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Proceedings

Politics of connections

A CNIL-EHESS Autumn School

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In October 2024, EHESS and CNIL organised an international, multidisciplinary autumn school to explore the political implications of data flows. The autumn school was open to early-career researchers (doctoral and post-doctoral students) from all disciplines, fields and sectors, interested in studying data flows through their socio-technical structures from a multidisciplinary perspective. Senior researchers from a range of disciplines (law, political science, sociology, STS, history, philosophy, geography, IT) provided selected candidates with theoretical and methodological resources and support.

SOMMAIRE DU DOSSIER

Introduction

These proceedings document the Autumn School on the "Political Implications of Data Flows," held in the autumn of 2024. This event represents a cornerstone of a partnership formalised on December 6, 2023, between two French institutions: the **Commission Nationale de l'Informatique et des Libertés (CNIL)**, France's data protection authority, and the **École des Hautes Études en Sciences Sociales (EHESS)**, a leading European centre for research and graduate studies in the social sciences and humanities.

This collaboration was born from a shared recognition that the rapid digitalization of society demands new forms of inquiry. As personal data becomes central to economic models, governance, and social interaction, pressing questions emerge that cannot be addressed from a single disciplinary viewpoint. The partnership aims to create a symbiotic dialogue: combining the CNIL's practical, regulatory, and technical expertise in data protection with the critical, historical, and theoretical depth of social sciences cultivated at the EHESS. It seeks to build a durable bridge between the worlds of policy and academia, allowing reflexive research to inform regulatory practice and, conversely, allowing the concrete challenges of regulation to inspire new academic questions. The Autumn School was conceived as the flagship initiative of this endeavor.

The Autumn School

The Autumn School was designed as an intensive, week-long moment of exchange. Through a international call for applications, we brought together a cohort of promising early-career researchers – doctoral candidates and post-doctoral fellows – from a diverse array of fields, including sociology, law, geography, history, computer science, and Science and Technology Studies (STS). The scientific committee prioritised projects that demonstrated methodological rigour and a clear interest in transcending disciplinary boundaries to tackle the complex nature of data flows.

The scientific programme was deliberately structured around three foundational and productive tensions that underlie the digital world. These axes were intended to serve as analytical prisms through which all discussions would be refracted:

1. **Interoperability / Non-interoperability:** This axis invited participants to look beyond the purely technical definition of interoperability. It framed connection and disconnection as outcomes of socio-technical negotiations, legal frameworks, and political choices that enable certain flows while obstructing others, thereby shaping access, power, and social equity.
2. **Visibility / Invisibility:** Here, the goal was to critically examine the pervasive metaphor of the "immaterial" digital realm. This theme pushed participants to investigate the

hidden material infrastructures (cables, data centres), opaque data processing arrangements, and invisible labour that sustain our connected world, and to question how these hidden elements create profound asymmetries of power and knowledge.

3. **Global / Local:** This final axis addressed the crucial issue of scale. It challenged researchers to develop methodologies capable of tracing the intricate links between vast, transnational data infrastructures and their tangible impacts on specific communities, local governance, and individual lives, forcing a nuanced discussion on contested concepts like "digital sovereignty."

Throughout the school, presentations by senior scholars were paired with extensive workshops dedicated to the participants' own research. This format fostered a non-hierarchical environment of collaborative inquiry, aiming not only to share knowledge but to collectively forge new analytical tools and build a lasting intellectual community. The papers and discussions collected in these proceedings result from this dynamic approach.

Program overview

	Monday 14	Tuesday 15	Wednesday 16	Thursday 17	Friday 18
Morning		**Global/Local** Marine Al Dahdah Francesca Musiani	**(In)visibility** Clément Marquet Mehdi Arfaoui **Data Centre visit** Equinix PA6	**Interoperability** Laurène Le Cozanet Deirdre Curtin Carmen Brando Raphaelle Fourlinnie & DINUM	**Geopolitics of connections** Frédérick Douzet **Digital research ethics** F. Musiani Jean Lassègue
Afternoon	**Introductory roundtable** Annalisa Pelizza, Valérie Schafer, Thomas Streinz & Serge Abiteboul	**Workshop** Anders Korsgaard Jean-Baptiste Ghins Liliane Hodieb Mathilde Chenu Samuele Fratini	**Workshop** Alizée Dauchy Burhan Ozdemir Guilherme Alves Rebecca Demoule	**Workshop** Chloé Bérut Dario Pizzul Faheem Muhammed Hanen Bellili Pankhudi Khandelwal	**Feedback**
Evening			**Screening** Stéphane Degoutin		

Politics of connections – An introduction (Monday)

How can looking at connections help to renew our understanding of data circulation? This introductory roundtable addressed the central theme of the Autumn School, providing all participants with a shared grounding in an infrastructural approach to the digital, combining history, law, science and technology studies, and computer science.

Data of the Past

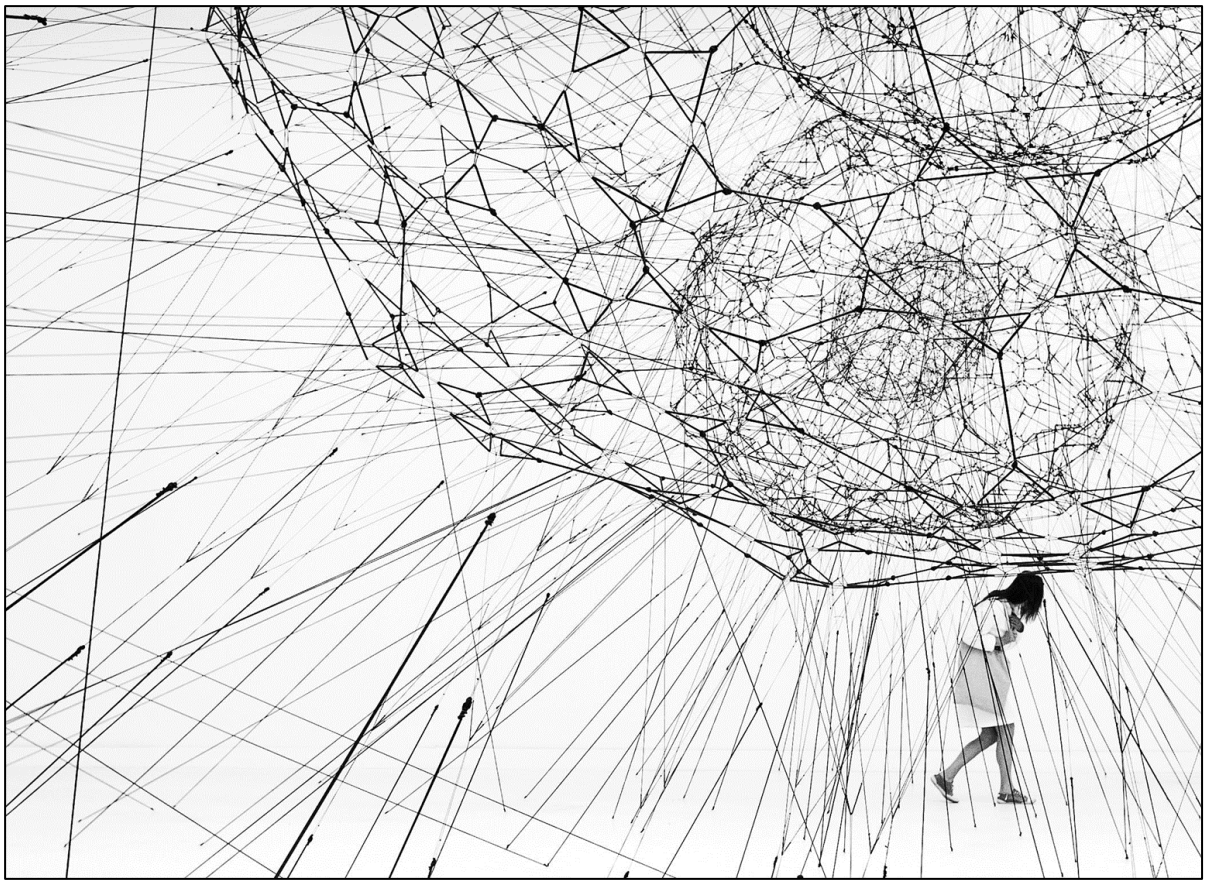
Valérie Schafer began her academic career studying the history of networks before moving on to digital cultures. Throughout this journey, she has observed the evolution of the relationship between history and data at various levels (data as an object of study, a source and a research context). The first of these was the evolution of data storage (CDs, hard drives, data centres, etc.), raising questions about the preservation of historical data. Online forums such as Usenet have also raised concerns, particularly with regard to citing their users, who often shared sensitive personal information and did not always employ pseudonyms. Indeed, the concept of anonymity and user privacy on the internet has shifted considerably over time. Another critical issue is the datafication of web archives – historical sources are increasingly presented as "data". Yet online data is not necessarily "frozen" data; it is also marked by presentism. Consider, for example, online "tributes", which always add data (e.g. using hashtags). This makes it more difficult to archive web and social media content accurately. Furthermore, behind the promises of big data, there is not only an overwhelming volume of digital information which requires new analytical methods, but also many cases of private data which make it difficult to comply with the law, especially the GDPR. More broadly, data are more "capta": they are situated and transformed through inherited institutions and infrastructures. We therefore need to contextualise data and study the knowledge infrastructure that created it. Valérie used the example of the Harlem Shake to illustrate the circulation of videos and the way in which they are searched for in web archives through Twitter's APIs, as well as on YouTube through comments and metadata. Her HIVI project (A History of Online Virality) aims precisely to deal with "data in motion". However, the "APIcalypse" (platforms restricting access to their data) poses a challenge to this new form of historical research. Valérie concluded by presenting the three challenges that the autumn school participants would face during the week. Interoperability: mostly achieved through metadata, but crossing web archives is currently impossible; Visibility: depending on the phenomenon, some leave traces, some do not, and some are missed by researchers, which raises the question of data representativeness; "Glocal" approach: involves connecting local data with global phenomena, infrastructures and context.

Valérie Schafer is Professor in Contemporary History at the Centre for Contemporary and Digital History at the University of Luxembourg since 2018. She previously worked

at the CNRS in France and is still an Associate Researcher at the Centre for Internet and Society. She specialises in the history of computing, telecommunications and data networks. Her main research interests are the history of the Internet and the Web, the history of digital cultures and infrastructures, and Web archives.

