



# International Symposium on Compliance for Algorithmic Law (SCALGO 2022)

01 December 2022 | 13:00 - 19:00 / 02 December 2022 | 9:00 - 13:00 (Paris Time)

Campus Condorcet - Bâtiment de recherche Sud

5 cours des Humanités, 93320 Aubervilliers

Registration for onsite and online: <https://forms.gle/3VPQHVEz93e5m9cq7>

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Along with advances of artificial intelligence into society, a situation has emerged in which artificial intelligence is closely related to the real world and legal and ethical problems caused by artificial intelligence naturally occur. In particular, AI systems by which governments replace human officials (we call here “algorithmic law”) receives a critical concern since these decisions made by the AI system will be legally effective to enforce people. Along with frequent uses of such AI systems, algorithmic law will become a great matter for civil rights. Therefore, civil control of algorithmic law should be prepared urgently. To solve these problems, we request governments to expose program source of such AI systems to the public. However, there is a serious technical problem about this check of algorithmic law. Currently, analysis of software code is done manually. However, according to increasing number of such software, it would be very difficult to find a problem by human. For this reason, automatic compliance check of legal and ethical norms for algorithmic law should be investigated. In this symposium, we are discussing how we automate compliance check of norms for algorithmic law with interdisciplinary researchers from computer science, AI, standardization, law and ethics. The topics includes but not limited to:

- (1) Automatic mechanisms for compliance check of algorithmic law
- (2) How to extract information related with compliance from program source of algorithmic law
- (3) How to formalize abstract compliance norms

# Programme

December 1<sup>st</sup> | Room 0.030

## 13.00 | Opening Remarks

**Sébastien Lechevalier** (EHESS-FFJ)  
**Ken Satoh** (National Institute of Informatics)  
*Air Liquide representative (to be confirmed)*

## 13.10 | Session 1

Algorithmic Law and Related Problems

**David Restrepo Amariles** (HEC)

Compliance Mechanism using AI for Algorithmic Law

**Ken Satoh** (National Institute of Informatics)

## Break

## 14:45 | Session 2

Can AI Meet Any of the Challenges of Regulatory Compliance?

**Randy Goebel** (University of Alberta)

Algorithmic Law as Computational Argumentation

**Bart Verheij** (University of Groningen)

## Break

## 16:30 | Session 3

The Compliance Gap in Data Supply Chains: Smart Contracts as a Compliance Technology

**Pablo M. Baquero** (HEC)

Can AI Technical Standards Save Human Rights?

**Grégory Lewkowicz** (Université libre de Bruxelles)

## Break

## 18:00 | Round Table

chaired by **David Restrepo Amariles** (HEC)

## 19:00 | Cocktail

# Programme

December 2<sup>nd</sup> | Room 0.031

## 09:00 | Session 4

**GDPR-120 : an Expert Annotated Dataset for Privacy Policy Compliance Assessment under the EU GDPR**

**Raphael Gyory** (Université libre de Bruxelles)

**Leveraging Knowledge Graphs for GDPR Compliance: Smart Cities and Insurance Use Cases**

**Anelia Kurteva** (University of Delft)

## Break

## 10:45 | Session 4

**Modelling, Analysing and Enacting Compliance Requirements in Digital Processes: A Process-Management Perspective**

**Hugo A. López** (Technical University of Denmark)

**Making Abstract Legal Norms Ready to be Formalised**

**Georg Borges** (Saaland University)

**Ethical Ccompliance Principles and Representations**

**Gauvain Bourgne** (Sorbonne University)

## 13:00 | Closing remarks & Lunch

## Participants (alphabetical order)



### **Pablo Baquero (HEC)**

Pablo Marcello Baquero is Assistant Professor at HEC Paris and a Fellow at the Hi! Paris Center on Data Analytics and Artificial Intelligence for Science, Business and Society. He is a member of the Smart Law Hub at HEC Paris, is involved in different interdisciplinary academic communities focused on law and technology and collaborates closely with scholars across different disciplines, in projects at the intersection between law and AI. His research examines how legal institutions and technologies can support practices of innovation in a socially and economically inclusive way, contributing to disseminate to most firms the opportunities to produce in the frontiers of innovation and extending the benefits of advanced technologies to society at large in a lawful and ethical way. His first book, entitled

“Networks of Collaborative Contracts for Innovation”, has been published by Hart. Before becoming an Assistant Professor, he was a Postdoctoral Research Fellow at HEC Paris. He holds a Ph.D. in Law from the University of Cambridge, a LL.M. from Harvard Law School and a LL.B. from the Federal University of Rio Grande do Sul, Brazil.

