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Friday, April 20, 2018, 9:00am–5:30pm

# Automated Justice: Algorithms, Big Data and Criminal Justice Systems

## EURIAS-Conference

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Organized by Assoc. Prof. Dr. Aleš Završnik (EURIAS-Fellow)



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From predictive policing to probation risk scores, the potential uses to of big data in criminal justice systems pose serious legal and ethical challenges relating to due process, discrimination, and the presumption of innocence.

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Editorial

Criminal justice systems are using technological solutions, for instance, to predict future crimes of those applying for bail or those to be sent on a parole. The idea of such “automated justice” is to vaporize biases, heuristics and to confine fundamentally value-based decisions to “clean and pure” mathematical reason. There are clear benefits deriving from calculating the risks of misconduct and risk assessments have become relatively standard practice in the criminal systems, e.g. for correctional placement and in the sentencing phase. Such assessment in the sentencing procedure was utilised long before the development of ICT, but algorithms and big data tools for determining prison sentences or for deciding on a parole are relatively newer practices.

Researchers have shown how relying too heavily on automated calculations of risk may encroach on fundamental liberties. For instance, in a detailed assessment of the COMPAS recidivism algorithm ProPublica discovered how the system is biased against black individuals. In fact, several scholars have warned how such “automated governance” can lead to “social sorting on steroids” (Lyon), and can encroach on fundamental liberties, such as privacy and presumption of innocence and even, ultimately, shake the democratic division of power (cf. Morozov).

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Friday, April 20, 2018

08:45

**Reception/Coffee**

09:00

**Welcome Address**

Thomas Hengartner

09:10

**Introduction: “Automated Justice”**

Aleš Završnik

09:30

**The Trouble with Risk Assessments**

Jeff Larson

10:00

**Justice and Artificial Intelligence**

Clementina Barbaro and Yannick Meneceur

10:30

**The Age of the Algorithmic Self: The Epistemological Evolution [and Revolution] of the Effectiveness Movement and Automated Justice**

Eran Fisher and Yoav Mehozay

11:00

**Coffee Break**

11:30

**Digital Punishment: Criminal Records as Big Data Commodity**  
Sarah Esther Lageson

12:00

**Bayesian Techniques for Modelling and Decision-Making in Criminology and Social Sciences**

Roman Marchant, Sally Cripps and Fabio Ramos

12:30

**Lunch Break**

14:00

**Automated Justice and Post-Disciplinary Power**  
Mark Andrejevic

14:30

**Predictive Policing and the Politics of Patterns**  
Mareile Kaufmann, Matthias Leese and Simon Egbert

15:00

**How Digitisation Jeopardises the Rule of Law in Criminal Procedure**  
Uwe Ewald

15:30

**Coffee Break**

16:00

**The Real-Time Cop: Imaginaries of Technology, Speed and Policing**  
Dean Wilson

16:30

**The Use of Algorithm-based Evidence in Criminal Proceedings and the Challenges to the Principle of the Equality of Arms**  
Serena Quattrococo and Ugo Pagallo

17:00

**Concluding remarks**  
Aleš Završnik

Dr. **Mark Andrejevic** is Professor of Media Studies at Pomona College and Visiting Adjunct Research Professor at Monash University. He is the author of three books on surveillance: *Reality TV: The Work of Being Watched*; *iSpy: Surveillance and Power in the Interactive Era*; and *Infoglut: How Too Much Information is Changing the Way We Think and Know*. He is currently writing a book called, *Drone Media*.

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**Clementina Barbaro** is a lawyer. Staff member of the Council of Europe since 2002, she has specialized on issues related to the independence and efficiency of justice systems. She is currently Secretary of the CEPEJ Working Group on Quality of Justice and Head of the CEPEJ Cooperation Unit.

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Dr. **Uwe Ewald** is the founding Executive Director of the International Justice Analysis Forum ([www.ijaf.eu](http://www.ijaf.eu)), an Internet portal which appeals to unite crime and legal analysts as well as empirical researchers in social and legal sciences in the field of serious and organised crimes.