Thinking infrastructurally about Data Regulation

Thomas Streinz began by emphasising that law — including the GDPR — does not define what "data" means, leaving room for ambiguity. Through three case studies, Thomas argued that, from a regulatory perspective, there is a need to "think infrastructurally" about data governance. Firstly, the article "Confronting Data Inequality" (Fisher & Streinz, 2022) discussed the 2021 World Bank Development Report and its view that data should be distributed more equitably. As The Economist famously stated, data is "the new oil". However, Thomas and his co-author argue that we should see data not as a resource, but as a social practice, as what constitutes "data" varies depending on social and contextual interpretations. This approach reveals other types of inequality besides mere distribution. How does datafication shape identities, environments and our understanding of the world? Who gains access to data and is able to extract value from it? What mechanisms enable control over data? Data is a source of power that can both reinforce and subvert existing inequalities. In the case of global data flows, these depend on infrastructures that are governed by various types of law. The second case conceptualises the "Beijing Effect" (Erie & Streinz, 2021) in contrast to Anu Bradford's "Brussels Effect" to analyse how China's influence on global digital governance differs from the European Union's. China's influence is less regulatory and more related to changes in institutional set-ups and the spread of Chinese infrastructure around the world. This stresses the need to analyse what constitutes an infrastructure and who governs, operates and maintains it. The third case is about European data law. How do the new EU laws on digital technologies (the Data Governance Act, the Data Act, the AI Act, etc.) relate to each other and to the GDPR? The question "Who should be able to port what data and under what terms?" involves different legal acts and is not only determined by law, but also by infrastructure — a factor that has not been given enough consideration by lawmakers. The Data Act aims to "make more data available for use", but there are different ways of sharing data that European law does not necessarily consider.



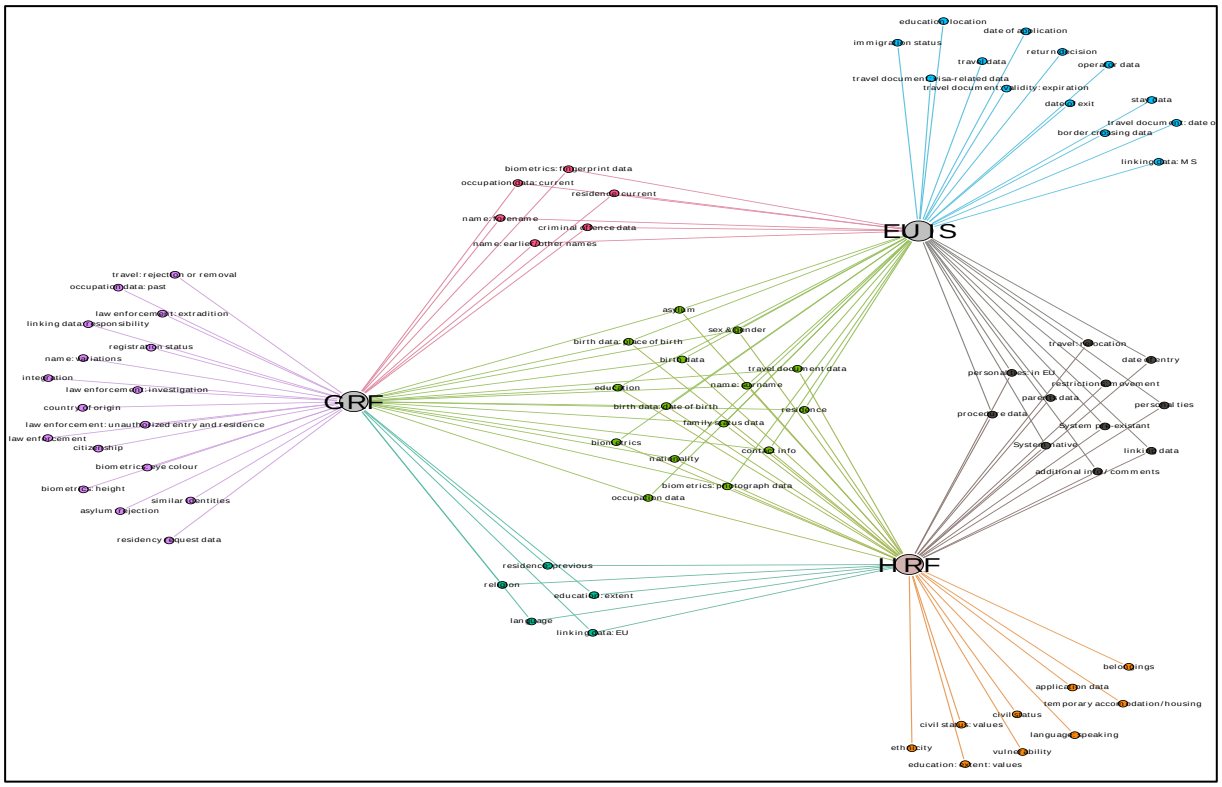
Source: Tomas Saraceno*, Galaxies Forming along Filaments, Like Droplets along the Strands of a Spider's Web*, Venice Biennale 2009.

Thomas Streinz is a legal scholar specializing in global digital governance, technology law, and the regulation of the global data economy. At the time of the autumn school, he served as an Adjunct Professor and Executive Director of the Guarini Global Law & Tech initiative at New York University (NYU). His work there focused on how legal frameworks address the governance of digital infrastructures and global tech corporations. At NYU, he taught courses on global data law and digital corporation regulation, exploring the intersection of law and emerging technologies. Professor Streinz is now Joint Chair in Law & Regulatory Theory at the European University Institute (EUI) in Florence, where he conducts research on global data and infrastructure governance in the context of the EU's quest for "digital sovereignty".

The long-term implications of data circulation for the institutional order of governance

Annalisa Pelizza has worked on datafication and data circulation in government for two decades, both inside and outside academia, as an STS scholar. For seven years, Annalisa led the Processing Citizenship research project, during which time she appreciated the

importance of paying attention not only to the effects of data choices on subjects – which are always enacted and not simply represented by information infrastructures – but also to the long-term implications of data circulation for the institutional order of governance. Her publications in the *Journal of European Public Policy* (2024), *Science, Technology, & Human Values* (2023) or *Big Data & Society* (2022), show that these implications are less visible because the administrative machine is one of the least visible infrastructures of the state and studying the back office is not fashionable. However, they are not necessarily less pervasive; they de facto challenge "obdurate" boundaries. The production, circulation, use and valuation of personal data challenges the institutional order through translations as conceptualized in STS. The Processing Citizenship project revealed disparities in data collection practices across European member states. Frontline states such as Greece collect more detailed data than non-frontline states, including information about migrants' occupations. This data is rarely shared among EU countries, which creates disparities in migration management. Furthermore, U.S. authorities exert influence over EU governments by imposing data compliance standards. For instance, Greece adheres to FBI standards, on top of EU regulations, reflecting broader geopolitical dynamics in data governance. A striking example of this influence is that the biometric machines used in Greece are funded by the European Commission, but the technology is provided by a US company, meaning they comply with US regulations. Annalisa also emphasized the increasingly blurred distinction between public and private entities in data governance. This is illustrated by the handling of biometric data: human characteristics, such as fingerprints, are converted into digital information. EU law prohibits the storage of fingerprints as images, permitting only the storage of fingerprints as code. The implementation of these policies requires collaboration between the EU and private companies. This further complicates the relationship between state regulations and corporate interests in the management of sensitive data: access to the fingerprints is only maintained as long as the contract with the company remains in force.



Source: Van Rossem, W., & Pelizza, A. (2022). The ontology explorer: A method to make visible data infrastructures for population management. Big Data & Society, 9(1).

Annalisa Pelizza is STS professor at Aarhus University and the University of Bologna. She was formerly associate professor at the University of Twente. She is president of STS Italia. She has been the recipient of excellence science grants and publishes on governance of and by data infrastructures; long-term transformations in modern institutions unnoticed and hidden in technical minutiae; sociotechnical aspects of data infrastructures, including ontologies and interoperability.

Data distribution

Serge Abiteboul addressed the complexities of data distribution from a computer science perspective. Distributed computing systems, which optimise performance through probabilistic methods, differ fundamentally from the original computer science models (traditional Turing machines). Today, we distribute everything; everything is networked, and the distinction between data and programmes is becoming increasingly blurred. How can we accurately model these systems? Serge discussed several consequences of increased distribution.

- Firstly, there is a need to secure communications through cryptography and authentication.

- Secondly, the challenge of achieving consensus in a distributed system was addressed.
- Thirdly, it is more difficult to understand what is actually happening: in the past, one-system programmes could be analysed in a similar way to mathematical proofs. Nowadays, the probabilistic nature of modern distributed systems makes such analysis significantly more challenging.
- Fourthly, it is more difficult to detect bugs: when you want to find one, you leave traces, but the bug disappears.

Then, Serge examined what makes distribution possible: standards and protocols. Open standards and protocols are beneficial for transparency and interoperability as digital commons, but they are often resisted by companies that profit from maintaining proprietary "black box" systems. The debate over centralisation versus decentralisation has long been a foundational issue in computer science. The history of digital technologies could be summarised as "all about more or less distribution", as illustrated by the case of movies. A movie can be distributed either through data centres, which offer centralised storage, or through peer-to-peer networks, which provide a scalable, decentralised alternative. Both options have their own trade-offs. How can companies be encouraged to share data? This requires ensuring that they benefit more than they lose from sharing their data, which remains an unresolved challenge.

Serge Abiteboul is a computer scientist specialising in database theory, data management, and web data systems. A research director at INRIA and former professor at École Polytechnique, he co-authored key works like "Foundations of Databases". His research has significantly impacted relational databases and data integration. He is a member of the French Academy of Sciences and has received honors such as the ACM SIGMOD Test of Time Award. He is also a strong advocate for ethical data management and privacy in the digital age.

From a global to local perspective (Tuesday)

How can we write an ethnography of a global, networked object? How can empirical practices and experiences help us to better understand processes that are by definition diffuse and composite? This workshop looks at how "global forces" articulate with local sites. Multi-sited analysis – which emphasises fieldwork in multiple and heterogeneous spaces is especially conducive to the study of ICT in a globalised context. Digital technology raises international issues: its financing, technical implementation, infrastructures and fields of application are managed by different actors located around the globe. Digital technology is not a finished product; no picture of the phenomenon could ever be complete. In a very concrete way, multi-sited research takes the form of chains and paths along which the sites are juxtaposed. In their presentations, Francesca Musiani and Marine Al Dahdah proposed to identify those links, connections and nodes, as well as the ways in which the global dimension of the network of networks can interact with its different 'local' dimensions in a variety of areas including security, policy, and uses.