## **The Compliance Gap in Data Supply Chains: Smart Contracts as a Compliance Technology**

Pablo M. Baquero (HEC Paris), David R. Amariles (HEC Paris), Daniel Amyot (University of Ottawa)

This paper investigates the use of smart contracts as a means to improve compliance with data protection laws by harnessing the back end of data supply chains. The privacy literature has focused predominantly on B2C relationships (front end data processing) to assess corporate compliance with data protection laws and explored the use of technologies primarily as a means to empower data subjects vis-à-vis data processors. This article shifts the perspective. First, it shows that the effective implementation of data subjects' rights hinges upon the capacity of data processors to monitor compliance in back end processing, i.e., the data supply chain. Second, it spells out the way smart contracts can contribute to bridge the compliance gap in the data supply chain which currently hinders data controllers from effectively monitoring data documents and practices across the networks of subcontractors. Indeed, while data is processed in an iterative and dynamic manner through a wide variety of means by actors within and across companies in the supply chain (e.g. controller, processors and sub-processors), the legal instruments utilized to ensure compliance (framework contracts, data protection addendums, data protection impact assessments, technical and security documents, etc.) are dispersed, static, convoluted and legalistic, ultimately lacking the capacity to operationalize data protection across different management levels (legal, technical, business, etc.). This paper offers a concrete case study testing the properties of the ‘Symboleo’ formal contract language in a dataset composed of contractual documents used in the data supply chain of a network of IT companies. The paper concludes with the challenges laying ahead to narrow the compliance gap and highlights the how smart contracts can evolve to become effective compliance tools in data protection.



### **Georg Borges (Saaland University)**

Georg Borges is a Professor of Civil Law, Legal Informatics, German and International Business Law and Legal Theory and the managing director of the Institute for Legal Informatics at Saarland University, Germany. From 2004 to 2014, he was Professor of Law at Ruhr-University Bochum. Beside this, he was also a Judge at the State Court of Appeals, Hamm Circuit. As an expert on Business Law with a focus on IT Law and on law and informatics, Prof. Borges authored several books and numerous articles in the field of IT law. Prof. Borges is involved in numerous projects in the field of IT and legal informatics. Currently, a focus of his interest is on formalizing legal norms, in particular with regard to autonomous driving.

## Making abstract legal norms ready to be formalised

In this presentation, some challenges and (possible) solutions regarding the formalisation of abstract legal norms shall be discussed. Such norms often contain broad/vague concepts which can be interpreted in various ways, allowing for their application in several different scenarios. In each of these scenarios, the concrete meaning of these broad/vague concepts has to be specified by the agent applying the law. Because of their semantic complexity and context-dependency, such broad/vague concepts pose a major challenge for the formalisation of abstract norms. One possible approach to solving this problem is to first specify the broad/vague concepts contained in them, thus reducing these abstract norms to more concrete rules entailed by them. These rules would then be used as a basis for the actual formalisation. Thus, instead of formalising the abstract norms themselves, one would only formalise the concrete rules implied by them. By analysing selected examples from Road Traffic Law, the paper will demonstrate the method and discuss the potential advantages and limitations of this approach.



### **Gauvain Bourgne (Sorbonne University)**

Gauvain Bourgne has been an associate professor in artificial intelligence at Sorbonne Université since 2012. After a PhD on collaborative hypothesis finding defended in 2008, he worked for 3 years at the National Institute of Informatics in Tokyo on logic programming, abductive reasoning and distributed knowledge discovery before joining the ACASA team in LIP6. His research domain includes knowledge representation and reasoning, logic programming and computational ethics. His current work focuses on modeling the reasoning of cognitive agents, with an emphasis on collective and ethical aspects.