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Dr. **Eran Fisher** is a senior lecturer at the department of sociology, political science, and communication at the Open University of Israel. He received his PhD in sociology from the New School for Social Research in New York. He studies the intersection of digital technology and society. His books include *Media and New Capitalism in the Digital Age* (2010, Palgrave), *Internet and Emotions* (co-edited with Tova Benski, 2014, Routledge), and *Reconsidering Value and Labour in the Digital Age* (co-edited with Christian Fuchs, 2015, Palgrave). He is currently working on algorithmic culture under a grant from the Israel Science Foundation (696/16) and a grant from the Danish National Science Foundation (2018).

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Dr. **Mareile Kaufmann** has been studying digital technologies for almost a decade. She is currently a post doc at the Department of Criminology and Legal Sociology, Oslo University, with a project on 'deviance and the digital'. She also is a senior researcher at the Peace Research Institute Oslo. She enjoys writing about security and digital practices at large and the relationship between surveillance and profiling, hacking, encryption and art in specific.

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**Jeff Larson** is a reporter at ProPublica. In 2017, he was a Pulitzer finalist with a series of articles investigating the hidden cost of algorithms and prediction systems in our modern society called Machine Bias. In 2013, he was a member of the team that reported on the top secret documents leaked by Edward Snowden, and in 2011 he won the Livingston Award for promising young journalists for *Redistricting: How Powerful Interests are Drawing You Out of a Vote*.

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Dr. **Roman Marchant**, member of the Centre for Translational Data Science, The University of Sydney, is applying machine learning to the social sciences, focusing on predicting crime

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**Yannick Meneceur** is a former French magistrate and is now staff member of the Council of Europe. Graduated in Law and trained in Computer Science, he was in charge the fight against cybercrime in a prosecution office and led the deployment of an electronic case management system in all the French courts. He is currently Secretary of the CEPEJ SATURN Centre for time management.

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**Dr. Dean Wilson** is Professor of Criminology in the Department of Sociology, School of Law, Politics and Sociology at the University of Sussex, Brighton, UK. Dean's key research interests are in surveillance and policing, and he has published widely in the areas of histories of urban policing, contemporary policing, surveillance and most recently pre-emption and criminal justice. His most recent publication (with Jude McCulloch) *Pre-Crime: Pre-emption, precaution and the future* was published by Routledge in 2016. Dean is also Co-Director of the international Surveillance Studies Network, and an Associate Editor of the journal *Surveillance & Society*.

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**Dr. Aleš Završnik** is EURIAS Junior Fellow 2017/18 at the Collegium Helveticum in Zurich and Senior Researcher Associate at the Institute of Criminology at the Faculty of Law in Ljubljana and Associate Professor at the Faculty of Law University of Ljubljana (Slovenia). His research interest lay in the intersection of law, crime, technology, and fundamental rights. Among several others, he lead a research project *Law in the age of big data* (Slovenian Research Agency, 2014 -2017), and edited a book *Big Data, Crime and Social Control* (Routledge, 2018) and a book *Drones and Unmanned Aerial Systems: Legal and Social Implications for Security and Surveillance* (Springer, 2016). He organised several conferences in these research areas, e.g. *Big data: Challenges for Law and Ethics* (Ljubljana, 2017).