Francesca Musiani's presentation explored internet governance (IG) as a complex interplay of power dynamics, technological infrastructure, and normative systems, operating across local, national, and global levels. Using examples like the impact of infrastructure attacks in the Russia-Ukraine conflict, copyright takedowns, and internet shutdowns, she highlighted how internet technologies and their design become strategic tools for control. Musiani advocated for an STS (Science and Technology Studies) lens to examine IG, emphasizing the socio-technical nature of infrastructures and their role as proxies of control. Her research focuses on how actors "do things with" technology, leading to a typology of infrastructural action: repression, bypassing, standardization, and repair/maintenance. She argued that studying internet infrastructure through this lens reveals how socio-political order is constituted, perpetuated, and contested, and raises methodological challenges for researchers studying both open and closed systems, the private sector, and the local/global dichotomy. Musiani concluded with a discussion of the role of users, the relevance of "digital governance," and the complexities of national security in the context of IG.

Marine Al Dahdah's presentation analysed the multi-scalar impact of mobile health (mHealth) projects in Ghana and India, focusing on the Motech programme designed to improve maternal health outcomes. Despite its promise, Motech encountered numerous challenges, including low adoption rates due to issues like access to mobile phones, cost, technical problems, and a persistent gender gap in mobile phone usage. The study reveals "intersecting inequalities," where the technology exacerbates existing power imbalances between patients and caregivers, as seen in the differing experiences in Ghana and India. Furthermore, the financial burden of mHealth falls disproportionately on women, and the programme suffers from "multiple frictions," including a top-down approach that disconnects women from traditional healthcare systems. Ultimately, the project yielded few beneficiaries and no proven positive health outcomes. Marine's research thus highlights the unintended consequences of such digital development projects, emphasizing the importance of

considering local contexts, power dynamics, and the commercial nature of digital cooperation in the global south, while also raising critical questions about data sovereignty and the "digital creation of subjects" in the context of shrinking digital public spaces.

Source: Marine Al Dahdah.

Marine Al Dahdah is a CNRS researcher at the Centre for studies of social movements (CEMS-EHESS), and a member of Unit 1276 "Risks, Violence, Reparation" of the French National Health and Medical Research Institute (INSERM). She is an associate researcher at the Centre for Human Sciences (CSH) in Delhi (India) and currently affected at the French Institute in Pondichéry. Her research focuses on health policies in Asia and Africa, and more particularly on digital healthcare in India, Ghana and Kenya. In 2023, Marine Al Dahdah was awarded a bronze medal by CNRS for her work.

Francesca Musiani is a CNRS research director, holds a PhD in the socio-economics of innovation (MINES ParisTech, 2012), and is qualified to supervise research in sociology (Sciences Po Paris, 2022). She is the director of the CNRS Centre for Internet and Society (UPR 2000) and deputy director of the Internet, AI, and Society research network (GDR 2091). She co-founded both with Mélanie Dulong de Rosnay in 2019 and 2020 respectively. She is also an associate researcher at the Centre for the Sociology of Innovation (i3/MINES ParisTech) and a Global Fellow at the Internet Governance Lab at American University in Washington, DC.

Beyond the seminar sessions, the Autumn School's theoretical inquiries were grounded in two complementary activities led on Wednesday. The first was a **guided visit to an Equinix data centre**, which provided a crucial, tangible counterpoint to the abstract notion of data flows. This experience directly addressed the Visibility/Invisibility tension by demystifying the physical infrastructure—servers, cables, cooling systems—that underpins the seemingly immaterial digital world. By stepping inside a key node of the internet, participants could physically observe how the Global/Local axis materialises: a specific, highly secured location

serving as an anchor for global data traffic and reconfiguring the territory it occupies. Furthermore, the data centre functions as a prime example of Interoperability in practice, acting as a meeting point where diverse networks connect, thus making the conditions and constraints of data circulation palpable. The visit powerfully reinforced the argument that the materiality of infrastructures is not a mere technical detail but a central element shaping data governance and its social consequences.

The programme was further enriched by a **dialogue with artist and researcher Stéphane Degoutin**, whose work offered a critical and aesthetic lens to explore the school's central themes. The discussion, centred on his projects like *World Brain*, *Atlas of the Cloud*, and *The House That Wishes You Well*, resonated deeply with the seminar's axes. Degoutin's artistic practice is a direct attempt to challenge the Visibility/Invisibility of network society by mapping and exposing the very infrastructures and control mechanisms that often remain hidden from public view. His work compellingly illustrates the Global/Local tension, tracing how vast, planetary-scale systems of connection and surveillance manifest and impact specific places and individual lives. By critically examining the seamless vision of a totally connected world, his projects implicitly question the politics of Interoperability, revealing how the technical capacity for systems to communicate can be leveraged for control, thereby highlighting the social and ethical stakes of designing—or resisting—digital connections.

Source: *The House That Wishes You Well*, Stéphane Degoutin and Gwenola Wagon, 2021-2023.

Workshop presentations

Health Data Sharing under the Imaginary of a European Health Data Space - Anders Korsgaard

Grounded in Science and Technology Studies (STS), the presentation explored the promises and visions embedded in the European Health Data Space (EHDS) Regulation, and how its promissory values become influential drivers for shaping infrastructure development, governance strategies, and cross-border health data sharing, throughout the EU, offering preliminary insights from a case study on Norway.

The EHDS Regulation is envisioned to establish a common framework for data sharing within the EU, so as to better achieve purposes in the health research and care sector that would benefit society, implying that sharing of health data can help solve both health and wider demographic challenges - and that realizing this potential will be imperative for the future of Europe and its population. However, fragmented policies and complex regulations across Member States limit the accessibility and utility of the health data. Subsequently, the Regulation seeks to address barriers, aiming to unlock the full potential of health data by harmonizing data governance across Europe. Central to the EHDS vision are Health Data Access Bodies (HDABs) - national entities mandated to oversee and streamline secure access to health data, enabling researchers, policymakers, and innovators to use high-quality data without reliance on individual consent.

Norway's HDAB became operational in 2023 following a decade of extensive investment in data infrastructure and harmonization. The country's advanced digital infrastructure and long-established data governance policies have positioned it to be among the first countries to operationalise an HDAB. As such, Norway offers an early model for the establishment of HDABs across Europe. The Norwegian case also provides insights into the challenges and requirements for establishing these infrastructures, by underscoring the substantial human, technical, and financial resources needed to support the cross-border data-sharing initiative of the EHDS, exemplifying the scale of effort required for establishing a HDAB. It reveals that cross-border health data sharing is not solely a technical or legal endeavour but requires extensive sociotechnical restructuring.

Ultimately, the Regulation embodies the most comprehensive legal framework for health data in EU history. However, translating this into local contexts may reveal tensions between EU aspirations and national realities. Through the Norwegian case, the presentation indicated how local factors - such as digitalization maturity, policy frameworks, and institutional capacities - can shape the implementation of the EHDS. To further investigate the effect of such local factors, the presentation suggests that future research could involve conducting a comparative analysis of Austria, Greece, and Norway, to explore how the EHDS promises translated into different localities though the establishment of the HDAB infrastructure. The

hypothesis presented is that by examining the policies surrounding EHDS and their translation into different national contexts, one might capture the socio-political processes shaping this complex infrastructure, providing insights into the interplay between policy, practice, and experience in the object of governance that the EHDS call into being, and as such, hopefully contribute to a more inclusive understanding of how the EHDS come into being.

Anders Korsgaard is a Ph.D. candidate at the doctoral programme of the Department of History and Philosophy of Science at the National and Kapodistrian University of Athens. Over the course of his latest studies and research, he has been especially interested in the European Health Data Space policy agenda. His master thesis focused on the promissory aspects of the European Health Data Space, where he through a comparative case study on Greece and Norway, looked into health data sharing within biobanks under the BBMRI-ERIC network, analysing how EU policy agendas can exhort expectations and visions on to biomedical professionals, how these were contested and/or stabilised, and how the biomedical professionals themselves envisioned health data sharing going forward. Most recently, in his doctoral research, drawing on perspectives from Science and Technology Studies (STS), he has set out to develop a deeper and more comprehensive understanding of the political promises associated the European Health Data Space policy agenda. In particular, he will focus on how its promises mobilize action; how the object of governance that the Regulation calls into being gets translated into rearrangements being made and actions being taken for the promises to be realized; and whether the promises of the EHDS takes on local forms reflecting particular values and ways of thinking.

The Optimization of Everyday Life Or How the Promise of Individual Sovereignty Made Us Submissive to Digitalization – Jean-Baptiste Ghins

Barry Schwartz identified that, due to the overwhelming number of choices available to us, we suffer from the "paradox of choice": we fear making the wrong decision, and abundance ceases to be a blessing, becoming a problem instead. This premise helps illuminate a particularly contemporary need: the desire for a "decision-making machine," a role that digital platforms appear to have taken on. Their algorithms allow us to filter through an abundance of content to find what most closely matches our preferences. However, what Schwartz's model fails to address – or addresses only marginally – is the root cause of decision-making distress, which justifies our willingness to offload this burden. The goal of our research is precisely to explain why we so readily embrace automated decision-making mechanisms.

Our central hypothesis is that decision-making is not merely burdensome because we seek to maximize our well-being (and thus fear missing out on the best option), as Schwartz suggests. Rather, it is burdensome because we have inherited a particular conception of individual sovereignty, which makes the experience of choosing an intensely demanding one. According

to this hypothesis, individuals today are assumed to want what happens to them. An indicator of this shared experience is the shame we feel when we must admit that we are not doing what we truly want. As a result, individuals seek reassurance that what they are doing is, indeed, what they want to do. Digital platforms then provide relief by presenting the option that aligns with their desires while validating this alignment through data-driven justifications. In a way, platforms create certainty in decision-making just as, according to Max Weber, the practice of *Beruf* provided the Pietist with certainty of salvation.

To demonstrate our hypothesis, we draw on various insights. First, we argue that the modern promise is individual sovereignty, which gives rise to a particular form of anxiety. Critical commentary on this situation is strongly present in the works of the first generation of the Frankfurt School and of Alain Ehrenberg. We then assert that cybernetics has successfully met this need by rationalizing decision-making through information processing. The connection between sovereignty, decision-making, and cybernetics has been recently explored by Alain Supiot and by Nicolas Guilhot. Finally, we contend that digital technology – or at least the digital cultural industry (i.e., the everyday mediation of decisions through platforms) – is the technical realization of the promise of living a life perfectly aligned with one's individual will. This conclusion challenges the Foucauldian assumptions underpinning Shoshanna Zuboff's critique, which argues that digitalization is forcefully imposed upon us. Instead, we emphasize our own need for optimization.

We conclude, therefore, that breaking free from the relentless digitalization of everyday life requires rejecting the notion of individual sovereignty and embracing a principle of collective sovereignty – one that may even entail abandoning the concept of sovereignty altogether.