## Ethical compliance principles and representations

This presentation will discuss ethical compliance checking. It will present some of the approaches used for assessing permissibility of actions and their foundation in normative ethics and introduce some of the challenges in representation or reasoning raised at different levels, such as the need for establishing actual causes or to take into account multiple values.



### **Randy Goebel (University of Alberta)**

R.G. (Randy) Goebel is currently professor of Computing Science in the Department of Computing Science at the University of Alberta and Fellow and co-founder of the Alberta Machine Intelligence Institute (Amii). He received the B.Sc. (Computer Science), M.Sc. (Computing Science), and Ph.D. (Computer Science) from the Universities of Regina, Alberta, and British Columbia, respectively.

Professor Goebel's theoretical work on abduction, hypothetical reasoning and belief revision is internationally well known; his recent research is focused on the formalization of visualization and explainable artificial intelligence (XAI), especially in applications in autonomous driving, legal reasoning, and precision health. He has worked on optimization, algorithm complexity, systems biology, natural language processing, and automated reasoning.

Randy has previously held faculty appointments at the University of Waterloo, University of Tokyo, Multimedia University (Kuala Lumpur), Hokkaido University (Sapporo), visiting researcher engagements at National Institute of Informatics (Tokyo), DFKI (Germany), and NICTA (now Data61, Australia); he is actively involved in collaborative research projects in Canada, Japan, Germany, France, the UK, and China.

## Can AI meet any of the challenges of regulatory compliance?

The current state of AI research requires more attention to principled application of AI to social sciences, including the area of regulatory compliance. Since regulatory compliance has such a broad scope, I will try and sketch a portion of that scope that can be conveyed to AI researchers, with the hope of encouraging cross disciplinary teams to multiply the value of those teams to create better value and more precisely connect to AI research challenges.



### **Raphael Gyori (Université Libre de Bruxelles)**

Raphael Gyori is a PhD candidate at IRIDIA, the Artificial Intelligence research laboratory of the Université Libre de Bruxelles. His research focuses on artificial intelligence in the field of law, and more specifically on the development of algorithmic solutions for legal compliance. He practiced as a lawyer before undertaking his research in engineering.

## **GDPR-120 : an expert annotated dataset for privacy policy compliance assessment under the EU GDPR**

Raphael Gyori (Université Libre de Bruxelles), Sébastien Meeùs (Université de Montréal, Université Libre de Bruxelles)

In this article, we present our work on GDPR-120, an expert annotated dataset for privacy policy compliance assessment under the EU General Data Protection Regulation, based on our own research on a conceptual model of mandatory information and tasks of compliance checking. The dataset consists of 120 policies, 109 possible label categories, and, currently, approximately 91,000 units of crowdsourced label units. We follow a 3-step methodology already adopted by other authors, where labels are first crowdsourced, then integrated and finally reviewed by legal experts. We are currently working on the integration stage and estimate that we will deliver about 15,000 training label units. Our goal is to provide the legal NLP community with a new task to train deep learning algorithms on an issue that affects the protection of citizens' fundamental rights.



### **Anelia Kurteva (University of Delft)**

Anelia's doctoral research, at the Semantic Technology Institute (STI) Innsbruck, Department of Computer Science, University of Innsbruck, Austria, focused on supporting machines and humans in making sense of informed consent for sensor data sharing in smart cities, with knowledge graphs. In collaboration with her colleagues from the *smashHit1 Horizon 2020* and *CampaNeo2 FFG* projects, Anelia helped bridge the gap between the Semantic Web, Human-Computer Interaction and Privacy fields by exploring the applications of knowledge graphs for informed consent solicitation and GDPR compliance. Prior to that, Anelia received an MSc in Advanced Computer Science from Cardiff University, The United Kingdom, where she also completed a BSc in Computer Science and Visual Computing.

