenicals as a disturbing presence in mid-nineteenth century agriculture and consumer culture

- *Abstract:* Arsenic is a transition metal that can occur in five different valences. Its use has been documented since ancient Greece, in a variety of different applications, e.g. in mining, medicine and as paint. In the early stages of European industrialization in the 19th century, its compounds appeared in the most unlikely contexts, e.g., in the novel stearin candles, but also in seeds, from where they ended up in the heads of dead pheasants in the retorts of toxicologists and even in the daily press. Synthetic textile colourings also contained arsenic, since it was used as a reagent in the synthesis of some of them. No matter whether the applications in manufacture and agriculture were planned or not, arsenical compounds often ended up as a residual substance in various condiments, in sweets and in bread, and it was unintentionally set free from papers and textiles. My thesis is that arsenic compounds played a symbolic role in the understanding of an unintentional and sometimes extensive mass contamination. This contribution explores the question whether shortly after the successes of separation and isolation of the substance by chemical means strategies of containing these contaminations were developed and which conflicting values played a role here. My material are Journal papers in English, French and German in the field of toxicology in the broader sense from the second half of the 19th century until the first third of the 20th century.

Simone M. Müller (Ludwig-Maximilians-Universität München), Mutability and Mobility. Placing Waste Around the Globe

- *Abstract:* Throughout the twentieth century, waste - in particular hazardous waste - represented one of the most contentious and contested regulatory categories globally. Based on a patchwork assemblage of vastly differing national understandings of discarded material, the very same object could take on multiple meanings in different national contexts. A substance or threshold that would qualify something as hazardous waste could in a different context lead to its assessment as harmless building material. International governing bodies, such as UNEP, OECD, EEC, or NATO even, failed to provide a framework based on something other than a philosophical understanding of hazardous waste in particular as discards that “may be harmful to humans or the environment”. It is this mutability of (hazardous) waste as a global category that gave rise to the material’s global mutability in the form of waste trade deals all around the world. This paper looks at the nexus of mutability and mobility of (hazardous) waste and the different regulatory attempts and failures to confront a global problem from the 1970s onwards.

May-Brith Ohman Nielsen (Agder University, Norway), Out of place? Spraying toxic waste in Norwegian woods 1957-2002

- Abstract: When does a toxic herbicide become waste? When is it a matter out of place? Pesticides have been among the most harmful substances on the planet, and pesticides made up a majority of the substances banned by the Stockholm convention in 2002, and its later amendments. Except for remaining containers of unused pesticides, empty containers and old spraying equipment, hazardous as it is, there is no controllable and collectable waste from the widespread practices of pesticide sprayings. The material itself is sprayed on living organisms and live soil, in agriculture, gardens, forests and more. Beyond the immediate intentional function, to kill insects, fungi or plants, these chemicals are waste. Harmful waste. They are definitely out of place, but mindsets within the industries and among the users and pesticide authorities have conceptualized this practices in different ways in conflict with growing public perceptions and citizens' protests. What is a place, and to whom? And what is "out" with regards to pesticides? The paper will discuss this based on a time-scape study of helicopter spraying of pesticides in Norwegian woods.

#### **Panel 4-3: Opening the Nuclear Technological Black Box**

Location: AUD D2 (1531-119)

Organizer: Siegfried Evens

Chair: Per Högselius

Achim Klüppelberg (KTH Royal Institute of Technology, Stockholm), The Wrong Water for a Right Purpose? A Tale of the Estonian Nuclear Power Plant Never Built at Lake Võrtsjärv

- Abstract: For reasons yet unknown, Soviet nuclear planners wanted to build an NPP in Estonia, encompassing Leningrad, the Baltic Republics, Kaliningrad, Belarus and parts of Western Russia. On a planner's map, Võrtsjärv looked like a promising location to host such a plant. Nevertheless, it became soon clear that Võrtsjärv had too little of the right water available. However, while Võrtsjärv had the wrong water for the NPP, it had the right for another important and in this case competing use of this liquid resource: the establishment of a high-value eel fishery. The act of blocking an NPP construction was part and parcel of a major shift in Soviet Estonia's fisheries management – one that redefined water and fish as a resource to be protected and valued rather than exploited. Ultimately, no NPP was built at Võrtsjärv.

Stefan Esselborn (Technical University of Munich), Prying Open the Nuclear Black Box in Court: Technoscientific Knowledge in West German Administrative Court Trials (1970s/80s)

- Abstract: In the wake of the high-profile trial on the Wyhl reactor project, technical terms like the “loss of coolant accident”, “diversified emergency shutdown systems”, or the “reactor vessel burst protection” (the pivotal point of the final verdict) suddenly filled the columns of local and national newspapers. Judges and lawyers tried their best to pry open the technoscientific black box of nuclear energy reactors. In the course of the 1977 Wyhl trial alone, half a hundred experts witnesses from various professional and disciplinary backgrounds testified before the court, detailing not only the workings of reactor technology, but also their calculations and estimations of the possible risks associated with it. In the context of the German discussion on nuclear power, the string of administrative court trials starting in mid-1970s posed a challenge for all parties concerned. Underlying it all, I will argue in this contribution, was an even bigger question: How could a democratic society control a highly complex technology such as a nuclear reactor, and who should be considered competent to do it?

Tatiana Kasperski (Sciences Po Paris), Radioactive Disaster Management as a Nuclear Technology: The Case of post-Chernobyl Belarus

- Abstract: From uranium mines to nuclear weapons production and test sites to territories affected by the fallout of nuclear accidents, the list of places durably contaminated by radioactivity is constantly growing. Over time national governments, nuclear industry and international nuclear organizations started to develop tools and approaches in order to manage and normalize the consequences of this contamination and diffuse political mobilization of those affected by it. This paper will look at the internationalized management of the long-term consequences of radioactive contamination as a technology that makes nuclear possible by focusing on the example of two participatory international projects in Belarus meant to address the needs of several communities affected by the fallout from the 1986 Chernobyl nuclear accident.

Siegfried Evens (KTH Royal Institute of Technology, Stockholm), “A Complicated Way of Boiling Water”: Nuclear Safety Governance and Its (Thermal)-Hydraulic Roots

- Abstract: The history of nuclear power contains a striking paradox: despite the huge importance of water in nuclear power plants, the technologies that manage all that water (and steam) have not enjoyed much attention from historians. This paper will discuss how the governance of these water and steam technologies between the 1950s and 1980s was characterised by a confrontation between older ‘non-nuclear’ and new ‘nuclear’ regulatory frameworks and networks. Over a period of 30 years, risks such as steam explosions, floods, pipe- or vessel breaks, and corrosion became ‘nuclearised’ – to draw on Gabrielle Hecht’s terminology. A case in point is the pressure vessel, a steam technology that spurred safety

debates once it was used for the (radioactive) primary circuit in nuclear power plants. Moving away from an innovation-centric focus on nuclear fission towards a “shock of the old” (as articulated by David Edgerton) for the study of nuclear safety, thus opening the thermohydraulic black box of nuclear power, does not only reveal striking new insights about nuclear history. It is also essential to understand nuclear safety and the challenges for nuclear power production in the future.

#### **Panel 4-4: Energy, materials and environmental impacts**

Location: AUD D3 (1531-215)

Chair: Aristotle Tympas

Yves Bouvier (Rouen Normandie University), Oil and neutrons: competition for energy resources, climate change and corporate strategies in postwar France.

- Abstract: Over the last ten years, numerous publications have highlighted oil companies as political actors (T. Mitchell Petrocratia, A. Malm Fossil Capital) or as 'merchants of doubt' (N. Oreskes, E. Conway, Merchants of Doubt) in the consideration of climate change. In parallel, nuclear programmes, generally associated with governmental policies, have also given to a rising number of historical studies (HoNEST research programme, G. Hecht Being Nuclear). However, this separate analysis of energy sources has shown its limits by juxtaposing conclusions based on fragmented archives (the best example being the recent article by Bonneuil, Choquet, Franta on the « responses » of Total to global warning). Above all, the apprehension of the environment is always considered as external to the actors (as a social and political constraint) and not as integrated into the processes of knowledge constitution (R. Graf, Petro-Knowledge) or corporate strategies. The paper will present, from the French case, the place of climate change in the perceptions, discourses and actions of energy companies (private or public), since the beginning of the 1960s through a comparative approach. The production of environmental knowledge by energy companies has been neglected in historiography. Similarly, the use of an environmental discourse to define competition between companies is much earlier than the great European wave of anti-nuclear protest would suggest. More generally, the paper will try to identify the foundations of the relationship between energy resources and environmental impacts (scientific studies, industrial mitigations, and roots of greenwashing narratives), outside the Cold War framework, but within Western industrial economies schemes.

Louise Skyggebjerg (Copenhagen Business School), The empty house and the black transition

- Abstract: There is lots of literature on urbanisation, housing, and the industrialisation of building from an architectural point of view. However, not much is written about the materials used for housing with a weight on what changes have meant for the environmental impact of city life. Among other things, changes in housing have contributed to a global shortage of sand, to emission of greenhouse gases, and more generally to a black transition of city life. In this paper, I zoom in on three interrelated processes changing common housing in Danish cities: From the use of few mainly local materials to global flows of multiple resources. From relatively small and simple constructions providing shelter to larger heterogeneous multifunctional 'machines' providing comfort and convenience. From more sustainable solutions to the still earlier coming of the Earth Overshoot Day. The outset is the IPAT equation, which is a rough measure of the impact of human activity on the environment. In the equation, impact is seen as the product of population, affluence, and technology. However, I present no calculations but zoom in on the interrelated changes in technology/materials and affluence with an outset in 'thick descriptions' of two typical accommodations from different time periods. These descriptions become the outset for a broader history of new entanglements of humans, materials, habits, technologies, values etc. Generally, the paper strives to combine insights from history of technology, architectural history, environmental history, and new materialism with a more technical and scientific approach to the measuring of environmental impact. It is part of a larger project about the black transition of city life with a focus on changes in everyday life and the emission of greenhouse gases. The project focuses on the period from 1850 until today and includes quantitative calculations presented elsewhere.