Jean-Baptiste Ghins is a PhD in philosophy at UCLouvain and a member of the "Chaire Valeurs et Politiques des Informations Personnelles" (Institut Mines-Télécom). His research particularly explores the connections between aesthetics and politics, which are articulated within contemporary cultural industries. His recently published works include papers entitled "Cybernétique et industrie culturelle numérique" (*Nouvelle Revue d'Esthétique*, 2025) and "Henri Lefebvre, théoricien de la décision quotidienne" (*Zilsel*, 2025).

The joint role of politics and the media in the representation of Sahel studies on digital research platforms – Liliane Hodieb

Area studies, as multidisciplinary approach to « cultural areas », attempt to « document the existence, internal logic, and theoretical implications of the distinctive social and cultural values, expressions, structures, and dynamics that shape the societies and nations, » one of their major aims being to « generate new knowledge and new forms of knowledge for their intrinsic and practical value ». This knowledge, in its turn produced from data analysis, is key in accurately understanding our world, its challenges and the responses that can be provided.

However, when we consider cultural areas like the Sahel, it must be noted that most of the data and research available that circulates at high speed is largely focused on security be it political, civil, environment or food-related. An analysis of dedicated digital platforms such as PASAS (Plateforme d'analyses, de suivi et d'apprentissage au Sahel), the Observatoire du Sahara et du Sahel, the Sahel Alliance, and more general research platforms like Zenodo, HAL and LaCAS, most data revolve around the crisis. What about the development of arts and culture or, as pointed out by Chopin and Pliez, the rapid urbanization of those territories of Western Africa? What about the notable enhancement of South-South cooperation in the region? This profound imbalance is also reflected in the disciplines: political science and geography largely predominate over disciplines such as social and cultural anthropology, ethnology and art history, whose few research works that emerge from the platforms mentioned above follow the trend of focusing on the crisis. Like an echo of the Sahel news as presented by the media, Sahelian studies appear to be caught up in a vicious circle where politics and the media both influence it, and are in turn influenced by it. Interestingly, a similar observation was made in the white paper on Turkish, Kurdish and Ottoman studies in France issued by the GIS MOMM (Groupement d'Intérêt Scientifique Moyen-Orient et Mondes Musulmans). This raises the question of the foundations of scientific research and the structural patterns that determine its direction. The circulation of research data on the Sahel thus seems to be governed by this political-media-research network, amplified by digital technology.

Liliane Hodieb received her Ph.D. degree in linguistics from the Institut National des Langues et Civilisations Orientales (INALCO) in Paris in 2020. She specialized in the typological description and documentation of African languages, particularly of understudied and endangered Cameroonian Grassfields Bantu languages. With a background in natural language processing (NLP) – she holds a Bachelor's degree in computational linguistics from the University of Paris –her current research interest focuses on digital humanities and underrepresented area studies. One major issue at the heart of her research is to understand the structural patterns that influence the collection, analysis, production and dissemination of such data across disciplines. She is thus a strong advocate of interdisciplinarity. She is also the author of articles as well as a monograph in linguistics published by L'Harmattan (Paris) in 2023.

Transition to post-quantum cryptography, a case study: from local to global, the tension between interoperability and sovereignty – Mathilde Chenu

The confidentiality and the security of (personal) data in transit rely on cryptographic protocols. However, some of these protocols are rendered obsolete against an attacker using a quantum computer. Encrypted data in transit today can already be collected, stored to be decrypted when a powerful enough quantum computer becomes available. Researchers, international organisations and governments are taking steps to create new quantum-

resistant algorithms, standardize them and induce a migration to new standards. This situation highlights the collaboration and tension between local and global actors, as well as frictions related to interoperability and sovereignty.

The first efforts in post-quantum cryptography came from local teams of specialized researchers, before gradually attracting more interest and the first internal conference on post-quantum cryptography in 2006. As the field became more mature and the issue more pressing, the American National Institute of Standards and Technology (NIST) organised a competition to standardize post-quantum algorithms in 2017. It triggered a remarkable international collaboration between researchers from all continents and nationalities, from academia to private companies.

Nonetheless, the NIST has a history of non-transparency, which led to an unsafe protocol, the Dual Elliptic Curve Deterministic Random Number Generator, being standardized in the early 2000s. To ensure that its subsequent standards would be trusted by the users, the NIST designed open competitions for the past cryptographic standardization processes, where teams of researchers could submit their proposals. These proposals were put under public scrutiny, and anyone in the cryptographic community could provide open comments and feedback. These standardizations via competitions helped the NIST to regain trust within the cryptographic community, but the scrutiny and the specter of inserted backdoors remain.

Globalization means that the NIST decision is likely to be adopted broadly, which should ease interoperability of systems. Besides, cryptographers have called for crypto-agility, that is, the capacity of systems to rapidly change to another scheme or to efficiently patch flaws if a vulnerability is detected. Ideally, crypto-agility would result in systems designed to be compatible with several post-quantum schemes. Some voices among the experts are also pushing for a hybrid approach transition, with a classical scheme paired with a post-quantum scheme, instead of switching directly to post-quantum schemes. While the two-layer approach has an impact on the performances, it would also have the effect of easily allowing for retro-compatibility. In that sense, both agility and retro-compatibility would ensure better interoperability of systems.

For sovereignty reasons, the interoperability picture might be more complicated. China and Russia have each created their own post-quantum standardization groups. However, it seems like the schemes to be standardized are tweaked versions of NIST-approved finalists. In Europe, the most vocal bodies regarding these results are the French ANSSI and the German BSI. Both partly adopt the results of the NIST competition, but they are also pushing for other schemes. While the NIST is aiming for a direct switch to post-quantum schemes, states in Europe are also keener on retro-compatibility and are pushing for hybrid approaches.

Mathilde Chenu is currently working as a science-for-policy researcher in Italy at the Joint Research Centre, a part of the European Commission. Her area of interest lies in cryptography, which involves developing methods to secure communications and ensure confidentiality. Cryptography is closely related to privacy and data protection, combining elegant mathematical concepts with societal aspects. The focus of her PhD

was a specific family of cryptographic schemes believed to be resistant to attacks by quantum computers. Her work showed that a generalization of these schemes was possible, giving access to a wider set of possible parameters.

Digital Sovereignty and Data Protection: The Role of Users in Reshaping Data Flows - Samuele Fratini

As the topic of digital sovereignty has become central in the public debate on data protection, both state and non-state actors increasingly consider jurisdictions and traditional governing structures as means to capture and regulate digital data flows. Nevertheless, data sovereignty through data localization as a component of digital sovereignty has been mostly analysed as a set of policy or infrastructural choices. This study relies on the conceptual connections of Internet Governance and Science and Technology Studies to account for the performative role of users in reshaping data flows in the name of data protection. "Data localization" is thus conceptualized as a socio-technical assemblage reflecting the evolving users' expectations surrounding Internet infrastructure and national boundaries. The study is based on 17 semi-structured interviews conducted with the users of Threema – a Swiss secure messaging app. The object of the analysis is to unravel data localization practices as a hybrid black box, intertwining technical changes, political discourses, socio-technical imaginaries, and shifting social norms. The analytical tools of controversy and discourse are used to highlight data localization as a locus of political contestation in Switzerland, where imaginaries of national boundaries are often mobilized to symbolize security and reliability.

The study provides several key contributions to the debate on digital governance, data protection, and interoperability.

- Firstly, it argues for the usefulness of Science and Technology Studies in understanding Internet governance, emphasizing the need for analyses grounded in specific socio-technical contexts.
- Secondly, it advocates for a social perspective on digital sovereignty, emphasizing user agency, social movements, and privacy-informed collective action as crucial factors shaping the governance of data flows.
- Thirdly, the article sheds light on users resorting to state jurisdictions as a means to reinforce control over data flows, exploring the discursive mobilization of national boundaries in the digital public sphere.
- Finally, the rise of Threema from outsider secure messaging application to the official app for internal communication in several Swiss institutions offers an alternative case of digital sovereignty.

As Threema legitimized its privacy-standards through jurisdictional reasons, it offered the Swiss public authorities the chance to reduce foreign dependencies by relying on a domestic solution. The study thus assesses how digital sovereignty can result not only from institutional

policymaking, but also from alternative technical assemblages, counter-hegemonic discourses and unforeseen private-public alignments.

Samuele Fratini is a postdoctoral researcher at the Centre National de la Recherche Scientifique (CNRS) and has just delivered his Ph.D. dissertation at the University of Padua and the Università della Svizzera Italiana. He is currently working within the ClaimSov project, analysing digital sovereignty practices in the European Union with an approach merging Science & Technology Studies, Critical Geopolitics, and Internet Governance. He is part of the Editorial Board of Studi Culturali and Sociologica. His regular publications cover topics such as digital sovereignty, geopolitics, and national identities.

Visibility and invisibility of connections (Wednesday)

Drawing on science and technology and infrastructure studies, this workshop explored the ambivalent configurations of visibility and invisibility as they relate to digital technologies. All too often, visibility is seen as a good in itself, in the semantic realm of transparency and accountability, while invisibility is associated with opacity, secrecy and certain obscure plans of dominant organisations to maintain their power. However, this duality simplifies situations that can be far more ambivalent, and tends to blur the nuances and variety of forms of engagement with digital technologies. What is in/visible, for whom, how does it pose a problem, and to whom? Drawing on a relational approach to in/visibility and on empirical research conducted on undersea cables and data centres, the workshop will propose various ways of understanding what is at stake when in/visibility is used as an analytical tool for the social sciences.

To answer those questions **Clément Marquet**'s presentation delved into the nuanced concept of (in)visibility as it relates to data centres, challenging simplistic interpretations and emphasizing its relational and socially constructed nature. He began by problematizing the idea of visibility as inherently positive, noting its potential connection to control and surveillance, and highlighting that visibility is always relative to an observer. Clément Marquet then explored three distinct cases.

- First, he examined the paradox of digital transparency, arguing that while digital interfaces are often designed to promote transparency, they are built upon inherently opaque programmatic layers. This can lead to controversial information becoming even less accessible, buried within vast data repositories, and requiring further technological mediation to be understood, suggesting that intelligibility is a more useful concept than mere visibility.
- Secondly, the presentation analysed the negotiated (in)visibilities of undersea cables, highlighting the tension between their infrastructural centrality and their general invisibility. Nicole Starosielski's work on cable landing points was discussed, showing how the very act of protecting these crucial infrastructures, often through visible measures, paradoxically increases public awareness of their existence.
- Third, the presentation examined the struggle for data centre (in)visibility in Plaine Commune, France. It traced the evolution of these facilities from initially invisible entities, hidden within deindustrialised urban spaces and misclassified as offices rather than industrial sites, to objects of public concern due to safety risks and resource consumption. This case demonstrates how (in)visibility can shift over time through political processes and local negotiations.