Currently, Anelia is a postdoctoral researcher at the Faculty of Industrial Design Engineering (IDE), TU Delft, The Netherlands. Anelia's research, on the RePlanIT3 project, explores the ways the Semantic Web can help facilitate trusted, transparent and FAIR ICT data sharing in order to encourage the further implementation of the Circular Economy.

Anelia is interested in exploring the utilisation of AI and the Semantic Web for Big Data in the privacy and sustainability domains.

# Leveraging Knowledge Graphs for GDPR Compliance: Smart Cities and Insurance Use Cases

The General Data Protection Regulation (GDPR) triggered a major technological shift towards greater transparency and responsibility in data sharing. An emphasis has been put on the rights of individuals, especially European citizens, regarding their personal data sharing. Despite the fact that data sharing has been a widely researched topic for years, there is a lack of solutions that enable the transparent implementation of consent in an easily interpretable manner for both humans and machines in compliance with GDPR. Further, almost five years after the acceptance of the legislation, organisations still face significant challenges such as demonstrating compliance (or audibility) and automated compliance verification due to the complex and dynamic nature of consent, as well as the scale at which compliance verification must be performed.

This talk will present a knowledge graph-based approach for consent management in the smart cities and insurance domains. It will present an overview of how Semantic Web technologies, namely ontologies and knowledge graphs, can be used to semantically represent informed consent through its life-cycle and for automated GDPR compliance verification and audibility.



## **Sébastien Lechevalier (Professor at EHESS/President of the Fondation France-Japon de l'EHESS)**

Sébastien Lechevalier is an Economist and a Professor at EHESS (School of Advanced Studies in the Social Sciences, Paris), specialised in Japanese economy and Asian Capitalisms. He is also founder and president of the Fondation FranceJapon de l'EHESS (FFJ). Trained as a labor economist, he has extensively published on various dimensions of the Japanese economy, in comparative perspective, including: "Lessons from the Japanese experience. Towards an alternative economic policy?" (ENS Editions, 2016). His book, *The Great Transformation of Japanese Capitalism* (Routledge, 2014) was published in three languages and has been cited as one of the most influential ones on the Japanese

economy published during the last decade. Other research interests include innovation (*Innovation beyond technology*, Springer, 2019), industrial policies ("Financialization and industrial policies in Japan and Korea: Evolving complementarities and loss of state capabilities" in *Structural Change and Economic Dynamics*, 2019, Vol. 48), and inequalities & redistribution ("Decomposing Preference for Redistribution. Beyond the Trans-Atlantic Perspective", forthcoming). For more than a decade, he is involved in SASE, as a participant and an organizer.



## **Gregory Lewkowicz (Université Libre de Bruxelles)**

Gregory Lewkowicz is a professor at the Université libre de Bruxelles (ULB) and the director of the Smart Law Hub at the Perelman Centre of the Faculty of Law. He is principal investigator at the Artificial Intelligence Institute for the Common Good (FARI) in Brussels and Koyre Senior Research Fellow in Business Law & Artificial Intelligence at the Université of Nice Sophia Antipolis. He teaches the course "Smart Law: Indicators, Algorithms and Big Data" at Science Po Paris School of Law. He teaches also at Paris II Panthéon-Assas and HEC-Paris. He is a member of the external advisory board of AI4Belgium, of the "Club des juristes" digital taskforce (Paris) and a founding member of the international platform of French-speaking experts in law & AI (Geneva).

## Can AI Technical Standards Save Human Rights?

During the last 20 years, the evidence has been piling up that digital technology play a role in significant violations of human rights by public and private actors and that available legal remedies are ill-equipped to address the issue. In this context, it comes as no surprise that the two building blocks of digital technologies – data and artificial intelligence – are the targets of new rules and regulations. Several of them impose new human rights-related compliance obligations for systems using artificial intelligence and for digital infrastructures. In this regulatory context, this paper claims that technical standards will inevitably become the spearhead of human rights in the digital society and highlights a set of issues that need to be addressed.