Thomas Zeller (University of Maryland), The View from the Road as a Controversial Commodity: Scenic Roads in Germany and the United States

- Abstract: Interactions between technology, the environment, and resources include perceptions and commodifications of the environment. My paper will address how viewing landscapes while driving has been a contested issue during the 20th century. Using an envirotechnical analytical frame, I will examine the German Alpine Road (Deutsche Alpenstraße) in Germany and the Blue Ridge Parkway in the USA. This paper will examine the history of the driving experience and the history of landscaped roads in Germany and the United States. My research is guided by these questions: Why did landscaped roads become one of the first major environmental changes wrought by the adoption of automobiles? How did similar technologies acquire different meanings in the United States and Germany, two major automotive and road-centric countries? How did knowledge about these roads circulate? How did consumers contribute to the construction and appropriation of such roads? What do these developments tell us about changing views of technology and the environment? The view from the road has become one of the major ways in which Europeans and Americans experience

their environments. Rather than accidental, however, these prospects are the results of historical forces. Humans shaped them as they sought to be transformed by them. Automotive vistas speak to visions of society and nations, the role of consumerism, and ideas about reshaping the environment in the twentieth century. Driving, a quotidian, if sometimes dangerous, activity by the late 20th century, emerged from its status as an anti-railroad, escapist moment in the early 20th century to a supposedly restorative, yet regimented, act by the 1920s and 1930s. Immersing oneself in the landscape while driving reflected the desire to reconnect technology with nature. Or so the designers of the German Alpine Road and the Blue Ridge Parkway claimed. Increasing numbers of consumers, however, preferred predictable over prescriptive roads.

Michal Ďurčo (Slovak academy of Sciences), The limits to growth? Automobiles and nature in the High Tatras during the 20th Century

- *Abstract*: In my paper I will focus on natural resources located in the High Tatras in Slovakia and their interaction with technology - motor vehicles. However, in the case of the Tatras, these are not traditional resources such as coal or oil, which must be extracted first from the country in order to be used. On the contrary, in this case, these are resources that must be protected on the spot. In the case of the High Tatras, the local deep forests, clean water, sun and spotless air have been highlighted since the 19th Century. Therefore, the High Tatras were marked as climatic spas and gradually began to develop tourism. An important prerequisite for the development of tourism in the Tatras was the planning and construction of transport infrastructure. In 1900, the first motor vehicle appeared in the High Tatras. In the interwar period, modern automobile roads with a dust-free surface were built here. At the turn of the 1950s and 1960s, the period of mass motorization of the population began. New resorts, roads, and especially caravan parks were built in the Tatras. In 1974, the Eurocamp FIIC was completed in Tatranská Lomnica with a capacity of more than 7,000 motor vehicles. However, motor vehicles started to destroy the unique natural environment of the High Tatras, thanks to which this mountain became climatic spas. It was common for visitors to wash their cars in streams, and air quality also declined. Therefore, at the end of the 1980s, the entry of motor vehicles into the High Tatras was limited in the summer season. The main research question is how exactly the advent of motoring affected the natural environment of the Tatras in the 20th Century.

**Panel 4-5: Resource use and its social impacts**

Location: AUD D4 (1531-219)

Chair: Timo Leimbach

Henrik Knudsen (The Danish National Archive), Resources and restrictions: Ivittuut, Arsuk and its long lockdown 1882-1931

- Abstract: Cryolite was mined at Ivittuut in Southwestern Greenland from 1854 to 1962. So far, the history of Greenland's so-called "white gold", has been framed as stories of prosperous business, pioneering arctic adventure, glorious geology, and chemical innovation, portraying the cryolite business as an essentially benign example of Arctic resource extraction. Few historians have asked what mining activities and heavy ship traffic meant for the 100-150 Greenlandic Inuit who lived in the Arsuk Fjord, perhaps based on the common notion that few or no Greenlanders ever took part in cryolite mining, or because of Ivittuut's official status as non-Greenlandic soil, isolated from the rest of Greenland. On close inspection however, Ivittuut's isolation from the rest of Greenland was not a fixed rule from the beginning, but rather the outcome of a dramatic history of intimate contact between Danish miners and the local Inuit population. What emerges from the sources is a history of shattered families and hunting communities, dispersed people, violence, alcohol and sexual abuse, a multitude of fatherless children, rampant spread of STD's and other epidemic diseases in what was essentially Greenland's first experience with rapid modernization. In an effort to combat the spread of STD's along the Greenlandic west coast, the nearby Arsuk village became a closed and isolated community for almost 50 years (1882 to 1931). In short, the inhabitants of Arsuk came to pay a heavy price for being located so close to Greenland's first profitable mine.

Sabine Loewe-Hannatzsch (TU Bergakademie Freiberg/Freiberg University of Mining and Technology), Uranium Mining in the GDR – Environmental Pollution and Technological Development, 1946-1991

- Abstract: Between 1946 and 1991 the joint Soviet-East German stock company Wismut produced 217:000 tons of uranium for Moscow and its nuclear weapons program. The uranium exploitation, mining and processing in East Germany did not consider special safety measures necessary to prevent radiological hazard to the population and environment. Instead, it led to severe air, soil, and water pollution in a very densely populated area. The unrestrained desire and need to explore, mine and process uranium led to a technological development that reshaped entire landscapes, cities, and infrastructure in the southern territories of the GDR. Further, it led to new mining and processing procedures that had an enormous impact on the environment. The milling and mining process left behind an enormous amount of toxic residues in form of waste rock heaps, tailings, settling ponds, polluted water, as well as contaminated equipment and buildings. For example, tailings were leaking into soil and groundwater because of a deficient sealing underneath the storage facilities. Furthermore, wind erosion blew radioactive dust away from uncovered waste rock heaps. The pollution had two components – heavy metals and radioactivity. Both have a persistence of toxicity that numerous future generations will have to deal with the waste and its consequences. However, the termination of mining and milling sites led to the

development of new forms of recultivation, remediation, depositing and redevelopment measures and procedures. The global geo-political context of the East-West conflict shaped the amount of mining and processing and therefore the environmental pollution. Uranium as a global resource was mined and processed in the GDR, transported to the Soviet Union where it was used to build up the nuclear stockpile. The uranium returned when the Soviet Union deployed SS 20 missiles on East German territory or as nuclear fuel rods. This research project shows the interactions between technological development, resource exploitation and use, and the environment change.

Clémence Gadenne-Rosfelder (Ecole des Hautes Etudes en Sciences Sociales),  
Technologising Agriculture: the Industrialisation of Pig Farms and the Disruption of Biogeochemical Cycles (Brittany, France, 1955-1995)

- *Abstract:* Since the mid-20th century, pig farming in Brittany had gone through major changes in the way that it is thought about and done. Before 1955, farmers in Brittany usually owned several animals (cows, horses, chickens, and pigs), which they fed only with the produce of their own land. Encouraged by the French state however, Breton farmers began to specialise in a single type of animal production: pigs. I would like to focus on three points in this paper. Firstly, the newly created Common Agricultural Policy (CAP) encouraged a Europe-wide movement of agricultural modernisation. On the one hand, this facilitated knowledge circulation and cooperation between zootechnicians across the European Economic Community (EEC), while on the other, it led to greater competition between pig farmers themselves. Secondly, agricultural specialisation induced a change in the way pigs were seen: from being an animal, pigs became a machine, a resource, and a scientific object needing constant improvement. In the wake of S.R. Schrepfer & P. Scranton's *Industrializing Organisms*, I would like to show how pigs (the garden) were technologised (put in the machine), thus becoming a technoscientific organism, as T. Saraiva puts it in *Fascist Pigs*. Every pig farm had to become a factory, producing scientifically improved meat. Thirdly, these new pig factories disrupted the cycle uniting farmer, pig, and environment, creating a new ecological relationship between the three. Pigs required a feed production that the land could not keep up with, and created quantities of nitrogen-rich manure that the land could not cope with. This led historians to qualify these farms as « hors-sol », or detached from the land. This regional agricultural specialisation has had an important rôle in the eutrophication of Brittany's estuaries, disrupting the nitrogen cycle.

10:30-11:00 Coffee break

11:00-12:30 **PANEL SESSIONS 5**

**Panel 5-1: Global Histories of Technology & the Environment: Current insights and future directions, Session 2 (triple panel). Teaching panel: How teach global history of technology—globally?**

Location: AUD E (1533-125)

Organizers: Jonas van der Straeten, Evelien de Hoop and Erik van der Vleuten

Chair: N.N.

Jethron Akallah (Maseno University), Stefan Esselborn (Technical University Munich), Felix Mauch (Technical University Munich), Jonas van der Straeten (Technical University of Darmstadt)

- *Description:* The field of history of technology and the environment needs to become more truly international, not just socially but intellectually. For this purpose, we need more scholars who produce multivocal and multifocal historical analyses of technology in the non-Western world that can feed into theory-making. At present, however, the discipline remains to be poorly staffed to achieve this goal, despite first signs of change. The number of scholars from Africa, Latin America or South Asia contributing to its major conferences and journals is limited. Its university curricula are overwhelmingly Western-centric. In most non-Western universities, history of technology does not exist as a discipline of its own. Its impact within academia is therefore negligible and that on the public debate or on engineering cultures almost inexistent. This roundtable discussion is dedicated to the question how to educate a generation of scholars, both in the Global North and South, who can advance the agenda of making the study of technology and the environment more global. How can we include non-western perspectives on technology in the curricula of Western universities? How can we increase the outreach of the historical study of technology within the academia of the non-Western world? To start the discussion, several contributors will briefly present their major insights from teaching pertinent courses. After a more general discussion, the roundtable will also address some of the practical questions: who is the potential audience and target group, what are the learning goals, suitable teaching formats and methods, texts and case studies, materials and media? And finally, how can we utilize the possibilities of virtual and hybrid formats that have shown their potential during Corona to craft truly global teaching formats? The roundtable is also part of a wider initiative to establish a network of scholars dedicated to the above mentioned questions.

**Panel 5-2: Trash Talk – Waste Regimes and their narratives from the 18th to the 21th century**

Location: AUD D1 (1531-113)

Organizers: Franziska Neumann and Christian Kehrt

Chair: Bettina Wahrig

Franziska Neumann (Technical University of Braunschweig), *Filthy Matter? Narrating Excrement in Eighteenth-Century London*

- Abstract: At a conservative estimate, the average adult in the early modern period produced at least 50 grams of faeces per day; London, with a population of 750,000 by the mid eighteenth century, had to dispose of around 37.5 tons every day. Given the sheer quantity, it is unsurprising that eighteenth-century London was often imagined as a gigantic sewer. In terms of methodology, this provides us with an interesting starting point. There is an unclear relationship between the popular contemporary topos of the dirty city and the everyday task of dealing with excrement as urban waste. On the one hand, defecation is a fact of life. Humans produce excrement with specific physical and chemical qualities, the disposal of which is an age-old problem of waste and sewage management. On the other, excrement is symbolically charged and associated with taboos and ideas of impurity. Using excrements as an example, the paper wants to explore the relationship between narratives and waste matter.