Clément Marquet concluded that (in)visibility is not a fixed attribute but a dynamic and contested outcome of local negotiations, intertwined with issues of intelligibility, insulation, interconnection, and the complex interplay of technological, economic, and political factors. It also touches upon the contested benefits of hosting data centres, including potential

economic revitalization and attracting tech companies, while acknowledging the lack of conclusive evidence for these claims.

To further underscore the themes of (in)visibility and the materiality of data centres, the presentation was complemented by a visit to a data centre. This site visit provided a unique opportunity to ground the theoretical discussion in the physical reality of data infrastructures. Participants were able to explore the various spaces within the data centre, gaining firsthand insight into the complex systems that support digital technologies. This on-site experience allowed participants to directly engage with the materiality of data centres, moving beyond abstract concepts to appreciate the tangible presence of these often-overlooked yet essential components of the digital world.

Clément Marquet is a permanent researcher in Science and Technology Studies at the Centre of Sociology of Innovation (CSI) at Mines Paris – PSL. His research focuses on the materiality of the digital technical system. He is interested in the political, social and environmental tensions caused by the deployment of digital infrastructures (data centres, undersea cables), and in the political and commercial stakes of the methodologies used to measure the environmental footprint of digital technology

Workshop presentations

The Policing of International Mobility: dreaming interoperability at the border? – Alizée Dauchy

Alizée Dauchy studies the current use of personal data of people on the move and the practices of information exchange between state authorities at two internal borders of the

Schengen area: the French-Italian border in Menton and the Italian-Austrian border in Brenner.

The interoperability of systems and databases has been a major topic in law enforcement cooperation in the European Union (EU) since the 2000s, particularly in relation to the institutionalization of police cooperation between EU Member States. Cross-border information exchange plays a key role in coupling the idea of border management with security. However, while most literature focuses on the control of human mobility and the bordering processes at the EU's external borders, Alizée sustains, along with Sara Casella-Colombeau, that "internal borders are still sites where the state manages individuals' mobility". As such, they remain privileged spaces to investigate how is information exchange integrated into the everyday work of police officers?

This paper employs a qualitative methodology, consisting of semi-structured interviews with national authorities and civil society actors (police officers, customs authorities, migrant support and environmental associations, transporters' unions), ethnographic observations at the borders, and a press review of Brenner and Menton from 2014 to the present. This approach allows for an understanding of the similarities between these two borders. Both Brenner and Menton face the political challenge of "secondary movements" of asylum seekers in Europe and have (temporarily) resorted to border closures. Additionally, since 2015, law enforcement authorities have intensified border checks related to human mobility, and cooperation between states is embedded in bilateral agreements that facilitate readmission procedures at the border.

Furthermore, Alizée identifies three control infrastructures – the police and customs cooperation centre, a smartphone application, and the container control centre – to highlight police practices of information exchange and their continuous adaptation to the complexities of a multi-layered legal regime (composed of European, bilateral, and national rules) and the agency of people on the move. Finally, by critically analysing border policing, this study aims to uncover the opacity and unpredictability of border procedures, which rely more on the skills and know-how of police officers than on technology, as well as the discriminatory experiences encountered by people on the move at the border.

This research has been prepared in the framework of Alizée's post-doctoral project "The border is no more, long live the border. De-materialisation and re-materialisation of internal borders in the European Union", under the supervision of Pr. Anna Casaglia (PRIN project, University of Trento).

Alizée Dauchy holds a PhD in political science. Since 2017, she has been studying the externalisation of European borders in Africa and international border security practices in areas of free movement, in the Economic Community of West African States (ECOWAS) and the European Union (EU). Her research focuses particularly on the digitalization of border control. She is a fellow of the Institut Convergences Migrations

(ICM) and a member of the POMAF collective (African migration policies), which organises, among other activities, a quarterly seminar on the study of migration policies in Africa. She is also a member of the Council of the Euro-African network Migreurop. She is currently a post-doctoral researcher at the University of Trento on the project "The border is no more, long live the border. De-materialisation and re-materialisation of internal borders in the European Union".

Imaginaries of blockchain pioneer designers - Burhan Ozdemir

The adoption of Blockchain is part of a long and complex process. This process is marked by negotiations revolving around tensions arising from the need to adapt Blockchain, whose socio-technical imaginary is rooted in an ideal of emancipating actors from trusted third parties, to a centralizing company subject to regulatory, economic, and political constraints. The main tension lies in adapting Blockchain to GDPR requirements. Blockchain is a decentralized technical system with an immutable ledger, meaning that the information recorded in its database cannot be altered or deleted. However, GDPR requires centralized governance and the ability for individuals to request that companies holding their data modify or delete it. These significant changes to Blockchain principles undermine trust in Blockchain as envisioned by its designers. These tensions can be categorized into three main areas: Blockchain governance, privacy, and trust.

The governance of projects raises questions about the distribution of power and authority and how these elements are structured in an ecosystem where decentralization is a core value. Blockchain designers, although sharing an imaginary advocating emancipation from trusted third parties, consider decentralization at the consortium level acceptable, as it tends to prevent situations where intermediaries unjustly exercise their power.

The issue of privacy relates to challenges around data protection and respect for personal privacy, which are especially pressing in the context of Blockchain as an immutable ledger. Blockchain designers place great importance on respecting user privacy and maintaining the immutability of the ledger, a condition for trust in the technology. The approved solutions aim to comply with GDPR while preserving the immutability of the Blockchain ledger through indirect mechanisms. This sometimes involves using more “traditional” computing tools, such as an “off-chain” database, a database not on a Blockchain where the company can make necessary modifications before linking the data back to the Blockchain.

The socio-technical compromises around privacy directly or indirectly undermine the immutability of the Blockchain ledger. This directly affects the trust designers place in Blockchain and their understanding of what users need to trust the technology. Blockchain projects, therefore, tend to adopt other trust mechanisms from computing culture, such as publishing white papers. Through such transparency, Blockchain designers aim to demonstrate the robustness and resilience of their systems.

Finally, the exercise of dominant decision-making that contradicts the designers' imaginary, particularly regarding the immutability of the ledger, a nearly sacrosanct element within the Blockchain design community, creates an internal conflict among these actors. This conflict oscillates between emotional and rational dimensions, highlighting the dissonance between the values and aspirations initially embedded in the technology and the pragmatic or strategic requirements of the organisation. Designers face a moral and identity dilemma, as their commitment to the foundational principles of Blockchain is tested against organisational realities and power dynamics. This internal conflict can significantly affect the motivation and engagement of designers.

Burhan Ozdemir is a PhD candidate in sociology at Université Côte d'Azur. As a sociologist specializing in the study of the diffusion of new technologies, he is particularly interested in the issues of privacy and trust that arise with the adoption of blockchain by large organisations. He examines this process through the lens of blockchain "designers" and the socio-technical imaginary of the technology. For his thesis, he conducted an initial study on the adoption of blockchain and the socio-technical compromises between the blockchain imaginary and the organisational imperatives it demands. His second study focuses on the diffusion of the technology within the banking sector.

Quantified Hope: Visibilities and Invisibilities in the Movement for the Use of Medical Cannabis in Brazil - Guilherme Alves

The use of medical cannabis in Brazil remains a complex and controversial issue. The social landscape surrounding cannabis is shaped by an intricate web of human and non-human actants, including regulatory agencies, healthcare professionals, patients, activists, technologies, material artifacts, and sociotechnical networks. These interconnected elements continually produce controversies and influence power dynamics in the field. Amid this evolving scenario, organisations dedicated to democratizing information and expanding access to cannabis-based treatments are emerging as critical actors. The routine generation and dissemination of data on patients and treatments have become a significant new materiality within cannabis activism, reshaping the strategies and narratives of these movements.

This study examines the Associação Brasileira de Acesso à Cannabis Medicinal do Rio de Janeiro (Abrario), focusing on its engagement with contemporary datafication practices in the context of cannabis activism. Datafication is understood here as a multidimensional process that transcends the traditional production of official statistics by governmental entities (top-down) and extends to community-driven, grassroots initiatives (bottom-up). By situating Abrario at the base of the data production and circulation pyramid, this research highlights the organisation's intermediary role in transforming patient data into actionable advocacy tools.

The findings reveal that Abrario has not only incorporated datafication into its organisational framework but also operates within what Carlos Novas describes as a "political economy of hope." In this framework, the organisation engages in data activism by producing quantitative evidence on patient demographics, medical conditions, treatment outcomes, and the efficacy of cannabis-based therapies. This data-driven approach simultaneously fosters a form of biological citizenship, wherein patients' lives are redefined around the pursuit of dignity and improved quality of life through access to medical cannabis.

Moreover, the study underscores the need to further investigate the intersection between grassroots data production and the broader structures of legitimacy in knowledge production. It highlights the importance of examining how grassroots organisations like Abrario navigate the dynamics of authority and credibility within scientific and medical discourses. Drawing on insights from Science and Technology Studies (STS), the findings suggest that data activism not only challenges established hierarchies of knowledge but also redefines the boundaries of expertise and authority in healthcare.

Ultimately, Abrario's practices extend beyond individual experiences, transforming them into collective narratives of resistance and social change. This case illustrates how grassroots datafication practices can drive social impact, turning localized experiences into powerful tools for advocacy, expanding data narratives, and fostering a more inclusive and equitable health landscape.

Guilherme Queiroz Alves is a Brazilian PhD candidate at the University of Antwerp (IOB) and a Doctoral Researcher at the InfoCitizen data lab (ERC). With a background in International Relations and Political Science, his research focuses on political behavior, citizenship, and democracy. In his PhD, he explores the transformative role of civil society organisations in Brazil's data landscape by investigating the politics (infrastructures, epistemologies, visibilities) and the poetics (experiences, socialites, and affects) of producing and circulating data. Through a mixed-methods approach that emphasizes data ethnography, he examines the daily routines, tools, and schemes of datafication within organisations to understand how data is leveraged to redefine citizenship in Brazil. Previously, he has worked with digital rights, social impact, and public policy at the local level, both in the public administration and non-governmental organisations.

Does Public Interest in Data Protection Law Cloud the Understanding of Health Data Actors? – Rebecca Demoule

This research analyses the evolution of the notion of '*public interest*' in the context of secondary use of health data. Access to health data in France is part of policies of competitiveness and attractiveness; as a result, private actors have access under conditions to the national SNDS database. This intervention intends to analyse the realization of these

policies in law through the legal notion of '*public interest*'. Indeed, the interpretation of '*public interest*' may have evolved since it first appeared in European and French data law, especially regarding health data processed by private actors. As a consequence, this research questions how the politics of access to health data have changed and shaped the notion of '*public interest*' in data protection law. This requires to identify the reasons of the evolution of '*public interest*', especially in French law. From this perspective, '*public interest*' could question the visibility and invisibility of the actors in the connections of health data. On the one hand, one can argue that the notion of '*public interest*' blurs the existence and the role of the actors involved in the circulation of health data. In that respect, the expansion of the notion of '*public interest*' questions the transparency of health data's reuse. While on the other hand, law might have made these actors more visible through the institutionalization of their access to databases, including through the notion of '*public interest*'.