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Dr. Mark Andrejevic

## Automated Justice and Post-Disciplinary Power

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This presentation considers the automation of justice as a logic that bridges drone warfare and emerging forms of predictive policing. It argues that in both cases, there is reconfigured conception of the subject as post-disciplinary, that is, not amenable to strategies of diplomacy or prevention. Disciplinary power envisions a subject that internalizes the imperatives set by authorities through logics of surveillance and threat. It is a deterrent power that is designed to use the threat of violence as a means of deferring its application. By contrast, pre-emptive power envisions a post-disciplinary subject unable or unwilling to internalize the narrative logics of discipline and thus its imperatives. In post-disciplinary power violence is not deferred: rather it is applied at the point of emergence of threat. In this respect, pre-emptive power is, as Brian Massumi suggests, “incitatory”: “since the threat is proliferative..., your best option is to help make it proliferate more – that is, hopefully, more on your own terms. The most effective way to fight an unspecified threat is to actively contribute to producing it.” We see something similar in the recent US response to school shootings: flood the schools with guns. Post-disciplinary forms of securitization imply a now familiar monitoring imperative: the attempt to “collect everything and hold on to it forever” – that is, to redouble the world in informed form in order to act on it “in advance.” Every un-predicted event becomes an incitation to more comprehensive surveillance (this is also the response to recent school shootings: greater monitoring of students both in and out of school). To actively contribute to “producing” a threat is to draw on the data to produce it in its “virtual” form to that it can be acted upon in reality. It is not difficult to see

that such an approach anticipates escalating levels of both surveillance and violence. This presentation concludes with a consideration of strategies that contest the logic of pre-emption, and its associated forms of surveillance.

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Clementina Barbaro and Yannick Meneceur

## Justice and Artificial Intelligence

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There is a growing interest among Council of Europe’s member states about the possibilities offered by tools of “predictive justice” which exploit the large availability of judicial decisions with Open Data through artificial intelligence technologies (AIs). These tools can help increase the foreseeability of the judicial process by trying to assess the chances of success of an application lodged with the court and can also contribute to harmonising judicial decisions. This could possibly contribute to alleviating the charge of judicial systems for applications which have a little chance of success. Yet, a thorough reflection on their intrinsic nature, technical and theoretical limitation does not seem to have been carried out yet. The European Commission for the Efficiency of Justice (CEPEJ) is currently preparing a document – likely to be adopted in December 2018 – aiming to provide European public-decision makers with an unbiased, scientific view to better understand this on-going phenomenon.

In first place, it is essential to clarify certain misconceptions related to their “predictive” abilities or an alleged ability to reproduce a judicial decision. AIs are extremely sophisticated statistical machines, directed towards the past, operating by correlation, and without any understanding of the rules applied. This is not unlike the impressive and time-saving

automatic language translation tools available online that are based on drawing up correlations between groups of words but do not grasp the meaning of what is being translated. The performance is a mechanical one, rather than one of judgment or of the assessment or weighing of facts, issues or circumstances. Likewise, presenting quantitative trends of judgments would provide a partial picture, to be complemented by identifying and analysing many other factors. Given that in the case of the judicial process, an extremely important part of the work done by a judge escapes the learning of these machines, it would be a mistake to believe that the results produced by AI tools are able to provide insights into the real causality of the situations submitted to them.

In second place, the CEPEJ will also analyse the pros and cons of these tools, in the light of the requirements of the European Convention on Human Rights (ECHR). The use of AIs in the civil and administrative field can be extremely effective, for example in increasing the search capabilities in case law databases using natural language queries, or establishing scales of compensation on the basis of a rigorous selection of representative decisions. However, it is important that member States approach the use of AI in the justice sector in a manner that also takes into account the risks, notably in respect of inequality by way of disparities in access to AI and the ability to challenge the results of the use of AIs.

In the criminal justice field, predictive analytics are used in the pre-sentencing and sentencing phase with a view to assessing the probabilities of reiteration of crime by the individual or determining imprisonment. Concerns arise vis-à-vis the respect of ECHR rights such as the right to a fair trial (notably equality of arms) and the right to non-discrimination.

With regard to personal data, the misuses of AI to create profiles of judges, prosecutor or lawyers as a means of pressure have also to be considered.

Legislators and public policy makers should work to ensure that the uses of AIs in the justice sector, where fundamental individual rights are at stake, are subject to the necessary regulation and safeguards. This should involve the stakeholder groups that will be affected by any decisions taken, including judges, prosecutors, lawyers, litigants and defendants. The need for a proper governance of this phenomenon and for the development of an ethical framework (including an independent and regular expert assessment to ensure that the “engines” of artificial intelligence used to assist judges in their decision-making are not biased, strengthening of training on cyber-ethics for IT developers) represents the third focus of CEPEJ reflection.