Eckart Voigts (Technical University of Braunschweig), *Dust, Sewers, Filth: The Neo-Victorian Appropriation of 19th-Century Waste Regimes*

- Abstract: Since the early 2000s “Neo-Victorianism” has emerged as a sub-field in the dissemination of historical knowledge of the long 19th century, investigating how creative narratives that engage with Victorian literature and culture shape the way in which contemporary culture appropriates the 19th century (Heilmann/Llewellyn 2010). This contribution presents research in an important area within neo-Victorian material culture that directly links Victorian interactions between technology, the environment and resources. It focuses on the way in which neo-Victorian writing engages with 19th-century discourses on dirt, discarded, ‘abject’ material (Kristeva) or “displaced” matter (Douglas), in this way re-writing 19th century Stoffgeschichten. It will show how the Victorian waste regimes (Gille 2012) feed into Neo-Victorian narratives that re-view Victorian practices of disposal, hygiene, cleaning and recycling in texts such as Matthew Kneale’s *Sweet Thames* (1992) or Clare Clarke’s *The Great Stink* (2005).

Christian Kehrt and Christian Götter (Technical University of Braunschweig), *From a Problem Solved to a Menace to Society – The Changing Semantics of Nuclear Waste in the Long 1970s*

- Abstract: This paper focuses on the historical semantics of nuclear waste in Germany’s long 1970s. During this period, the public perception of nuclear power underwent drastic changes, with changing meanings and perceptions of nuclear waste playing a central role in this transformation. In this paper we trace these changes as they took place among the people of the region at whose feet a supposedly experimental final disposal in the disused salt mine ‘Asse’ took place

and to the communities of which the experts operating it belonged. Based upon published sources from local and national newspapers, scientific publications and documents from the protest movement, we argue that the change in the perception of, talk about and treatment of nuclear waste was first pushed on in this region. Thereby, the public debates about the Asse deposit came to be a pioneer in a discourse that shaped Germany's nuclear policy overall and is set to continue for the foreseeable future.

Rüdiger Heinze (Technical University of Braunschweig), Waste not, want not – Speculative Fiction Between Sustainability & Oppression

- *Abstract*: A significant number of speculative fiction about the future are post-apocalyptic and/or dystopian. Interestingly, and contrary to the majority of older canonical texts, many of these fictional worlds feature technically advanced, "post-scarcity" societies in which problems and issues of limited resources, reuse and waste have been resolved. In this regard, these societies might be called utopian in the classical sense. At the same time, their political and social organization leaves little doubt that they are dystopian. Ergo, these fictions break with the often unquestioned assumption that a fully sustainable and ecological society devoid of poverty is, at the same time, also fair, just, and free. As a result, they constitute important, critical, and recalcitrant extensions of (fictional and non-fictional!) discourses about possible sustainable future societies, in which social and political organization all too often play no or only a minor role.

### **Panel 5-3: Material and Ungraspable Nuclearities: Consumption of Resources and Spaces in the Transnational Nuclear Fuel Cycle**

Location: AUD D2 (1531-119)

Organizer: Melina Antonia Buns

Chair: Michiel Bron

Commentator: Anna Åberg

Christopher Hill (University of South Wales), Imperial History and the Strategic Nuclearities of Namibian Uranium

- *Abstract*: Whilst the resource flows and effects of all nuclear materials are difficult to map and quantify, uranium from Rössing, Namibia, has been particularly resistant to such an undertaking. In official reports about 'nuclear activities', for example, the mining of natural uranium from Rössing was often discounted. When the USA forbade imports of this uranium in sanctions against Apartheid South Africa, the nuclear industries of Europe also engaged in 'flag-swapping' to obscure the origins of this material. In this context, it is clear that a range of European actors employed taxonomies of nuclear knowledge strategically, concealing or declaring the 'nuclearity' of Rössing uranium to suit

their interests. Drawing on political ecology, this paper unmasks these strategic nuclearities by rooting them in a deeper history of European imperialism and knowledge practices in Namibia. These practices re-classified Namibian lands and peoples, leading to the transformation of Namibia into a minerals and uranium-exporting state.

Per Högselius (KTH Royal Institute of Technology, Stockholm), The Metabolism of Nuclear Power Plants

- Abstract: This paper widens the notion of the 'nuclear fuel cycle' by analyzing it in relation to other tangible and less tangible material flows. It does so by exploring the overall 'metabolism' of nuclear power plants. Once every year, nuclear fuel arrives in the nuclear plant, and once in a while, irradiated fuel leaves the plant. This fuel metabolism can be contrasted with the much faster flows that dominate the 'everyday life' of the nuclear plant: water intake and discharge, and electricity consumption and production. A third metabolism is linked to steel and concrete. These are subject to extremely slow 'Braudelian' flows: like a Mediterranean mountain, they are slowly worn out over time, due to both radioactive and non-radioactive 'digestive' processes, and eventually have to be replaced. The paper argues that all three metabolic categories and their corresponding timescales are essential in order to properly grasp nuclear safety.

Melina Antonia Buns ( University of Stavanger/KTH Royal Institute of Technology), Shipping Nuclear Waste and Fluid Nuclearities in Border Environments

- Abstract: During the late 1970s and 1980s, spent nuclear fuel was transported to reprocessing plants across and between countries. Within the Nordic region, casks were often transported in border environments, such as the Oresund channel between non-nuclear Denmark and nuclear Sweden, leading to political tensions and discussions about transport technologies, environmental safety, and political liability. This paper analyses how the sea transport of radioactive waste and spent nuclear fuel on the one hand required the construction of new transportation technologies and specifically designed ships, and how on the other hand the nuclear material remained an ungraspable commodity. As such, the paper argues that the shipping of nuclear waste can be defined as a fluid nuclearity, as a temporary nuclear construction, which requires new thinking about spatiality and temporality.

**Panel 5-4: Technologies and politics of life**

Location: AUD D3 (1531-215)

Chair: Stefan Krebs

Katerina Vlantonis (National and Kapodistrian University of Athens & University of West Attica), Encountering the heterogeneous nature of biobanks: a taxonomy of past and current biobanking infrastructures in a national setting

- *Abstract*: This paper will introduce to a first round of findings regarding the study of biobanking in Greece.<sup>1</sup> Biobanks are described as organised collections of biological samples and associated data, being both repositories of biological material and genomic/genetic databases. Their collections may be used in medical-scientific research beyond the confined site of their production, by outsiders. Biobanking infrastructure is embedded in a discourse of progress and of advancement of biomedical research on new diagnostics and on therapeutic methods of greater efficiency. More importantly, biobanks exemplify a discourse about progress that is based on the beneficial impact of science, technology and medicine on healthcare. Biobanks are complex institutions, with scientific and technical elements forming a unity with ideological, political, economic preferences. In this paper, we attempt to understand the “heterogeneous nature” of biobanks, by exploring how biobanks have operated in the past and operate in the present, with respect to the different ways of classifying them.<sup>2</sup> Our case study focuses on a national setting and its local characteristics (that of Greece), in order to draw on past and current practices of biobanking, in search of continuities in collecting and processing biological material and associated data. By employing a multi-method qualitative approach, studying archives and conducting interviews, we will present a historical overview of biobanking developments in Greece and a taxonomy according to their size, scope, institutional type, methods of attracting participant/donors, source of funding, economic valuation, and the degree of getting networked with other infrastructures. Our aim is to further explore the overlapping in institutional and organizational configurations of biobanking, as there are no clear-cut distinctions here, e.g. between the public and the private sector. By acknowledging that biobanks are not a unified kind of infrastructure, we are critical to the normative elements of biobanking classifications and we propose ways to build a taxonomy that respects their heterogeneity.

Eduardo Rely (Friedrich-Schiller-Universität Jena), Stevia as a genetic resource: bioeconomy, the last frontiers of commodification and strategies of access and benefit sharing

- *Abstract*: The Ka'a He', azuca-caá or hierba dulce has been globally known through its westernized-Latin name Stevia (Stevia rebaudiana Bertoni) and it corresponds to a woody shrub which has been traditionally linked to the Guarani people in eastern Paraguay and central-west Brazil (state of Mato Grosso do Sul). Out of the Stevia leaves, different glycosides may be extracted namely dulcoside A, rebaudiosides A-E, steviolbioside, and stevioside (Goyal et al, 2007) whose outstanding sweetening properties have awakened huge corporate interests

worldwide. The Guaranis have for centuries nurtured an affective relationship to this plant using it both as a medicine as much as a sweetener. Anthropological research has placed the Guarani perception of the sweet palate on multisided ontological terms, since the fruition of the sweet comes hand in hand with the collective mandate for “sweet” social bonds between humans themselves and plants (Tempass, 2012). In the last 50 years, Stevia has though been globalized: research, development, adaption and cultivation gained pace especially in eastern Asia, India, Europe and in the United States. The possibility of replacing the traditional sucrose for stevia- based products has stirred up an ongoing run for patents, market control and lobbies on governmental agencies. Genetic synthetization of steviosides enabled by the fermentation of microorganisms on corn tissues has also been a recent trend in corporative research. In 2016 with the help of European and Paraguayan NGOs, the Guarani filed for an access and benefit agreement demanding the end of biopiracy concerning the Stevia and asking for financial reimbursements. This paper aims at discussing the disputed assumptions on “genetic resources” under the frame of the bioeconomy.

Hanna Vikström (Luleå University of Technology), Arctic teeth: The friction between a white smile and caries in northern Sweden, 1920-1938

- Abstract: In the 1920s, the Swedish state through the Swedish Medical Agency, performed the largest population study at the time, The Norrland Survey 1929-1931, to examine the health of people in the north of Sweden. People from the north were perceived as being poor, uneducated and less healthy, and the state wanted to improve their health. A key problem was caries – it was believed to be the root to numerous other diseases. They sought to prevent the disease. But, dentists had different ideas about the origins of caries, which theories became established and circulated and how did that affect ideas about diseases and people in the north? Was dental health actually worse in the counties of Norrbotten and Västerbotten than in other parts of the country? The state tried to improve health by, for example, encourage vitamin rich types of food – which became critical resources in managing the disease, but how did that affect the people and the environment in the north? There are some questions this project will try to answer.