Rebecca Demoule is a postdoctoral researcher in law at the ISJPS (CNRS UMR 8103 - Paris 1 Panthéon-Sorbonne University, France) and the ISNS, within the project SaNSo of the PEPR Digital Health. She undertakes research on the legal challenges of the digitalization of health data, especially the reuse of health data. She has a PhD in law from Paris 1 Panthéon-Sorbonne University (IRJS). Her doctoral dissertation focused on a critical approach of the use of the word 'consent' in the law of persons. Rebecca has an interest in interdisciplinary research, especially between law and social science, and in comparative law, in particular German law.

Interoperability/non-interoperability (Thursday)

As connections shape data circulation, they allow certain flows and prevent others, with potentially considerable social consequences, if only in terms of access to services. These affordances and constraints are linked to a property that is essential to the existence of networks: interoperability, i.e. the ability of information systems to exchange and interpret data. Interoperability requires conditions – not only technical, but also legal and organisational – that can be hard to meet. Interoperability selects what is shared and how, but also highlights the importance, when thinking about connections, of considering what hinders or obstructs them, sometimes to the point of disconnection. Here, various political issues come into play: reconfiguration of territories by connectivity infrastructures, social inequalities in the face of connections, the right to data portability, the right to privacy and emerging discussions on a putative right to remain offline. Laurène Le Cozanet built this workshop to argue for a research that takes into account the different dimensions of interoperability – especially technical and legal – when investigating the political implications of interoperability. This reflection was extended by a case study on challenges of interoperability/non-interoperability in proactive administration projects.

Laurène Le Cozanet's introduction presented how we can study connections through interoperability. Taking the approach to networks in science and technology studies (STS) as a starting point, she highlighted the importance of considering connections. Connections do more than create a link between different entities; they actually transform them by putting them in contact with each other. She then discussed the concept of interoperability, which originates from the worlds of railways and the army. This concept gained great importance with the rise of information and communication technologies, beginning with the installation of major telecommunications and computer networks from the 1960s onwards. This was followed by the spread of information systems in administrations and businesses, e-government projects and then national and international interconnection projects in various sectors, such as police, justice, migration or health. Recently, interoperability has even become a watchword, particularly in the public sector of the European Union. Interoperability emerges at different "layers" of connections (hardware, software and semantics, to which some definitions add legal and organisational layers). However, interoperability is often studied through only one of these layers, despite the importance of considering these different dimensions together.

Laurène Le Cozanet is part-time assistant professor at the European University Institute (Italy), associate researcher at the Centre for studies of social movements (CEMS-EHESS) and at the Interdisciplinary Laboratory for Economic Sociology (Lise- CNAM). She holds a PhD in political science (Paris Dauphine, 2019), winner of the Eicher Prize in 2022. Her research focuses on the regulation of interconnections and on the interoperability of

administrative information systems in Europe. She also works on the political role of contemporary universities.

In her presentation, **Deirdre Curtin** explored the profound challenges that EU data-led and interoperable security pose to democratic control, as well as to the normative principles of legal protection and accountability. Her research investigates shifts in executive power at the EU level using a bottom-up approach. She examines how digitalized bottom-up practices are developed and transformed into legislation, thereby shifting the frontiers of the EU. EU agencies, especially Frontex, have built databases to which access has been progressively granted to multiple actors, and which are partly interconnected thanks to increasing interoperability within the EU's structures. Deirdre returned to the European project of a "security union" and explained how interoperability relativises the principle of originator control over data, which normally applies to international data exchanges. Protecting rights in databases and data flows has therefore become challenging. How do fundamental rights of the individual apply in this context? We should consider who owns data (as there is no real ownership), how EU public administrations access, share and use data, the implications for border management and the factors that make rights transition. The introduction of AI increases technical and institutional opacity, as secrecy (from private providers regarding public authorities) is the dominant logic. How should transparency be approached in this context? What is its relationship to law? Deirdre Curtin concluded with a call for more interdisciplinary reflection.

Deirdre Curtin is a professor of European Law at the EUI. Prior to that, she held the Chair in European Law and Governance at the University of Amsterdam where she was the founding Director of the Amsterdam Centre of European Law and Governance (2008-2015). She is an elected member of the Royal Netherlands Academy of Arts and Sciences (KNAW, 2003) and a laureate of the Spinoza prize by the Dutch Scientific Organization (NWO, 2007). Her current research is mainly focused on the accountability of European executive actors in relation to AI and information-sharing.

In their presentation, **Carmen Brando** and **Raphaëlle Fourlinnie** examined the mechanisms and best practices that facilitate data sharing and protection in the field of digital humanities. While the practice of interoperability is well established in the context of the web and digital libraries, questions remain about the changing purpose of data. In an academic setting, for example, interoperability can create tension between the promotion of open science and the risk of data being exploited by predatory publishers and IA technology companies. Interoperability is essential for open science, facilitating the sharing of research data and scholarly communication.

Carmen and Raphaëlle introduced the research data lifecycle, as well as the FAIR principles (making data findable, accessible, interoperable and reusable), and questioned their

implementation in cases such as Didoména (a research data repository at EHESS), recherche.data.gouv.fr (a French government aggregator of research data repositories), and OPERAS (a European research infrastructure for the development of open scholarly communication in the social sciences and humanities).

If research data can be open, to what extent can personal data can be? The web is the largest data repository, but is it really open in licensing terms? How can we prevent research data from being carelessly used to train AI? Is the decentralised web a good alternative? Carmen and Raphaëlle discussed protocols and presented interesting initiatives, such as the Linked Web Storage Working Group Charter, Dokieli and the CARE principles of data governance centre interoperability, which focus on people rather than data (Collective Benefit, Authority to Control, Responsibility and Ethics).

Carmen Brando is a senior research engineer at the École des Hautes Études en Sciences Sociales (EHESS) in Paris. With a PhD in Computer Science, her work focuses on Digital Humanities, particularly in the areas of natural language processing (NLP), information extraction, and data visualization for historical and literary sources. Her research explores how technology can be applied to the humanities, including projects on named entity recognition and geospatial analysis of historical data. Brando is involved in various interdisciplinary projects that combine computer science, geography, and social sciences, aiming to make historical data more accessible and analysable.

Raphaëlle Fourlinnie is a digital project expert at EHESS with a focus on digital humanities and library data management. She has held key positions at the National Library of France (BnF) and the Grand Équipement Documentaire at the Condorcet Campus, promoting open science initiatives and leading training programmes. Her expertise spans metadata engineering, semantic web technologies, and the promotion of scientific publications. She has also contributed to cultural and educational projects aimed at enhancing open access.

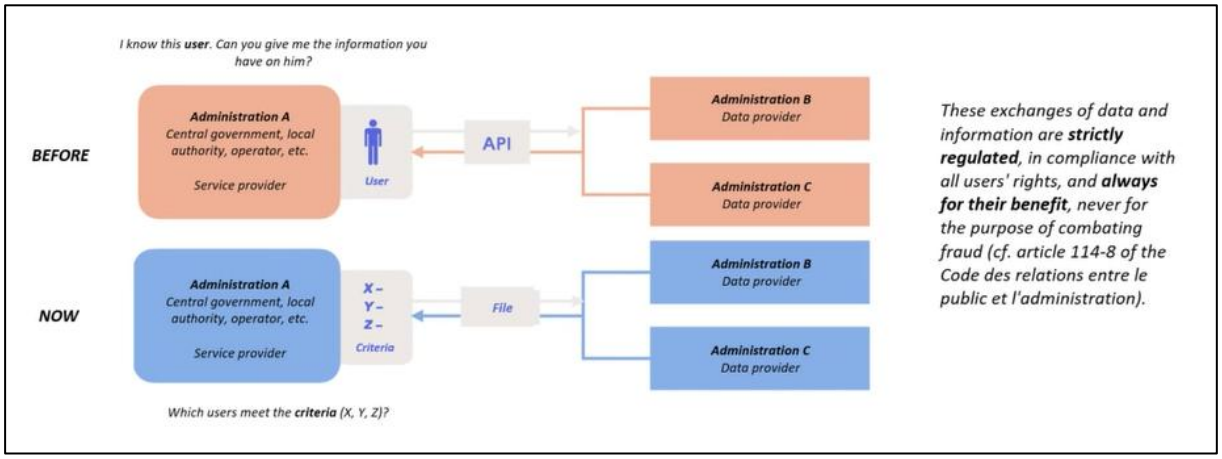
In her presentation, **Marion Loustric** discussed proactive state programmes led by the French Interministerial Digital Department (Dinum), focusing on the use of data to make administrations more proactive and the obstacles raised by interoperability/non-interoperability in this regard.

She started by providing a definition of a proactive state, distinguishing three levels: simplification (the "tell us once" principle), notifications (the administration informs people when they are eligible for certain rights), and automation (automatic allocation of rights). She presented these programmes as an answer to the non-use of rights and a way to simplify procedures. She emphasised the paradigm shift involved: knowing citizens better in order to give them rights, but also to understand the risks better in order to regulate more effectively. The three main issues in such initiatives are the legal framework, security and interoperability.

She identified three main challenges.

- First, sharing a common definition of data, both a semantic and a legal challenge. For example, the Dinum held lengthy discussions about how to calculate the number of children in a family or how to define income.
- Second, a need to speak the same technical language.
- Third, "industrialising data exchange" through APIs, which raises issues regarding the quality and security of exchanges.

At last, Marion introduced the concept of "interoperability by design": the API.gouv offer has realised the concept of 'tell us once' and is evolving to address the challenges of proactivity.



Source: DINUM.

Marion Loustric is the director of the "Proactive Administration" programme at the Interministerial Directorate for Digital Affairs (DINUM). Her mission is to simplify administrative procedures by anticipating the needs of citizens and businesses through improved data sharing between government agencies. A key figure in the digital transformation of the state, she works to make public services more efficient and user-focused.

Workshop presentations

Interoperability Politics in EU Digital Health: Case Studies of COVID-19 Contact-Tracing Applications and the European Health Data Space – Chloé Bérut

The paper explores how digitization in public policy, particularly in the European Union (EU), creates new governance opportunities through digital health interoperability. By focusing on two EU initiatives—the COVID-19 contact-tracing applications and the European Health Data Space (EHDS)—it examines how technical considerations intersect with political dynamics.