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Dr. Uwe Ewald

## How Digitisation Jeopardises the Rule of Law in Criminal Procedure

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Digitisation of security and criminal justice within the European Union is not just applying new technical tools for more effective data and information processing in criminal investigation, pre-trial and trial – it causes a (paradigm?) shift in concept and practice of criminal justice.

In order to be legitimate and accepted rule of law based criminal justice requires rational reasoning of facts of the crime as a statement of ‘truth’ and sentencing/sanctioning linked to the gravity of the crime. Hence, the analysis and evaluation of evidentiary data should be independently tested by both prosecution and defence.

The change from analogue to (mostly) digital evidentiary data in particular in large organised crime cases affects traditional principles in criminal justice as a result of computer-based analysis of mass digital evidence. To name a few: 1) While traditionally the proof of (criminal) behaviour and its causality to harmful effects was constitutive for a conviction, correlation and patterns produced with computer-based analysis of large sets of data contrast causality in cases where decisions are based on mass digital data. 2) Processing evidentiary data in the analogous age (mainly reading/qualitative analysis of written text) presented a rather similar and comparable situation for judges, prosecutors and defence lawyers. Digitisation creates what has been called a “digital gap” among courtroom participants, a significant shift of competency in particular between prosecution and defence. While prosecutors can rely on police investigators and analysts (cyber-cops) producing and presenting electronic evidence at trial, defence attorneys lack this capability and are barely able (for the time being) to seriously challenge the prosecution’s presentation of parts of electronic evidence. 3) Judicial mode of reasoning, finally in the judgement, is changing and tends to be more dependent on computer-based prediction and probability and its intriguing-suggestive video presentations.

The question emerges whether digitisation of criminal procedure, in particular of the evidentiary process, ultimately jeopardises basic principles of criminal justice such as individual criminal responsibility and the independent right for defence.

The in-depth changes triggered in criminal procedure by digitisation challenge the legal perspective of Article 6 of the European Convention on Human Rights which aims to protect the principles of fair trial, equality of arms and presumption of innocence.

The paper will deal with these issues based on the analysis of large organized crime cases with big data digital

evidence and results of a survey among criminal defence attorneys in Germany.

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Dr. Eran Fisher and Dr. Yoav Mehozay

## The Age of the Algorithmic Self: The Epistemological Evolution (and Revolution) of the Effectiveness Movement and Automated Justice

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Today, we are witnessing an important technological development in the way risk analyses are performed. Risk assessments are increasingly carried out through algorithm-based big-data analysis (supported by machine learning). It is argued that this method introduces a new frontier of accuracy, to the extent that it may even eliminate all forms of bias. This development represents a significant step forward in the epistemological transition that started with the effectiveness movement in crime control and administrative criminology. Algorithm-based big-data analysis completes this epistemological evolution or, arguably, revolution. If individual-based theories of crime assumed a pathological self, and neoclassical theories assumed a rational self, big-data analysis brings about an algorithmic self. The old types of self are abandoned; consciousness, reason and clinical diagnoses are replaced with a type of performative knowledge that is a-theoretical, predictive, and non-reflexive. Algorithm-based big-data analysis bypasses consciousness and reason, and offers solutions without concerning itself with the “path” leading to them (“black box” solutions). In this sense, algorithmic knowledge is a radical break from



the types of epistemology that once dominated the modern world, and the knowledge of the world and of the self they produced. The proposed paper analyzes the epistemological evolution of the effectiveness movement in crime control as a result of automated justice. The paper considers the macro effects that stem from the reciprocal interaction between knowledge production and policy making. Overall, it seeks to shed light on the question, are we entering a post-humanist era in crime control?