**Panel 5-5: Energy challenges and infrastructures (PhD Session 2)**

Location: AUD D4 (1531-219)

Chair: Arne Kaijser

Duygu Dilek Kesen (Norwegian University of Science and Technology),  
Multinational oil companies operating in Turkey in the post-war era

- Abstract: My project deals with Turkey and the multinational oil companies in Turkey operating from 1950 -1970. One of the objectives of the project is to investigate Turkish and Western perspective on oil industry after the Second World War period. Multinational companies and the economic development in the Republican era has remained an unresearched topic. The available literature regarding multinational companies and oil concessions mainly emphasizes on the late Ottoman period and the transition period with the establishment of the Turkish Republic. My pre-work in the research process with finding relevant academic literature and contact with various economic historians shows the lack of available research on Turkish and Western perspective on oil industry in the Republican period. However, Turkey was considered a promising place to look for oil due to its potentials. The Turkish oil industry was not fully explored, and it was subjected to political controversy on the question of national or international domination of the sector. The second objective of the project is to analyze the development and consequences of inter-relation between Turkey and the multinational companies.

Siegfried Evens (Royal Institute of Technology, Stockholm), *Streams, Steams, and Steels: The Governance of Nuclear and Non-Nuclear Risks*

- Abstract: As light water reactors are increasingly seen as a solution to achieving a sustainable energy transition and battling the climate crisis, it is more important than ever to study what the risks of using water for nuclear power production are. However, the technologies that manage all that water (and steam) have not enjoyed much attention from historians. Therefore, my PhD research project 'Streams, Steams, and Steels' aims to study the governance of risk of these crucial reactor components and materials by national and international actors from a historical perspective. Relying on archival sources from the U.S., Sweden, France, and multiple international organisations, as well as interviews, this dissertation attempts to write a new, *longue durée* history of nuclear safety, going back to the origins of water and steam risk management. In such a history, it becomes clear that a hybrid nuclear safety regime was shaped between the 1950s and 1980s – by a multitude of 'nuclear' and 'non-nuclear' actors – which was the result of a confrontation between older 'non-nuclear' steam safety regimes and newer 'nuclear' risk prevention measures.

Tijana Rupčić (Central European University, Vienna, Austria), *Powering Connections: Transnational Electric Grids in the Balkans (1945-1975)*

- Abstract: Currently, my doctoral research focuses on how the Balkans developed their electrical grid outside of the established blocs between 1945 and 1975, mainly because of the Yugoslav initiative in the region after 1948 and the Tito-Stalin split, and particularly during the opening of Yugoslavia, and to the extent Romania, to the West in the 1970s. My research aims to examine the Balkans'

transnational cooperation during the Cold War and its unique position outside the established center-satellite system in Eastern Europe and the NATO-USSR bloc. This will not be an account of technologies harnessed in service to some generic path of economic development in the geographical space of “the Balkans,” but rather an attempt to explain the role of Yugoslavia as a political entity in the formation of an infrastructure whose causes and effects extended well beyond its borders.

12:30-14:00 Lunch

14:00-15:30 **PANEL SESSIONS 6**

**Panel 6-1: Global Histories of Technology & the Environment: Current insights and future directions, Session 3 (triple panel). Collective brainstorm: Future research, approaches, initiatives**

Location: AUD E (1533-125)

Organizers: Jonas van der Straeten, Evelien de Hoop, and Erik van der Vleuten

Chair: Evelien de Hoop, Jonas van der Straeten and Erik van der Vleuten

*Special format: Workshop/breakout groups/World Café-setting*

- *Description:* Based on the results from the previous sessions, participants will be invited to a collective brainstorm about where to go next in research and teaching. Issues for discussion may include (but are not limited to) the conceptual underpinnings of an overarching research agenda, urgent research questions, innovative research methodologies, building more inclusive and diverse historical networks, concrete project ideas, etc.

**Panel 6-2: Joint Roundtable: Toxic Waste and Trash Talk**

Location: AUD D1 (1531-113)

Organizer: Bettina Wahrig and Franziska Neumann

Chair: Bettina Wahrig and Franziska Neumann

Franziska Neumann, Christian Kehrt, Christian Götter, Eckart Voigts, Rüdiger Heinze, Cora Buchenberger, Bettina Wahrig, May-Brith Ohman Nielsen and Simone M. Müller

**Panel 6-3: Engaging the Atom. The need for historical research on nuclear energy in Europe**

Location: AUD D2 (1531-119)

Organizer: Arne Kaijser

Chair: Thomas Kaiserfeld

Arne Kaijser (KTH Royal Institute of Technology), Jan-Henrik Meyer (Max Planck Institute for European Legal History), Markku Lehtonen (Universitat Pompeu Fabra, Spain), Maria Mar Rubio-Varas (Universidad Publica de Navarra, Spain),  
Brief introduction of the book *Engaging the Atom, The History of Nuclear Energy and Society in Europe from the 1950s to the Present*

- Abstract: This panel is devoted to discussing the need for historical research on nuclear energy in Europe. At present, nuclear power is again high on the political agenda. Influential actors argue that an expansion of nuclear power, not least through building small modular reactors, SMRs, is necessary to tackle the climate crisis, while others are skeptical of the virtues and possibilities of a nuclear renaissance. Irrespective of this, many European countries need to grapple with an enduring legacy of their past nuclear programs including the upgrading of aging reactors, the decommissioning of old reactors, and safely managing nuclear waste. In recent years, a number of research projects have investigated various aspects of the history of nuclear power. This panel will discuss what contributions the humanities and social sciences can provide to help address these challenges. The point of departure for the panel is the book *Engaging the Atom, The History of Nuclear Energy and Society in Europe from the 1950s to the Present* (WVU Press, 2021). This book is the outcome of a large collaborative research project, *The History of Nuclear Energy and Society (HoNESt)*, funded by Euratom, and with partners from twenty-three research institutions all over Europe. As the title indicates, the book focuses on public engagement with nuclear power. Some of the key questions addressed in the book are: Why has nuclear energy been more contentious in some countries than in others? Why have some countries never gone nuclear, or decided to abandon it, while their neighbors have pursued new-build programs and repeatedly placed their faith in a “nuclear renaissance”? How has the character of public engagement varied across countries and changed over time?

Sonja Schmid (Virginia Tech), Comments on the book (1)

Per Högselius (KTH Royal Institute of Technology), Comments on the book and suggestions for future research on nuclear history, followed by a discussion with the audience

#### **Panel 6-4: Revisiting the tools and data for a mediated planet**

Location: AUD D3 (1531-215)

Organizer: Nina Wormbs

Chair: N.N.

Tirza Meyer (KTH Royal Institute of Technology, Stockholm), The mediated ocean – a short history of bionics and biomimicry in underwater technology

- *Abstract:* This paper explores the evolution of a specific branch of underwater technology: bionics and biomimicry in subsea robots. Knowledge production about the subsea environment relies increasingly on highly specialized technological solutions. Engineers have turned to cybernetics, AI and biomimicry to create robots that can dive, swim, paddle and navigate fully or partly autonomously through the oceanic environment. Meet the AquaJellie2.0 and the Eelume. Both robots were built to navigate autonomously through the water column, equipped with a set of different functions. The AquaJellie2.0 collect data about temperature, depth and current, while the Eelume is an autonomous tool used for surveillance and maintenance on oil rigs and other subsea constructions. This paper explores the challenges created by the turn to underwater autonomous vehicles inspired by nature. Are governments and intergovernmental agencies equipped to meet them? And is the oceanic environment prepared to serve as both canvass and testing ground of dreams about future ocean scenarios?

Erik Ljungberg (KTH Royal Institute of Technology, Stockholm), The role of deep learning in shaping the perception of Earth observation data as a resource

- *Abstract:* In the last decade remote-sensing has seen a dramatic increases in coverage area, data quality and spatial resolution. Simultaneously there has been a parallel evolution of digital tools to process data in new ways. These tools have provided remote-sensing companies with new ways to leverage Earth observation data as a product for commercial companies. Companies like Planet Labs implement deep learning into their product pipeline to provide commercial actors with services such as urban growth monitoring, road construction detection, and vessel tracking. Many of the crucial breakthroughs that led to these changes occurred in the field of computer vision where neural network architectures were trained on vast image datasets. This paper introduces the concept of function transfer in order to explore the history of how algorithmic techniques from computer vision were transferred to the remote-sensing industry, and how this facilitated the perception of remote-sensing data as a monetizable product.

Nina Wormbs (KTH Royal Institute of Technology, Stockholm), The environmental sublime: Satellite technology and sea ice

- *Abstract:* There is no place on Earth where one can stand and watch the Arctic sea ice steadily diminish. It is through satellite remote sensing that knowledge about this essential part of the cryosphere can be produced. The images of the ice are often mosaics, put together from hundreds of images from several orbits, serving

as condensates of climate data that can pinpoint temporal turning points like a sea ice minimum. The shrinking sea ice has become a recurrent media story conveying climate change against the background of several story lines. This paper argues that the stunning imagery of this climate change has an environmental sublime of the 21st century that is enabled by the techno-scientific instrumentation and culturally construed.

15:30-16:00 Coffee break

16:00-17:00 **PLENARY SESSION 3**  
Location: AUD. E (1533-125)

**Keynote: Prakash Kumar (Pennsylvania State University), Imagining India's Agrarian Futures, 1912-72**

17:00-18:00 **Tensions of Europe Tensions of Europe discussion and group practice**

## **Friday, 1 July 2022**

9.00-12.30 **Special Mentoring Workshop for young scholars with Prof. May Tan-Mullins**  
Location: Kol D (1531-211)  
This mentoring workshop will address career development issues such as publishing, career selection, importance of conference and networking, and home-work balance.  
Coffee break will be from 10.30-11.00

9:00-10:30 **PANEL SESSIONS 7**

**Panel 7-1: Tensions of Oil. Technology, State Power, and Environment, Session 1 (double panel): National, International Oil.**

Location: AUD E (1533-125)

Organizer: Saara Matala

Chair: Anna Åberg

Jens Millkrantz (Chalmers University of Technology, Sweden), Fuelling the nation, nationalising the fuel: Governmental attempts to nationalise the oil industry in Sweden, 1932-1947

- Abstract: Between 1932 and 1947, the Swedish government launched five governmental committees to investigate how to organise the domestic oil market. Right-wingers and industrialists chaired the first two committees, while leftists and trade unionists chaired the latter three. The committee members' shifting political convictions shaped the investigations and the resultant political proposals. Conservatives were chiefly interested in securing the availability of fuel through investment in alternative energy sources, while Social Democrats focused on importing oil from sources outside of the control of the transnational oil cartel. However, there was also considerable continuity between the five committees: both right- and left-wingers wanted to reduce or manage oil dependence and ensure resource security through government intervention. This paper examines how the political parties turned the Swedish oil industry into an object of government policy and intervention. The paper also outlines the shifting political motivations behind the proposed nationalisation and its long- term effects on Swedish energy policy.