The EU leverages digitization to navigate its jurisdictional limitations by ensuring compatibility across national infrastructures. This process, often framed as purely technical, enables the EU

to position itself as a central governance actor. Interoperability is presented as a neutral technical issue, yet it carries profound political and ethical implications. Decisions about what data to include in health systems or how that data is structured reflect conflicting interests—ranging from medical and industrial priorities to governmental and citizen needs. Such decisions significantly influence the usability and inclusivity of digital tools, shaping how public services are delivered.

In the case of the COVID-19 contact-tracing apps, the EU developed a voluntary interoperability gateway to harmonize application designs across member states. This initiative, implemented in 2020, illustrated the prominent role of tech giants like Google and Apple, whose influence shaped key technical decisions, such as the adoption of decentralized data systems. The EHDS, adopted in 2024, takes a more comprehensive approach by mandating health data exchange standards across the EU. This framework facilitates seamless data sharing for primary care and secondary uses like scientific research. By reducing data fragmentation, the EHDS strengthens the EU's regulatory presence in healthcare, traditionally a domain protected by national sovereignty.

The study reveals that interoperability is not merely a technical necessity but also a political tool. By framing it as a neutral concept, the EU has managed to gain consensus on digital health reforms, even in areas where member states have historically resisted shared governance. This narrative shift has allowed the EU to expand its regulatory influence without triggering overt political opposition. The research also highlights the growing involvement of new actors, including tech companies and standardization bodies, in shaping EU policies. These actors, alongside traditional political institutions, navigate complex power dynamics, often resulting in conflicts over data privacy, system design, and control.

The implications of interoperability extend beyond technical efficiency. Standardization risks marginalizing diverse societal needs, such as those of minorities, and raises broader ethical and political questions about governance, inclusivity, and power. Through its case studies, the paper demonstrates how technical decisions in digital health governance can obscure underlying political struggles while reshaping power relations between states, the EU, and private entities.

In conclusion, the study underscores interoperability's dual function as a technical enabler and a political strategy. It facilitates deeper European integration while transforming governance structures, illustrating how the EU navigates the complex interplay of politics and technology to expand its influence in sensitive policy domains like healthcare.

Chloé Bérut is an MSCA Fellow at Ca' Foscari University. Prior to this, she served as a postdoctoral researcher for the Risk and Uncertainties Assessment Program (PARI) at Sciences Po Paris, and at the Printemps Research Centre in collaboration with the French Ministry of Health. She earned her PhD in Political Science from Sciences Po Grenoble in 2020, where her dissertation received two PhD awards. Her research primarily focuses on health policies within the EU, with a particular emphasis on digital health policies. She has investigated the influence of the EU on member states' digital health policies

and has explored issues related to access to health databases. Her work has been published in *West European Politics*, *Governance*, *French Politics*, *Politique européenne*, and *Gouvernement et Action Publique*.

Masters of interoperability: the gatekeeping role of Apple and Google in digital contact tracing strategies during Covid-19 – Dario Pizzul

Digital Contact Tracing (DCT) was one of the many non-pharmaceutical interventions deployed in the early months of 2020 to combat the COVID-19 pandemic while awaiting the development of vaccines. In Europe, DCT became a highly discussed topic, with many scholars contributing to the design of protocols, private firms—led by Apple and Google—participating in its implementation, and countries releasing official tracing apps. The EU encouraged member states to develop interoperable solutions that could communicate with one another.

As Annalisa Pelizza argues, interoperability-oriented projects are ideal sites for observing significant institutional transformations, particularly in terms of power distribution, by examining the technical and specific details of these projects. The development of DCT in Europe illustrates this dynamic, with Apple and Google playing the most significant role in shaping the majority of the EU's tracing apps. The two tech giants collaborated to create a digital solution that addressed issues related to the use of iPhones' Bluetooth for tracing purposes, which had previously hampered the functionality of these apps. Their solution quickly became the dominant DCT protocol in Europe. On one hand, it was the only official method Apple used to "open up" Bluetooth communication on its devices; on the other, it provided a common framework for developing national apps that could communicate with each other, ensuring interoperability.

France was one of the few European countries that did not rely on Apple and Google's solution, citing digital sovereignty concerns. This decision resulted in significant difficulties as France sought to develop its own DCT system outside the emerging standard. Considering the arrangements of power concealed within the arrangements of technical architecture, the DCT case underscores Apple and Google's gatekeeping role. This role allows them to set rules and guiding principles that even public institutions must follow. By controlling the digital mobile infrastructure, Apple and Google not only established ethical principles and rules for this newly developed technology but also influenced the implementation of a multinational non-pharmaceutical intervention—an area traditionally reserved for healthcare policymaking.

During the pandemic, national governments across Europe implemented strict measures such as curfews, lockdowns, and widespread closures. However, they were unable to compel Apple to change its Bluetooth policy. In times of emergency, basic rights were temporarily restricted for the greater good, yet the policies of a tech corporation remained unaltered. This reality highlights the current power dynamics between these actors.

Dario Pizzul is a postdoctoral researcher at the University of Pavia (Italy), primarily working on a project focused on aging and digital technologies. He obtained his PhD from the University of Milan – Bicocca in the programme "Analysis of Social and Economic Processes", with a dissertation titled "The Governance of Digital Contact Tracing: The Role of States, Corporations, and Users in the Development of a Digital Strategy Against COVID-19 in Europe". During his PhD and in the months following it, he also worked on a project concerning surveillance capitalism and collaborated with Fondazione Giangiacomo Feltrinelli, a research centre in Milan, on topics related to the digital transition.
His research interests lie broadly within Science and Technology Studies and the many issues surrounding digital technology, with a specific recent focus on datafication.

Biometric Health Identity in India: Controversial Interoperability and Data Doubles – Faheem Muhammed

In less than a decade, access to most of India's welfare schemes has been digitalized. Biometric IDs such as AADHAAR, PM-JAY (formerly RSBY) and ABHA are now required to access health services in many States of India. What is the genealogy of these multiple biometric identification systems? How are citizens navigating between the different health digital IDs? What kind of data are these biometric IDs encapsulating? How are these databases communicating (or not)? What is the role of the state, parastatal and private actors in building and maintaining these infrastructures? By studying several health ID systems - from RSBY to ABHA - implemented by the central government, our paper builds a genealogy of biometric-based identification systems for health. It relies on archival and ethnographic materials collected between 2017 and 2024 in Bihar, Jharkhand, Chhattisgarh, Tamil Nadu, Puducherry and Kerala. We will trace the trajectories and connections that make these digital infrastructures pervasive and omnipresent to access fundamental health rights. We will detail the differences and common grounds between these ID systems that are confusing citizens and displacing their datafied identities. These digital systems are creating digital twins of citizens that are circulating in an opaque manner, between different stakeholders. Public health insurance for the poorest often turns out to be a testing ground for these digital ID systems. The most dependent and vulnerable strata of the population are bound to experience the complexity, duplicity, and breakdowns of these technical systems in order to exert their right to healthcare.

Faheem Muhammed M.P. is a PhD research scholar in the Department of Electronic Media and Mass Communication, Pondicherry University, India. His work explores the datafication of body and health in India and the interplay of identities, bodies, and embodiment within health identity systems. He holds a postgraduate degree in Mass

Communication from Pondicherry University. His research interests include STS, digital sociology, medical humanities, decolonialism, critical race studies and gender.

Collective Science platform: a FAIR-by-design psychological assessment tool for persons with autism – Hanen Bellili

The Collective Science platform embodies the FAIR by design and Privacy by design principles by producing standardized computable data in the experimental research framework. Heterogeneous data on human cognition and in the neurodiverse band gap on which Data and Information Sciences are called to work come as multiple open-access low-level formats and computational complexity with strains of normalization degrees. Methodological and ethical challenges shape the humanization of experimental research in the open science framework.

This study aims to develop, standardize, and computably assess experimental datasets structured according to different sampled styles of evolutionary-informed cognitive profiling of neurodiverse autistic individuals.

The -dataset producer device generates, collects, and manages heterogeneous information across a multi-scope triangulation, collecting researcher, participant, and transformed data from Experimental Tasks, Video Games, Cognitive Tests, and Questionnaires. The data synergy comprised different exposure modes, accuracy levels, data volume, and meta-structured information forms the evolutionary-informed cognitive profiling horizontal dataset of change. The integrative standardization and interoperability process crosses the FAIR-oriented framework of diverse structures and types of data and information.

The overall operational framework of CS is built to complement the action of existing infrastructures like NAKALA, Zenodo, and EOSC, focusing on archiving, sharing, and preservation, intervening at a later stage in the data lifecycle. As part of the preparation of heterogeneous datasets, it handles the initial stages of data collection, cleaning, and integration. The homogenizing complementary value of data and information, as well as heterogeneous accuracy range and functional diversity within the paradigmatic framework of the CS context, require the implementation of specific computational logic. The latter will be applied to ensure compliance with FAIR requirements, information consistency, compatibility with all cross-standard and regulatory requirements, while preserving full informational value without data loss or conversion.

The CS deliberately integrates, harmonizes, and processes early empirical evidence to prepare for structuring and normalizing the FAIR-compliant evolutionary-informed cognitive profiling of neurodiverse autistic participants from the generation point. The platform's intrinsic modularity ensures a high level of personalization, complementing the above-indicated evidence-based environments and counterbalancing the bias introduced by the variability of exposure modes (Experimental Tasks, Video Games, Cognitive Tests).

CS represents the shift from experimental Social Sciences and Humanities research towards open science-oriented infrastructures. FAIR and Privacy by design principles are natively embedded in the whole process of data production and in the sharing phase. Beyond methodological issues, the platform makes it possible to implement effectively the multilevel transformation from different representations of experimental context data toward data sharing and reuse in a standardized interoperable computer-compliant framework where consecutive processes remain strictly aligned with SSH epistemic rigor and ethical principles.

Hanen Bellili is an engineer with over ten years of experience, and has worked as a full-stack developer in two CNRS research centres. She is currently PhD candidate in social sciences at EHESS and ENS. Her research focuses on developing a new approach to assess the abilities of autistic individuals. This involves creating an experimental tool that generates datasets compliant with FAIR standards and GDPR regulations, emphasizing participatory science, decision support, and personalized experimental tasks. Her work aims to combine scientific rigor with ethical considerations to make a significant impact in this field. She is confident that this research will bring significant advancements in evaluating the abilities of autistic individuals while upholding the highest ethical and scientific standards.

Interoperability in Digital Markets: Extending the regulatory and technical framework from the financial sector – Pankhudi Khandelwal

Digital services are controlled by large firms. Regulations such as the Digital Markets Act (DMA) impose an interoperability obligation on these firms to interconnect their services with other players to facilitate their entry and expansion. However, the DMA depends on the regulated entities for compliance with the obligations. The paper argues that the compliance mechanism is not sufficient for obligations such as interoperability since it provides the firms with wide discretion to comply with these obligations on their own terms [Interoperability in digital markets: extending the regulatory framework from the financial sector, E.C.L.R. 2024, 45(10), 464-478. Therefore, the regulator should have a more active role in ensuring the implementation of interoperability obligations.