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Dr. Mareile Kaufmann, Dr. Matthias Leese and Simon Egbert

## Predictive Policing and the Politics of Patterns

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This paper engages predictive policing from the vantage point of the “pattern.” It starts from the assumption that any prediction presupposes the occurrence of patterns within the analyzed data. That is to say: non-pattern-based phenomena cannot be algorithmically identified, and therefore not be subjected to a logic of forecast. While the pattern has always been a relevant determinant within statistics and the analytics of large numbers, the move of predictive policing to digital data and algorithmic tools has had several effects. Not only did this move integrate new occupational fields and commercial logics into policing, but it has also renewed the epistemic authority of the pattern. Especially discourses about algorithmic and artificial intelligence have created a whole new stage for the politics of patterns. Instead of following a singular critique of the pattern as tied to the workings of big data, this paper explores the multiplicity and specificity of patterns by focusing concrete usages of predictive policing software and their underlying patterns.

Empirically, patterns come into being in many forms, they are based on diverse datasets, and are analyzed via distinct mathematical approaches, as can be witnessed by the growing and fragmented landscape of predictive policing tools across the globe. This paper uses insights from three qualitative projects on predictive policing tools to take a closer look at how patterns come about and the role they play for the government of future crime. When, for example, is a pattern defined as such, and who does that? Which variables are they based upon? Who chooses the relevant datasets? What impact does the visualization of patterns have for the understanding and handling of crime? While all these aspects are intimately tied to the specific workings of each tool, this paper engages these differences to forward an informed critique of the politics of patterns.

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Dr. Sarah Esther Lageson

## Digital Punishment: Criminal Records as Big Data Commodity

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In the United States, new forms of digital criminal record data collection and generous FOIA and First Amendment interpretations have allowed criminal records to transform into a valuable commodity. Data brokers aggressively pursue law enforcement, court, and correctional data, then repackage and sell it to a growing class of criminal record consumers. Taking a field approach, this mixed methods study traces the development of relationships between criminal justice agencies and data brokers. Analyses of internal and public documents and interviews with data brokers show how this work is framed through cultural values of tech efficiency and transparency, and as a consumer friendly alternative to bureaucratic and inefficient govern-

ment. By collating and synthesizing public records, these companies create markets of criminal record consumers and sell criminal record data as commodity. Ultimately, this wide scale embrace of open records by media and the courts have more firmly guided U.S. criminal record policy than due process, privacy and liberty values.

The result is that this unregulated and widespread digital release of arrest and booking information, court records, and criminal history reports is creating new forms of punishment and social control in the United States. Drawing upon ethnographic fieldwork in three US states, 150 interviews, and extensive legal and policy review, this study analyzes the forces that have led to this state of affairs and the consequences for understanding stigma and the criminal label in the digital age.

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Jeff Larson

## The Trouble with Risk Assessments

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Courtrooms and police departments in the United States often use criminal risk assessments in an effort to try to identify riskier defendants. These assessments are supposed to predict whether a particular defendant is more likely to commit future crimes. In the past these scores were primarily used to identify candidates for early release from prison.

But they are increasingly used before a defendant has their day in court.

In 2016, ProPublica analyzed one such risk assessment, named COMPAS. Although the algorithm is proprietary,

we were able to obtain more than 10,000 risk scores for defendants from a Florida police department.

After six months cleaning and analyzing the data, we found that the algorithm predicted recidivism only sixty percent of the time when trying to classify future criminal behavior. When the algorithm tried to classify future violent crime it was only correct twenty percent of the time.

But there was something more troubling: the algorithm was far more likely to mistakenly classify African American defendants as dangerous more often than white defendants. That conclusion also held when accounting for differences in age, sex, criminal history, and whether the defendant committed another crime.

This finding led to a heated discussion on the ethics of using these assessments before trial. The company that sells the software challenged the findings, as did a number of criminologists.

However, other academic studies pointed out that risk assessments will always show this bias in predictions in this way when base rates of recidivism differ, and a study published earlier this year showed that the algorithm was no more accurate than human judgment.

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Dr. Roman Marchant, Sally Cripps and Fabio Ramos

## Bayesian Techniques for Modelling and Decision-Making in Criminology and Social Science

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The new era of data-science has brought increasing concerns regarding how decisions are drawn from mathematical models. This paper describes why decision-making is better informed when models are estimated using a fully Bayesian methodology, which should be fundamental for the application of machine learning to the social sciences.