Duygu Dilek Kesen (Norwegian University of Science and Technology NTNU), Escaping nationalization- The British Petroleum's oil policy in Turkey in the 1940s and 1950s

- Abstract: Nationalization in the oil sector poses both a challenge and an opportunity to multinational companies. The British Petroleum was forced to turn to Turkey after Romania nationalized its holdings in 1948. Eventually, Turkey which became important for the BP's regional and global supply thanks to its geographical position. This paper explores the transnational effect of nationalization on multinational companies. In particular, how the nationalization of the Romanian oil shaped BP's policy in Turkey. In addition, the paper contributes to our understanding on BP's Turkish policies as a part of their overall operational strategy in the Middle East. The research is based on primary resources from the British Petroleum Company Archive in Coventry, and government sources from the Turkish National Archives, Ankara and the British National Archives in Kew.

Saara Matala (Chalmers University of Technology), National Security, Security of Supply. Finnish-Soviet special relationship and oil in Finland, 1973-1992

- Abstract: The supply of fossil fuels became imperative in the post-war era. In countries without domestic hydrocarbon resources, it became inevitably a transnational project in which geopolitical factors shaped the energy infrastructure alongside geographic and economic considerations. This paper

examines the system building and gradual restructuring of the Finnish-Soviet oil supply infrastructure. The period of interest starts with the first oil crisis in 1972, that de facto enforced the Soviet monopoly over the Finnish oil supply, and ends in 1992 when Finland deregulated its oil imports and joined the International Energy Agency (IEA). This paper shows how Finland –a country without oil– eventually became a fuel exporting country.

**Panel 7-2: Entangling Technological Infrastructures, Material Flows and Environmental Modernities, Session 1 (double panel)**

Location: AUD D1 (1531-113)

Organizers: Frank Veraart and Stathis Arapostathis

Chair: Frank Veraart and Stathis Arapostathis

Commentators: Frank Veraart and Stathis Arapostathis

Per Högselius (KTH Royal Institute of Technology), The European Energy System: Between Resource Colonialism and Energy Transnationalism

- *Abstract:* In this paper I discuss how the European energy system has been shaped by intra- and extra-European resource extraction and by infrastructure system-building over the past century and a half. The point of departure for the analysis is the observation that Europe, starting in the late nineteenth century, became increasingly dependent on coal, oil, gas, and uranium imports from a plethora of colonial regions, from Siberia and Transcaucasia to North Africa and Southeast Asia. In parallel with this, intra-European system builders joined forces with each other in the construction of transnational pipelines, electricity transmission lines and other cross-border energy connections that channelled extra-European resources to users in different European countries and regions. I suggest that, as a result, the modern European energy system can be modelled theoretically as resulting from the interaction between “resource colonialism” and “energy transnationalism”, and that it is in the interaction between these two historical processes that we must try and discern the underlying dynamics of Europe’s long-term energy evolution.

Robrecht Declercq (Ghent University, Belgium), The technologies of economic geology in the 20th century: expanding the future of mining?

- *Abstract:* This paper focuses on economic geology – the science behind finding and appraising resources - and how it shaped extractive industries in the 20th century. From the 1920s onwards, technologies of exploration evolved in a spectacular way and tremendously altered the possibilities for extractive industries. From robust fieldwork based on serendipity, economic geology came to involve new technologies like aerial reconnaissance that made possible to sweep enormously large territories, especially after World War II. Using the case

of the copper mining industry, the paper discusses the use of new exploration technologies, in particular standardized geophysical technologies, that were implemented by mining companies across the world. The development of economic geology had a number of fundamental consequences: allowing the incorporation of new natures, making exploration a routine activity for mining companies, and reducing the speculative nature of mining by measuring minerals as future business assets.

Efi Nakopoulou and Stathis Arapostathis (National and Kapodistrian University of Athens), Entangling materials and people: Constructing the geographies of the EU research networks for solar PV technologies

- *Abstract*: As the EU sought to foster the RES transition, the European PV sector became industrial, resulting in increased raw materials' demand. Gradually, the locus of the raw materials' production was transferred to the global South resulting in geopolitical implications for satisfying the material needs required for the RES transition. Our paper examines the EU-funded technoscientific research networks, as they have been historically configured and reconfigured 'around' different PV technologies and the respective raw materials dominant for each PV technology. We draw from the empirical analysis of two case studies, namely CPV and CI(G)S. CPV was developed by the European South and for the European South and more particularly by Mediterranean countries. In contrast, the CI(G)S networks are dominated by actors from Germany, Switzerland, Sweden, France and Luxembourg. Each one of these two technologies utilises different raw materials and is 'best suited' for different climates, while enabling different system integration options. Our analysis results in a European North-South divide regarding the (i) geographical funding distribution, (ii) loci of expertise and (iii) actors that dominate the PV networks. Moreover, we complement the above analysis with insights from the global North-South by tracing the geography of production of the raw materials required for the two PV technologies.

### **Panel 7-3: New Imperialism and the technoscientific construction of natural resources, 1870–1945**

Location: AUD D2 (1531-119)

Organizers: Daniel Gamito-Marques and Leonoor Zuiderveen Borgesius

Chair: Martin Meiske

Daniel Gamito-Marques (NOVA University of Lisbon), Scrambling for the unknown: the invention of Portuguese colonial Africa

- *Abstract*: The purpose of this communication is to discuss the role that natural resources played in the Portuguese Scramble for Africa. In 1883, a Cartography Commission was founded in the Portuguese Ministry of the Navy and Overseas

Territories. Its aim was to coordinate the production of cartography relative to the Portuguese Empire, most notably Africa, in order to generate knowledge useful for the definition of the country's colonial policy. Although the Portuguese economic and political elite wanted to identify and exploit any resources in African territories of interest, the maps produced until 1891, when the colonies' main borders were settled, focused on general geographical aspects. Portuguese colonial Africa therefore crystallized before a sound evaluation of its economic potential, which only emerged in the following decades. Such trajectory leads to reconsider the aims, pace, and consequences of the Portuguese Scramble for Africa.

Leonoor Zuiderveen Borgesius (University of Oslo), Anticipation and Emptiness: Dutch colonialism and knowledge practices in Suriname in the late 19<sup>th</sup> century

- *Abstract:* After the abolition of slavery in the Dutch empire in 1873, the plantation economy that made the colony of Suriname profitable collapsed. Instead, investors turned to mining, specifically gold and bauxite, hoping for large profits. This paper investigates the knowledge practices of mining engineers, geologists, and geographers around the construction of the Lawa-railroad between 1894 and 1905, which was planned both in response to and to incentivize this rising interest in raw materials. When the construction took off, it was unclear how much and where exactly gold and bauxite deposits could be found and explorations continued throughout the construction process. The paper centers the question of how spatial imaginaries of "empty" versus "productive" land, as well as the temporal imaginaries of modernity and bountiful futures, were employed by engineers who made colonial territory legible and accessible in the form of expedition reports and maps.

Stine Alling Jacobsen (University of Oslo), Vertical territories - Mediation and materiality of Greenland's underground in the 19<sup>th</sup> and 20<sup>th</sup> centuries

- *Abstract:* In this talk I investigate the case of colonial extractivism and Danish geological surveying of Greenland's underground in the 19th and 20th centuries. Employing the analytical notions of vertical colonialism, vertical mediation and vertical territoriality as formulated by scholars such as Mark Dorrian, Heidi V. Scott, and Bruce Braun, I discuss the production and mediation of the Greenlandic underground as spaces of geopolitical, scientific, and economic value. The Danish economic interest in Greenlandic minerals and metals and the geopolitical strategies of territorial sovereignty and control largely drove the operations of geological mapping and mineral prospecting. The gradual development of a visual language of Greenland's underground is here investigated as a form of vertical mediation -geological test tube drillings over aerial photography to electromagnetic surveys. The colonial mining projects themselves add to the

understanding of vertical movement as points of interaction between vertical technologies and underground geographies.

**Panel 7-4: Microelectronics in the Eastern Bloc**

Location: AUD D3 (1531-215)

Organizer: Falk Flade

Chair: Dagmara Jajeśniak-Quast

Commentator: Piotr Dumania (Institute of Microelectronics and Photonics)

Falk Flade (European University Viadrina, Germany), Foreign trade as an innovation barrier. (Self-)limited technology imports by GDR's microelectronics sector

- Abstract: Experts and decisions-makers in GDR microelectronics favored the cooperation with other CMEA countries and especially the Soviet Union. It had become clear to many experts that an independent development of the semiconductor and microelectronics industry in the GDR was hardly realistic. However, cooperation with the Soviet Union fell short of expectations. A technology transfer from the West, on the other hand, met with disapproval from political decision makers due to ideological reasons. Foreign trade in the field of semiconductors and microelectronics thus became an innovation blockade, which was at least partly self-chosen. The presentation aims at describing the obstacles the GDR encountered in international technology transfer both in socialist countries and the capitalist West as well as the paths chosen to overcome these obstacles.

Mirosław Sikora (Institute of The National Remembrance, Poland), Détente as a factor in the modernization of Polish computer industry 1960s-1970s

- Abstract: In the late 1960s CoCom agreed on more flexible attitude towards the Comecon. Political objections gave way to the business. Communist countries realized that the "window" has just opened. Poland took advantage of the favorable atmosphere and quickly started to modernize its computer industry. The government used mixed legal – illicit methods to acquire equipment and know-how from OECD area. In my paper the attempts undertaken by the intelligence service in the 1970s are going to be tracked. Did Polish government behave reasonable in the constrains produced by the political environment? Was there any strategy existing to develop Polish computer industry in the early 1970s? Was the illicit channel of high-tech transfer a primary or a secondary one, comparing to official commercial agreements? My findings come from analysis of documents produced by Polish authorities, scientific institutions and enterprises as well as by CoCom community.

Victor Petrov (University of Tennessee), Technology transfers in the Bulgarian computer sector, 1960s-1970s

- *Abstract:* The Bulgarian regime placed high hopes in its microelectronic sector from the 1960s onwards, aiming to capture leading positions within COMECON's market by the 1970s. To do so, it explored the possibilities of both licit and illicit technology transfers in the computer sector. This paper will explore the openings up of the industry towards Japan in the late 1960s and 1970s, and the entanglement of spying in this new mode of exchange. Using party, industrial, and state security archives, as well as interviews and memoirs, it will argue that the increasing symbiosis between the civilian sector and the state security agencies was both a key part in the creation of this industry, and a reconfiguration - through electronic exchange - of the usual power balance between these two sectors.