The research project investigates whether a model of interoperability derived from the financial sector might provide a suitable blueprint for interoperability in digital services. There are two reasons for this. First, interoperability models that manage trade-offs well have been deployed in several jurisdictions. To some extent, this can be attributed to well-designed regulation and an active regulator overseeing its implementation. Second, the question of a horizontal extension of the financial sector experience with interoperability to digital markets also makes sense. Certain market features of digital services resemble financial markets, such as data-intensiveness, network effects, economies of scope and asymmetric information, which lead to the entrenching of market power of incumbents.

The research aims to look at regulated interoperability frameworks to bridge the gap in the literature concerning the effective implementation of interoperability on digital platforms. Based on the regulatory framework of the Unified Payment Interface (UPI) payments system in India, the paper draws a parallel with the following functions that the financial regulator undertakes and suggests how the same functions can be applied to ensure interoperability in digital markets:

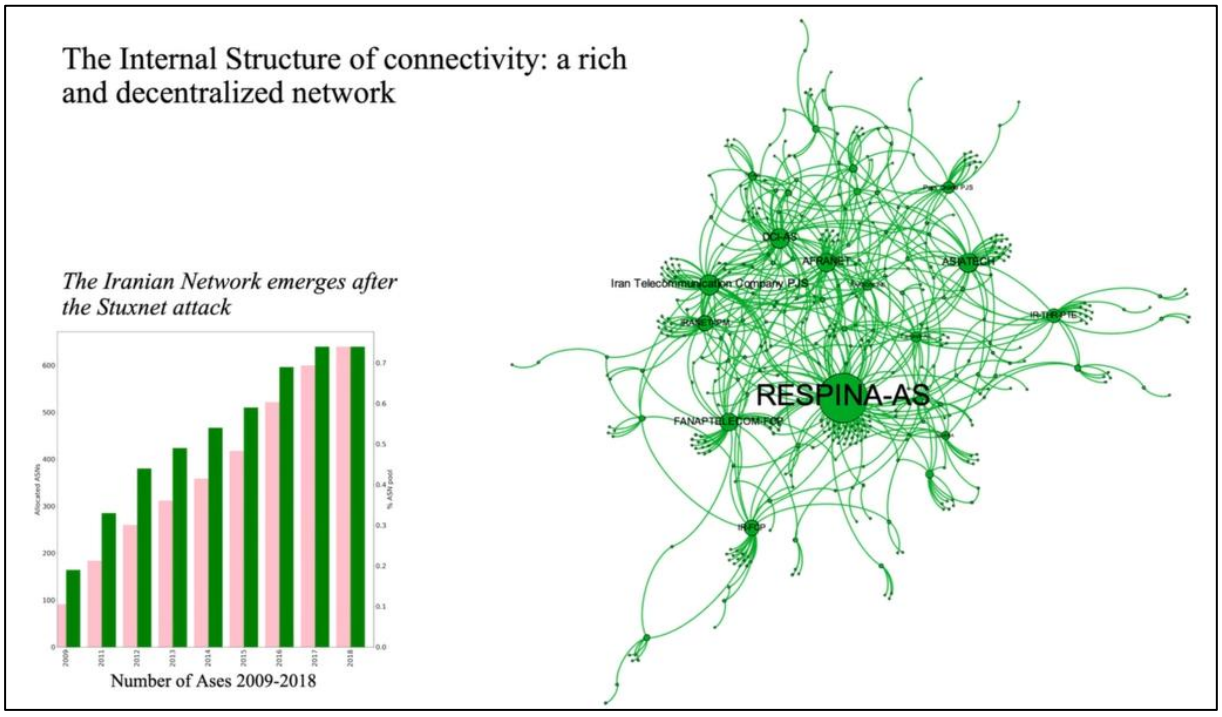
1) Licensing – The regulator could form an alternative forum where, dependent on the privacy and security requirements of the gatekeepers, third-party players could gain a license, after which the gatekeeper cannot refuse to provide interoperability. This would remove the gatekeepers' discretion to decide who to share interoperability with.
2) Standardisation – The standards should be formulated through a collaborative approach, as seen in UK open banking. The paper elaborates on how this can be achieved under the DMA.
3) Information-gathering and audits – There could be a duty on the gatekeepers to get an audit conducted by a third-party independent auditor to ensure that it is functioning in a fair, reasonable, and non-discriminatory manner by providing the same terms and conditions for interoperability for all app developers.
4) Building trustworthy institutions – From the financial sector experience, it is seen that consumers adopt alternative solutions when they are backed by institutions that they trust. The paper elaborates on how such trust can be built up in these institutions.

Pankhudi Khandelwal is a second-year PhD researcher at the European University Institute and the first candidate under the ASPIRE scholarship grant. Her research project focuses on interoperability in digital markets from a competition law perspective. She is also a young scholar at the Dynamic Competition Initiative (DCI). Previously, she worked in a leading corporate law firm in India for one year, after which she went on to pursue her master's in Competition, Innovation and trade law from the London School of Economics and Political Science (LSE). Before starting her PhD, she worked for 3 years as an Assistant Professor at O. P. Jindal Global University in India. Her articles have been published in various reputed journals, including the Journal of Competition Law and Practice, Concurrences, International Review of Law, Computers & Technology etc. She has also presented her work at highly prestigious conferences, including the conference on 'Mapping and governing the online world' organised jointly by ETH Zurich, New York University (NYU) and the University of Lausanne, Competition Law and Policy Workshop hosted by the Centre for Law, Economics and Society at UCL Faculty of Laws and annual conferences held by the Academic Society for Competition Law (ASCOLA) and Asian Law Institute (ASLI).

Geopolitics of connections (Friday)

Frédérick Douzet and her team presented their research conducted at GEODE Centre, on the geopolitics of the "datasphere". This concept refers to the fusion between the digital revolution and the global interconnection of information and communication systems. For this purpose, their DATAROUTES ERC project aims at mapping Internet routes and their manipulation for strategic purposes.

Frédérick Douzet's presentation explored the geopolitics of internet infrastructure, focusing on how states and private actors exert control over internet connectivity and routing. Using examples like Russia's "digital annexation" of Crimea and Donbass, and Iran's strategically centralized network, the presentation highlighted how internet infrastructure can be manipulated for political purposes. The research utilizes the Border Gateway Protocol (BGP) to map internet routes, revealing a trend towards centralization and vulnerability, with a significant portion of global traffic flowing through a limited number of private companies like Google and Facebook. This concentration of control raises concerns about resilience, as demonstrated by the 2021 Facebook outage caused by a BGP misconfiguration. The presentation also examined the case of Pakistan, which relies heavily on a single cable route through the Suez Canal, making it susceptible to disruptions. In contrast, Bangladesh boasts a more distributed and robust network. The research concludes that Pakistan needs more Points-of-Presence (PoP) to enhance its internet resilience, despite having Content Delivery Networks (CDN) for caching content. Overall, the presentation underscores the importance of understanding the geopolitical dimensions of internet infrastructure and the need for greater diversification and resilience in an increasingly interconnected world.



Source: Loqman Salamatian, Frédérick Douzet, Kavé Salamatian, Kévin Limonier, "The geopolitics behind the routes data travel: a case study of Iran", *Journal of Cybersecurity*, Volume 7, Issue 1, 2021.

Frédérick Douzet is a Professor of Geopolitics at the University of Paris 8 and director of the French Institute of Geopolitics research team (IFG Lab). She also leads the Centre for Geopolitics of the Datasphere (GEODE), where her research focuses on the strategic and geopolitical challenges of cyberspace. In 2022, Douzet was appointed as a senior member of the prestigious Institut Universitaire de France and has been a member of the French Defense Ethics Committee since its creation in 2020. Her work primarily addresses the power struggles within cyberspace and aims to incorporate the cyber dimension into geopolitical analysis.

Digital research ethics (Friday)

This last sequence on digital research ethics was divided into two presentations. The first presentation by **Jean Lassègue** focused on the ethical and legal challenges arising from the use of humanly-illegible computer code in courts. Jean Lassègue's presentation explored the implications of Artificial Intelligence (AI) for the concept and practice of justice. He emphasized the importance of physical and social spaces for justice, where deliberation and conflict resolution can occur. Then, drawing parallels between mathematics and law, he traced the historical evolution of mathematical reasoning from geometry to arithmetic, to the binary language of computers, arguing that it is a new kind of writing. He then examined the increasing integration of AI in legal processes, highlighting three key stages: 1) automation of administrative tasks, 2) the rise of "code as law" where algorithms determine outcomes and profiling is used for surveillance, and 3) the emergence of distributed and crowdsourced justice through online platforms and the use of digital evidence. Lassegue concludes by raising questions about the changing nature of justice in an increasingly digital world, where AI blurs traditional boundaries and challenges established notions of legal spaces, evidence, and decision-making.

Jean Lassègue is a philosopher and researcher at the CNRS (French National Centre for Scientific Research) and affiliated with the École des Hautes Études en Sciences Sociales (EHESS) in Paris. His research focuses on the philosophy of technology, symbolic forms, and the history of computer science. Lassègue's work explores the intersection of digitalization and social sciences, with particular emphasis on the evolution of symbolic activities in human societies. He has also written extensively on the contributions of Alan Turing to modern computational theory.

Drawing from her experience, including her recent work on secure messaging and digital resistance in Russia, as part of the NEXTLEAP (2016-2018) and ResisTIC (2018-2022) project, **Francesca Musiani** discussed approaches to conducting fieldwork in sensitive areas.

Her presentation advocated for a shift in research methodology, emphasizing collaboration and ethical considerations when studying communities, particularly in the digital realm. It encouraged researchers to move beyond simply extracting information "about" a subject to actively engaging "with" the community, contributing to their well-being, and minimizing potential harm. The presentation thus highlighted four key areas for reflection:

1) Choices of communication tools and data storage: Researchers should prioritize secure and transparent methods that respect community preferences and ensure data confidentiality.

2) Evolutive engagement protocols: Researchers should establish clear and adaptable protocols for interaction, ensuring ongoing consent and allowing for community feedback throughout the research process.
3) Publication and dissemination of the results: Researchers should involve the community in disseminating findings, ensuring that results are presented in a way that is accessible and beneficial to them.
4) Digital hygiene: Researchers must prioritize digital security and confidentiality, protecting sensitive information and respecting community privacy.

Overall, the presentation emphasized a more ethical and collaborative approach to research, recognizing the agency and expertise of the communities being studied.