### **Hugo A. López (Technical University of Denmark)**

Hugo A. López is a tenure-track assistant professor at the Technical University of Denmark (DTU), in the Computer Science Department. His research objectives involve the maturing of a new generation of process technologies that can adapt to citizen needs, while still be compliant with regulations and laws. His main research topics are process-oriented technologies, their theoretical formalisation, their adoption via software tools (engineering), and their empirical validation. Previously he have had research positions at Copenhagen University, the IT university (Denmark) and the University of Lisbon (Portugal).

## **Modelling, Analysing and Enacting Compliance Requirements in Digital Processes: A process-management perspective**

Digitalisation of the public sector is not an optional path: given the amount of work, number of cases and lack of transparency, state organisations decide to invest in different type of digital tools, many of them involving AI-powered processes. However, not all AI-powered implementations support the knowledge-intensive nature of administrative case work, leading to implementations that are inflexible and opaque in the decisions recommended, or that replicate undesirable biases. In our talk we will discuss how the combination of two variants of AI that can support the flexible nature of case work while at the same time being compliant with regulations. In our research, we explore the use of declarative process models and natural language processing to 1) generate digital representations of legislations, 2) analyse the compliance of existing cases with regulations, and 3) generate case-management applications that support the flexible nature of case work. Our talk will discuss the results achieved so far, but, equally importantly, stresses the importance of an inter-disciplinary and inter-sectorial approach to digitalisation and compliance involving law, design and computer science.

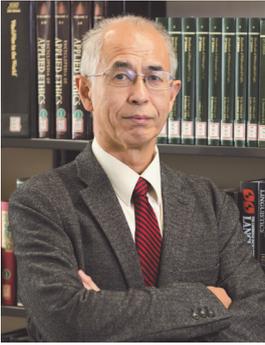


### **David Restrepo Amariles (HEC)**

David Restrepo Amariles is Associate Professor of Data Law and Artificial Intelligence at HEC Paris. He is co-Director of research on SMART Law (Scientific Mathematical, Algorithmic, Risk and Technology driven law) at the DATA IA Institute and director of the project Smart Contracts and Regulatory Technologies in the Autonomy through Cyberjustice Technologies Programme.

His work analyses the transformations of law and regulation in the global and digital society with a special focus on the fields of privacy, financial law, international business transactions and corporate social responsibility. His research combines approaches from legal theory, computer science and informatics, empirical legal studies, and science and technology studies. He has conducted several industrial projects with public partners such as the European Commission and the French Supreme Court, as well as with private partners such as Atos, Baker McKenzie, Dechert LLP, Natixis, among others.

## **Ken Satoh (2022 FFJ/Air Liquide fellow, National Institute of Informatics)**



Ken Satoh is a full professor of Principles of Informatics Research Division, NII (National Institute of Informatics), and Sokendai (The Graduate University of Advanced Studies), Japan. He worked with Fujitsu 1981-1995 and then was an associate professor of Hokkaido University till 2001. He also studied law at the law school of University of Tokyo in 2006-2009 and passed Japanese bar exam in 2017. His main research interest is logical foundations of Artificial Intelligence (AI) and application of AI to law. He recently proposed juris-informatics which is a new research field combining informatics and law.

## **Bart Verheij (University of Groningen)**



Bart Verheij's research and teaching focus on the connections between knowledge, data and reasoning, as a contribution to responsible artificial intelligence. He uses an argumentation perspective, inspired by the domain of law. Bart Verheij holds the chair of artificial intelligence and argumentation as full professor at the University of Groningen. He is head of the department of Artificial Intelligence in the Bernoulli Institute of Mathematics, Computer Science and Artificial Intelligence, Faculty of Science and Engineering.

## **Algorithmic Law as Computational Argumentation**

In these days of successes in artificial intelligence, an old question returns: are we close to building a computer judge? Reading the news the answer seems to be yes. Are we indeed close to a fully algorithmic perspective on law? In the talk we take the perspective of computational argumentation to analyze algorithmic law. We discuss historical and current developments. As a conclusion, it is suggested that algorithmic law will be hybrid in nature, in two ways. First, algorithmic law necessarily involves various techniques and skills involving knowledge, reasoning, learning and language, in a hybrid mix. Also high quality algorithmic law will depend on the strengths of both humans and machines in a hybrid collaboration.