**Panel 7-5: Negotiating Natural Resources: The Impact of Economics, Science, Law, and Technology on Governing Energy Systems and the Environment in the Federal Republic of Germany between the 1970s and 1980s**

Location: AUD D4 (1531-219)

Organizers: Laura Kaiser, Thomas Lettang and Christopher Neumaier

Chair: Jan-Henrik Meyer

Laura Kaiser (The Leibniz Centre for Contemporary History ZZf Potsdam), Negotiations over Economic Incentives as Policy Instruments: The Role of the German Advisory Council on the Environment in the Implementation of the Polluter-Pays-Principle during the 1970s

- *Abstract:* Already during the first years of environmental policy-making, politicians and scientific advisors discussed economic incentives (EI) as part of a new policy strategy meant to incorporate economic expertise on environmental issues into the policy-making process in order to overcome the supposed failures of traditional command-and-control regulation. The proponents of EI considered these policy instruments superior to any other instruments because they supposedly could reduce environmental pollution in the most effective way with the least possible costs. Even though the West German government promoted EI via the Polluter-Pays-Principle, which the OECD and EC had declared as new foundational environmental policy concept, this panel will show why EI had a very hard time becoming part of environmental policy-making in the FRG using archival sources dealing with the Waste Water Charges Act (1976). Furthermore, this paper will demonstrate that the implementation of the Polluter-Pays-Principle was strongly debated between science advisors, administrative officials, different politicians and industry representatives, and will investigate how these debates related to contemporaries' differing understandings of the role of the state in the governing of the environment.

Thomas Lettang (ZZF Potsdam), Remaking Consumer Choice: Negotiations on the Governability of Energy Consumption and Statehood in the Federal Republic of Germany (1970s and 1980s)

- *Abstract:* In response to the oil crises and perceived future resource scarcities, energy efficiency was conceptualized as a “resource of its own” among numerous policy actors, such as environmental groups, scientists, energy suppliers and government officials. Managing the national energy system also from the demand side to help stabilize economic growth and the environment, brought about new state-consumer-relationships. As the governability of consumers through prices, product labels, emission standards, informational campaigns, or the design of household appliances was discussed among competing policy actors, the responsibilities of the Federal State were debated as much as those of consumers to produce economically “rational” energy use. Scrutinizing governmental departments as modes of negotiation and knowledge production based on archival and published sources, this paper will show how democratic statehood and market policy were interconnected in the national project of producing “rationally” behaving energy consumers. It will therefore contribute to the citizen-consumer debate from a history of governance and resource perspective.

Christopher Neumaier (ZZF Potsdam), Quest for Clean Air and Fuel Efficiency: The Short-Lived Halcyon Days of Diesel Cars in West Germany during the 1970s and 1980s

- *Abstract:* “How to solve the emissions problem?”, marveled the automobile club ADAC in 1971, since pollution had increased significantly in recent years. Two years later, the first energy crisis hit Europe, casting doubt on the future of automobility. Air pollution and energy consumption shaped political, scientific, and public debates about cars for the following decades. In these negotiations on the future use of resources and the uncertainties on the health effects of exhaust fumes, engineers, scientists, and economists as well as politicians envisioned the diesel car as a promising alternative to the gasoline-powered car. Addressing the questions of this panel, this paper will show how and why diesel cars were defined as “low emission” and “fuel efficient” in West Germany and in Europe. This in return influenced policy strategies to reduce pollution and energy consumption. Using archival materials and published papers, the paper will discuss if these halcyon days were short-lived or whether a specific European environmental policy emerged that differed from other continents.

10:30-11:00 Coffee break

11:00-12:30 **PANEL SESSIONS 8**

**Panel 8-1: Tensions of Oil. Technology, State Power, and Environment, Session 2 (double panel): National Resources and Environment**

Location: AUD E (1533-125)

Organizer: Saara Matala

Chair: Saara Matala

Christos Karampatsos (National and Kapodistrian University of Athens), Spyros Tzokas, Giorgos Velegrakis and Gelina Harlaftis (Institute for Mediterranean Studies of the Foundation of Research and Technology- Hellas FORTH), The emergence of a deeply political discipline: How certain Greek geologists transformed themselves into oil experts, all the while failing to discover oil (1913-1940)

- *Abstract:* Oil exploration in Greece has been attempted in various instances since the mid-nineteenth Century, usually to no avail. This paper focuses on two such instances, namely (a) the oil exploration attempts in Epirus between 1913 and 1922 and (b) the territory-spanning oil exploration attempts that took place between 1936 and 1940. Both of these attempts took place in times of political turbulence and war anticipation. Both were fruitless as far as their 'main objective' is concerned. Yet they were quite productive on another front: they led to the emergence of a novel scientific expertise. Indeed, Greek inter-war petroleum geologists built their expertise on a particularly complicated crossroads between corporate and personal interests, state imperatives, public expectations and the demands of their scientific discipline. We will use their scientific writings, newspaper articles and archival information to show that (a) since its beginnings, Greek petroleum geology was a scientific discipline of a deeply political nature that thrived during times of crisis and (b) that this political nature is most evident during the recent, post-2010 resurfacing of Greek hydrocarbon exploration attempts in the Eastern Mediterranean.

Susanna Lidström (KTH The Royal Institute of Technology) and Anna Åberg (Chalmers University of Technology), Conflicting Goals. The role of petroculture in siloing energy and environmental policy in Sweden

- *Abstract:* This paper analyses the development of goals and strategies for mitigating climate change by transforming energy consumption as formulated in Swedish policy documents since around 1980. Today there are considerable conflicts between ambitious overarching goals for climate change mitigation and practical policy measures that are either insufficient or clash with cultural ideals and meet considerable resistance in different social and cultural settings. This has partly been blamed on the "siloing" of energy and environmental policies. The problem is, however, not new, but is the result of a historic process that has separated energy and environmental policy in most countries. We study how this

separation and conflicting narratives have developed over time in Sweden into their current form, relating them to, for example, the state budget, transport policies, consumption and spatial planning and practical government-supported interventions. We further relate this to a petroculture framework, aiming to understand the role of oil as a central player in this process.

Kristoffer Ekberg (Chalmers University of Technology, Sweden), *Defending oil extraction: The counter repertoires of Royal Dutch Shell and the Nigeria campaign 1994-1998*

- *Abstract:* In the mid-1990s Royal Dutch Shell became target of an international campaign questioning the company's operations in Nigeria, especially after the death of Nigerian activist Ken Saro-Wiwa in November 1995. The ensuing international campaign took different forms ranging from boycotts, demonstrations, petitions, and sabotage and combined environmental and human rights issues. Through the lens of the Swedish subsidiary of Shell and a collection of situational report circulated among subsidiaries the years 1994-1998, we analyze how Shell responded to the diverse campaign. Using this unique material, we track not just rhetorical responses and the rise of CSR, but also the practical dimensions; what we conceptualize as counter repertoires within a multi-layered organization. The paper thus provides important knowledge on how MNCs operate when threatened by campaigns and political demands. It further adds insights on the effectiveness of campaigns and social movement repertoires targeting MNCs.

Tanja Riekkinen (University of Oulu, Finland), *Petrofutures: The Role of Sociotechnical Imaginaries in Shaping Finnish Petroculture*

- *Abstract:* Human ability to imagine alternative futures can be understood as a powerful tool in shaping large sociotechnical systems—including modern petrocultures, which have gradually emerged alongside existing energy regimes since the nineteenth Century. However, as it is evident, collective future-making processes, including those related to the previous and present energy transitions, are not predetermined and straightforward but rather messy and complex phenomena that can be interpreted as the products of unique sociomaterial contexts in the history of the world. In this paper, I employ the theoretical concepts of sociotechnical imaginaries and deep transitions, aiming to shed light on the nonlinear nature of imagining and implementing Finnish petroculture in the age of oil. As an example, I provide parliamentary debates on the potential futures of fossil fuels and their alternatives in mid-twentieth Century Finland.

**Panel 8-2: Entangling Technological Infrastructures, Material Flows and Environmental Modernities, Session 2 (double panel)**

Location: AUD D1 (1531-113)

Organizers: Frank Veraart and Stathis Arapostathis

Chair: Frank Veraart and Stathis Arapostathis

Commentators: Frank Veraart and Stathis Arapostathis

John Martin (Museum Of English Rural Life/Reading University), The Modern Agricultural Revolution: British Farming since the Second World War

- Abstract: This paper explores the reasons for the modern agricultural revolution which took place in Britain immediately after the second world war. Agricultural output trebled and self-sufficiency rising from 40 to 60 percent between 1954 and 1973, and near doubling of total factor productivity from the 1950s to the 1990s. The magnitude of the increases in output and more importantly productivity of land and labour totally dwarf those achieved during previous periods of agrarian change, not only in Britain but that achieved in other countries. It focuses in particular on the way the state played in establishing a framework for promoting scientific and technological initiatives, and more importantly their assimilation and widespread adoption by the farming community. In doing so material flows into the sector resulted in the industrialisation of farming practices. In addition, it also considers the environmental effects of this transformation.

Sotiris Alexakis and Stathis Arapostathis (National and Kapodistrian of Athens), Entangling Minerals, Chemicals and Water in Greek agriculture of the 20th century

- Abstract: The paper's aim is to provide a historical reconstruction of the entangled history of agrochemicals, raw materials drawn from extraction activities and water management in the Greek agrifood industry since 1920 and until 2000. We argue that the visions of industrialized agriculture that was shaped by the activities of state and private actors reproduced through the entangled relation of lignite extraction, the intensification of nitrogen fertilizers and the promotion of large-scale water management infrastructures. We unravel the visions and technological promises relevant to the industrial agriculture and the intensified use of agrochemicals and its linkage to developmental policies based on economies of scales. We show the importance of flows of raw materials, mostly of lignite and at a lesser extent of pyrite, for the local industrial interests since the interwar period. Furthermore, we unfold the linkage of the intensive use of agrochemicals that was part and parcel of the emergence of the model of industrial agriculture, with the development of large-scale dams and irrigation channels in the Greek provinces. The paper is a tale of three entangled sociotechnical regimes that involve agriculture politics and policies, politics of natural commons and politics of scale technological infrastructures. Our emphasis is on the history of entangled sociotechnical regimes thus we unravel the interrelation between regimes as well as the materialities that configure the

interrelations define sociotechnical transformations and the environment. The paper is based on research in published sources, corporate and state archives as well as technical and popular press.

Frank Veraart (Eindhoven University of Technology), Entangled global sustainability history

**Panel 8-3: Saving old and promoting new technologies (PhD Session)**

Location: AUD D2 (1531-119)

Chair: Katerina Vlantoní

Regina Bichler (University of Munich), The “Zero Waste Cities” Munich and Kamikatsu: waste prevention, recycling, and the integration of technological innovations to establish sustainable waste practices

- Abstract: My dissertation focuses on the role of waste and consumption related social practices and the way these are being shaped by materials and technologies. The objective is to support Munich in developing strategies how to transform into a “Zero Waste City”, i.e. a city that aims to reduce both its waste volume and resource consumption, and establish a closed-loop material cycle for businesses and private households. By analyzing the experiences of the Japanese Zero Waste Town Kamikatsu in interviews and fieldwork with regard to both social practices and material-technological changes in consumption and waste handling, I’m aiming to identify challenges and opportunities in the course of the process which are relevant for Munich’s own socio-technical transformation. Furthermore, I want to illuminate how cutting-edge technology in material synthesis, packaging, waste processing, and related fields can contribute to a more sustainable development of Munich’s consumption and waste system.

Thomas Hoppenheit (University of Luxembourg), The Development of Urban Repair Opportunities in Luxembourg, 1918-1990

- Abstract: As a PhD candidate for the wider project “Repairing technology – fixing society? History of maintenance and repair in Luxembourg” I am researching the nonlinear and asynchronous development of urban everyday repair opportunities in the short 20th century (1918-1990). By focusing on the repair of shoes, clothes and radios, I have identified three key consumer objects and related repairing professions that were widespread throughout the last century in Luxembourg. For a systematic study of these developments, I am adopting a broader perspective that first elucidates the shifting social, political and economic environments that shaped repairers’ histories. These discursive insights will then serve as a basis to compare the development of these professions in the urban contexts of Luxembourg City, the bourgeois capital, and Esch-sur-Alzette, the country’s

second largest city with a more working-class background. Finally, three shorter micro-histories of professional repair shops based largely on oral history interviews will critically engage with my findings and give a voice to these understudied professions.

Rebecca Mossop (University of Luxembourg), Repairing and Maintaining the Telephone System in Luxembourg: Socio-Technical Approaches to Repair and Maintenance Practices

- Abstract: My PhD project is embedded in a larger study of the history of repair and maintenance in Luxembourg in the short 20th century, from 1920 to 1990. In the REPAIR project, I examine the development of repair and maintenance practices with respect to large technological systems (LTSs), in my case the telephone network in Luxembourg, which was primarily built, developed and transformed by P&T (Postes et Télécommunications) Luxembourg. Maintenance and repair are key to keeping LTSs in working order, extending their lifespan and expanding and modernising them. However, these aspects have barely been investigated in LTS literature. In my study of the Luxembourg telephone system, I will focus on how maintenance and repair were conceptualised and discussed by the P&T management, how repair practices were described in trade journals and training materials, and how repair practices changed over time.

#### **Panel 8-4: Privatising and Liberalising European Infrastructure**

Location: AUD D3 (1531-215)

Organizers: Jacob Ward and Stephen Gross

Chair: Valérie Schafer

Jacob Ward (Maastricht University), Where it all began? Privatising and Liberalising Britain's Telecom Infrastructure

- Abstract: The 1984 privatisation of British Telecom was a pivotal moment for Margaret Thatcher's Conservative government, radicalising a privatisation agenda that had been fairly pragmatic in Thatcher's first term. BT's sale was not just significant for British economic policy, but also for European, as it became the model for European telecommunications deregulation in the European Commission's 1987 Green Paper on the Development of the Common Market for Telecommunications Services and Equipment. This paper investigates the privatisation and liberalisation of Britain's telecom infrastructure from a material perspective. It will show how ideas of information as a commodity that Britain's finance industry could become world-leading in fuelled BT's privatisation. It will also show how BT's privatisation shaped the digital transformation, pioneering ideologies about digitalisation and neoliberalism as mutually constitutive. The

paper will conclude by outlining future directions for infrastructural histories of European privatisation and liberalisation.

Thomas Turnbull (Max Planck Institute for the History of Science), Conservation and the Denationalisation and Reprivatisation of Energy in 1970s Britain

- Abstract: Energy conservation is a commonplace policy injunction. This wasn't always the case. This article traces its history in British policy, and its relation to calls for the reprivatisation of Britain's energy industries – which had been nationalised following World War II.

Christian Henrich-Franke (Siegen University), New technology – new regulation? The role of technical change in the liberalisation of European transport markets in the 1980s and 1990s

- Abstract: EC Competition law and in particular the Council Regulation 17/62 were established to eliminate market dominance, cartels, state aid and to control mergers and competition in the late 1950s and early 1960s. The Commission tried to use competition law as a lever for liberal transport regulation. This approach turned out to be a failure. Two decades later, however, EC Competition law was the driving force behind the liberalisation and privatisation of transport markets. The presentation will raise the question, which role did technical change play for the victory of competition law. It will place technical change and new technologies, like the container, in the broader framework of political, economic, juridical and institutional factors that enabled competition law to shape the liberalisation of European transport policies from the 1980s onwards.

Stephen G. Gross (New York University), The Contradictions of Europe's Energy Market Liberalization, 1990-2005

- Abstract: This essay shows how the European Union's (EU) campaign to liberalize its energy market during the 1990s worked directly counter to its effort to lead the world in the fight against climate change. Fearing for its economic performance in a globalizing world, and inspired by neoliberal ideas about the power of competition and market pricing, Brussels pushed through an aggressive liberalization agenda after 1995 that profoundly changed the union's energy infrastructure. Liberalization unleashed a wave of mergers between utility companies, leading energy prices to fall. But the quest for low-priced energy undermined the EU's simultaneous effort to craft an energy-carbon tax to tackle climate change, and led to a rise in electricity consumption and greenhouse gas emissions. Brussels' desire to create a more connected energy infrastructure and market, moreover, harmed national efforts to foster renewable technology. As the example of Europe illustrates, not only did globalization and neoliberalism make it more challenging to craft the policy tools and infrastructure that might slow the

warming of the world, these very processes were actually driving greenhouse gases (GHGs) to new heights during the 1990s and 2000s.

**Panel 8-5: White Coal Revisited. The Promises of Participation and Clean Energy from High Modernity to the Age of Climate Crisis**

Location: AUD D4 (1531-219)

Organizers: Annina Boogen, Sibylle Lustenberger, Martin Meiske and Fabian Zimmer

Chair: Ute Hasenöhl

Martin Meiske (Research Institute for the History of Science and Technology, Deutsches Museum), How Green was the New Deal? Hydropower in the Tennessee Valley between Power, Participation and Intensification

- Abstract: In recent years, Roosevelt's "New Deal" approach—an extensive state planning and economic reform program set up in the 1930s to fight the effects of the Great Depression in the US— has experienced a remarkable renaissance. Various political actors on both sides of the Atlantic have updated and mobilized the term as Green New Deal for their political agendas facing challenges of climate change, social inequality, and democracy. But how green and how democratic was the New Deal? The Tennessee Valley Authority—a key initiative of the New Deal promoting multipurpose dams—promised "Electricity For All," democratic planning, and (techno-)fixing erosion in "left behind" regions. By analyzing the TVA and its Fontana Dam project (1942–44), this paper shows how sustainable and democratic planning (narratives) evolved during the New Deal, and it might provide vital lessons for today's Green New Deal initiatives: It uncovers how promises of democratic and decentralized planning were broken (e.g., regarding participation and racial equality), and while erosion and floods indeed decreased, resource extraction in the region intensified.

Fabian Zimmer (Technische Universität Berlin), Adapting to Modernity. River Engineering and Social Engineering in Northern Sweden

- Abstract: In the post-war decades, the Swedish State invested heavily in the exploitation of hydro power resources in Northern Sweden. As my paper will demonstrate, river engineering and social engineering went hand in hand in the ensuing boom in hydropower construction. Increasing protest both from civil society and local communities against the construction works spurred an intense public relations campaign by Vattenfall, the State Power Board. Examining Vattenfall's PR materials, and especially the large body of films produced in the late 1950s and early 1960s, I propose to conceptualize these media as social and emotional engineering techniques designed to "adapt" various audiences to the technological futures envisioned by Vattenfall. Analyzing the dispositives, the

narratives and the larger discursive contexts of these PR materials, my paper also sheds light on current debates on renewable energies, in which corporate PR continues to be used to foster “acceptance” by creating an ambience of openness and participation.

Annina Boogen (Zurich University of Applied Sciences), Renewable Energy in (Alpine) Landscapes: Making Infrastructure Perceptible to the Senses

- Abstract: The net-zero emissions target by 2050 and its consequential electrification calls for an expansion of renewable energies (RE) such as hydropower, wind and photovoltaics. To this end the alpine regions will play a major role, but particularly in these landscapes, a change will be in conflict with the preservation of undeveloped spaces as claimed by nature conservation. To deal with this dilemma it is of crucial importance that a just and inclusive social negotiation process is progressed. The concept of “social acceptance”, to analyse the public opinion of RE technologies, has been criticised as limited due to its normative top-down perspective, where citizens’ attitude towards RE is characterised by non-agency and passivity. To gain engagement for RE infrastructure in alpine regions, perception of these structures must be rendered tangible, so that they can be collectively discussed and re-negotiated. To do this, I propose an aesthetic approach focusing on sound.

Sibylle Lustenberger (Université de Fribourg), Towards Decentralized and Democratic Energy Systems: Lessons from the Swiss Alps

- Abstract: The current energy turn allows us to reflect on the social organization of energy production, to decentralize it, and to make it more democratic. Thus “Community Energy Initiatives” (CEIs) are emerging around the world. While varying in their concrete design, CEIs share the promise for people to have a say in how to use the resources in their surroundings and to enhance their benefits from energy production. But although CEIs have attracted considerable scholarly attention, we know relatively little about how community-based energy production persists over time and to what extent it reproduces or changes existing power relations. Addressing this research lacuna, this paper zooms in on rural communities in the Swiss Alps, which have produced their own hydroelectricity for over a century. I draw from archival and ethnographic fieldwork to argue that their experiences, knowledge and visions are vital for the design of alternative, yet empirically-based, energy futures.

12:30-13:30 Lunch

13:30-14:30 **PLENARY SESSION 4**  
Location: AUD. E (1533-125)

**Keynote: Andrew L. Russell (State University of New York Polytechnic Institute), Maintenance in the Technological Past, Present, and Future**

14:30-15:00 **Tensions of Europe plenary communications and discussion – looking forward**

Location: AUD. E (1533-125)

15:00-15:30 Coffee break

15:30-17:00 **PANEL SESSIONS 9**

**Panel 9-1: Oil connections: A networking workshop for oil-interested historians and their friends**

Location: AUD E (1533-113)

Organizers: Anna Åberg and Saara Matala

Contributions: All interested conference participants

*Special format: networking workshop*

- *Abstract:* The central role of oil in constructing our current societies is well known, and oil infrastructures and resource vulnerabilities have been recurring themes in ToE work. However, the ways in which oil is studied has developed and multiplied over the past years, not least due to the rise of the petrocultures field, but also due to the current discussions of how we can use lessons from history to enable the move away from oil in the coming energy transitions. The importance of studying a variety of aspects of oil history is reflected in the interest in oil from historians of technology and energy in the Tensions of Europe network, many of which will attend the Aarhus meeting. For example, Saara Maatala is proposing two oil-themed panels including altogether 13 scholars, and several papers in the triple-panel on energy resources organised by Odinn Melsted and colleagues focus on oil. In this session we therefore want to take the opportunity to gather oil-interested historians for a network meeting and workshop where we can reflect on the oil related paper presentations together, sum up the current state of the art, consider common themes, identify research gaps and future trends, and discuss methodologies and literature. Several of us are involved in ongoing projects as well as project applications, and it will be fruitful to share our experiences, and plan future collaborations.

**Panel 9-2: Coping with risks: Preindustrial resource scarcities and its winners and losers**

Location: AUD D2 (1531-119)

Chair: Mats Ingulstad

Cyril Lacheze (Paris 1 University), Firing tile ovens in France, 13th-19th century.  
From resources crisis to technological innovation

- Abstract: Firing in French tile ovens until the beginning of the 20th century required considerable intakes of wood (50 to 100 cubic meters per firing), while the country was marked by significant deforestation (forest cover estimated at 25% in the 16th century and 12.5% in 1825, compared to 30% at present). Preservation measures were taken as early as the 16th century, but many establishments found themselves in great difficulty from the mid-18th century. In some regions, tile makers had to adapt accordingly to avoid bankruptcy, primarily by switching fuel: at the same time, the first coal firing tests were attempted, but with mixed results due to a low coal availability, incomplete technical mastery, and cultural resistance to change. In the absence of adaptation, another possibility was innovation, with furnaces consuming less fuel. In the first half of the 19th century, a large number of patents were filed for this purpose, and it was this constraint that led to the development of the continuous furnaces (Hoffmann system and tunnel furnaces) still used today. Finally, it should be pointed out that this wood crisis also created opportunities for forest cover owners, and in particular lords: standards imposed by them on the exploitation of their woods often sought not so much to protect them as to take advantage of the crisis to tax their use. In this communication, using an open corpus of historical (including patents) and archaeological sources, we propose to present a panorama of these dynamics which, although referring to a past energy crisis, are not unlike those which are taking place in the current energy crisis.

Kevin Tracey (Maynooth University, Ireland), Biopower, Bloody Soil, and Hybrid Bodies: Constructing the Right to Resources in Early Modern Ireland

- Abstract: Through an exploration of opposing conceptions of the enumeration, description, and use of Irish resources by transnational actors including Francis Bacon and Philip O'Sullivan Beare, this paper argues that our understanding of foundational interpretations of nature and law underpinning the plantation of early modern Ireland can be further extended via the biopolitical framework proposed by Giorgio Agamben. Early seventeenth century attempts to control Irish land and resources were, for Elizabethan counsellors, intimately bound up with legal theory, political theology, and novel quantification. Bodies of indigenous individuals, land and water were surveyed and surveilled with newly mathematized theory and practice. The exercise of political will upon intersections of technology, resources, and environment which followed was an embryonic display of state biopower. To help enact and secure control over resources and people alike, state-sponsored agents authored delineating geographies and histories national as well as natural. Conceptualizing resource rights in this manner was an ideological practice in which older political theologies were retooled. As

part of this process, what Agamben has defined as the homo sacer – by turns either a sacralized, quasi-eternal sovereign or as barbarous outlaw, denuded entirely of natural and civil rights – was utilized in the exceptional policies of the superindividual state, in whose name a continuous idea of sovereignty might extirpate and exile those threatening resource extraction and processes of technological development. Rejecting the imposition of executable homo sacer, exiled Irish figures authored instead a unique textual remaking of Ireland: one which reclaimed eco-political space both real and imagined. In doing so, they revealed much of the shared basis of apparently opposed traditions, regimes, and epistemological outlooks of a continent in conflict. Understanding these narratives can, I argue, help us to reconceptualise contested issues of resource, political power, and confessional identity still at play in the Irelands of today.

Raymond Ruhaak (University of Sussex), The Crusades, the Development of a Centralised Arab State, and the Rise of Vulnerability Factors for Black Death

- Abstract: The uniting of much of Western and Central Europe during the Middle Ages with the Roman Church as the centre of the theocracy has been considered the beginning of early globalisation. This unification period was characterised by the enforcement of anything that potentially contradicted Church doctrine or authority, the greatest mobilisation of which were the Crusades. These events set the beginning of large, centralised systems and institutions founded upon wealth surpluses created by the cash-based, international trading economy that has largely grown with little interruption ever since. The Crusades brought large-scale war to Europe and the southeastern Mediterranean. This campaign necessitated the development of systems and institutions that fostered the development of wealth and ample food surpluses to help support an extensive military and ever-growing centralised bureaucratic systems and institutions. The palaeoecological evidence shows large-scale ecological change in Europe and the southeast Mediterranean beginning in the Crusader period to support this development. These anthropogenic ecological changes, largely through more intensive agricultural practices, also signal the development of a greater risk for a zoonotic epidemic that resulted in the mid-fourteenth century pandemic, Black Death. This paper will illustrate how the Crusades led to the unification of the Arab tribes and the development of the socio-economic systems and institutions in the southeast Mediterranean that largely reflected that of their European invaders. The study goes on to demonstrate how the implementation of these socio-economic systems and institutions fostered the human activity that caused ecological changes that heightened the risk for a zoonotic pandemic, Black Death, in the region.

**Panel 9-3: Technological promises? Imagining and building infrastructures and environments**

Location: AUD D3 (1531-215)

Chair: Cyrus Mody

Malte Stöcken (Universität Wuppertal), Researching and Testing New Materials in the First World War and the Third Reich. A Scientific and Political History of the German State Materials Testing Office 1914-1945

- Abstract: During the First World War, Germany had to manage a resource crisis. Due to the British naval blockade, the raw materials and materials that had been imported until then could no longer be obtained from abroad. Therefore, science and technology endeavored to research and develop substitutes for metals, mineral oil and fibrous materials not available in Germany. The new materials were tested for their suitability by the State Materials Testing Office. Such work was also of great importance during the „Third Reich“. In order to make the country ready for war, the National Socialists made efforts to make Germany independent of foreign raw materials and materials not only after the announcement of the Four-Year Plan. This lecture deals with the research and testing of new materials by the State Materials Testing Office, which was founded in 1904 and from which the present Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung) emerged in 1954. The question will be clarified which materials this Institution was concerned with from the First World War to the end of the Second World War and which methods, apparatus and machines were used to investigate and test these materials. The focus is also on the cooperation of the Materials Testing Office with other institutes, universities, industry and, last but not least, the military. With regard to the National Socialist period, the aim is to show that the Materials Testing Office played an important role in the establishment of the autarchy and military state.

Timo Leimbach (Aarhus University), From product families, transaction fees and telephones to platforms – the evolution of the idea of platforms and its impact

- Abstract: Platforms and in particular the notion of platform capitalism or similar terms have gained more and more interest in recent years. While most of the discussion are about current or even future forms of platforms, there is few research on the history of platforms. There are at least three seminal streams, which interplay in our current understanding of platforms. Firstly, there is the idea of hard- and software product families and product lines (see for example Meyer/Utterback 1993) that emerged into the idea of platform strategies in IT based industries (Cusumano/Gawer 2002). Secondly, there is concept of network externalities/effects, which were already described in the case of the anti-trust cases in telephony. Sometimes also named as Metcalfe's Law this idea was formalized by Shapiro, Katz and Varian in the late 1990's as economics of information (f. e. Carl/Shapiro/Varian 1998). Finally, based on the works on transaction fees for payment cards, Tirole and Rochet (2003) formalized the

theory of the two-sided markets. Although, all three lines describe similar phenomena, they use slightly different notions and interpretations of the underlying mechanisms. Moreover, many of these theories were evolved in the context of the ICT industries (f.e. van Alstyne/Parker 2005) and thereby also impact the perception and self-perception of the industry. Utilizing the idea of performativity of economics (MacKenzie 2004) the different streams and their perception through different will be analyzed and their impact on the ICT industry will be discussed. In this context a focus will be set on the different perceptions and impacts in Europe and the US, in particular in the context of a dominance of the latter in the computer and later internet industry.

Stevienne de Saille (University of Sheffield), Conflict, confluence and omissions in sociotechnical imaginaries of robotic care

- *Abstract:* Although technological innovation in digital and robotic applications are increasingly touted as vital to addressing the expanding health-social care needs of aging European populations, research comparing stakeholder expectations of what that might look like on a systemic level is sparse. Identifying misalignment of expectations can enhance national research programmes and improve prototyping, but is also needed to embed responsible innovation practices which can go beyond the usual calls for public and stakeholder engagement and consider the wider ecosystem in which such activities are taking place. What is included in these imaginaries and what – particularly with regard to the environmental costs of ramping up technological delivery of health-social care at scale – is left out? We report the results of a project using LEGO Serious Play as a method for collecting data on socio-technical “imaginaries” (collectively achieved, systemic visions of social transformation through technology) of robot-enabled care held by diverse stakeholders across the health-social care ecosystem in the UK, including roboticists, administrators, carers, and care users. By examining where imaginaries cohere and conflict and what is left out before such systems are in place, we hope to contribute to more desirable, including more ecologically stable, resource-aware development trajectories, as well as improved understanding of what potential stakeholders expect from the introduction of robots into existing social care arrangements.

18:00-24:00 **TENSIONS OF EUROPE DINNER AND PARTY**  
Centralværkstedet, Værkmestergade 9, 8000 Aarhus

Reception and Dinner  
Song Contest  
Party with The Wild Band