This short piece of work highlights the benefits of using a combination of probabilistic models and uncertainty-aware decision-making algorithms for the social sciences setting. A fully probabilistic model, which quantifies uncertainty in a principled manner, provides a unified framework for risk-aware decision making. Decision Making under uncertainty has been studied deeply in the context of autonomous systems, where machines achieve a balance between exploration and exploitation to maximise a long term reward.

The same principles apply to policy decisions involving humans, where risk-adverse policies should take into account not just the expected outcome, but equally important – its associated uncertainty. When predictive posterior probability distributions are highly uncertain, then further exploration can be conducted in the form of information gathering routines, which can reduce the credible intervals of predictions and inference.

We show examples of the application of probabilistic models to predictive policing and risk prediction instruments,

and identify suitable decision-making algorithms that maximise long term reward under uncertain outcomes and observations.

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Dr. Serena Quattrocolo and Dr. Ugo Pagallo

## The Use of Algorithm-based Evidence in Criminal Proceedings and the Challenges to the Principle of the Equality of Arms

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The authors will reflect upon the risk of using algorithm-based evidence in criminal proceedings. The focus is on shifting the attention from possible violations of the right to privacy to potential infringements on a basic fair trial feature, the Equality of Arms. Does the existing European legal framework provide suitable protection for such a fundamental right? The analysis shines the spotlight on the guarantees of arts. 8 and 6 of the ECHR. While the interaction between digital data and criminal proceedings has been usually considered in light of privacy and protection of private life, the use of wholly automated data as evidence displays new shortcomings. In particular, the access to algorithm-generated evidence by the prosecutor may hamper the equality of arms, because of an extreme “knowledge impairment” between the parties. In fact, the defense may not be able to challenge the accuracy of evidence, having no access to the source-code of the algorithm that generated it. This represents a potential violation of the principle of the equality of arms, enshrined in art. 6 ECHR, as interpreted by the ECtHR. Thus, it is worth reflecting either on the

reasons and the possible solutions for such impairment. On the one hand, the algorithms used for investigative purposes cannot be openly disclosed. On the other hand, the defense may be totally deprived of the right to confront the evidence against her. Are there software preventing such shortcomings? Is transparency the decisive tool to prevent the infringement of the principles of fair trial? Or should the parties rely on an expert witness, whenever the accuracy of algorithmic evidence is at stake? The authors will try to cast light on these matters, in light of the currently existing guarantees at the European level.

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Dr. Dean Wilson

## The Real-Time Cop: Imaginarities of Technology, Speed and Policing

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‘Predictive Policing’ has emerged as the key buzz term of contemporary crime control. Engaging predictive analytics drawn from such diverse domains as disaster prediction, combat situations and supply-chain management, predictive policing extends the promise of anticipating crime prior to its actualization. Marketing materials are replete with strident claims of future crimes that are calculable, knowable and targetable before they transpire. This paper aims to situate these contemporary developments within the historical context of police engagement with technologies that have aspired to compress the temporal distance between police action and criminal event. Patrol cars, telephone, and wireless radio communications, extended the promise of technologically and temporally omnipotent policing that could suppress crime through time-space supremacy. From

the 1960s, there was also an increasing mathematization of police work, much of it drawing from operations research, that sought to achieve optimal efficiency in police distribution and management. Computer technology from the 1980s onwards intensified such quantification, promising to increase bureaucratic control internally, and with in-car computers igniting the possibility of policing as a seamless information network of real-time transmissions. Predictive policing then, rather than an entirely novel development, is one manifestation of a longer trajectory of police entrancement with technology and quantification, and their potential to facilitate temporal and spatial domination. Moreover, this paper argues that despite the frequent recourse to cultural memes of pre-crime encapsulated in recourse to the fictional example of *Minority Report*, the objective is not to police the future. Rather, predictive policing envisages a form of policing in real-time – instant policing – that continually suppresses criminal activity at the moment of its unfolding. While acknowledging that operational realities are likely to differ substantially from the promoted vision, the rationalities of the contemporary datafication of policing are explored and linked to wider developments within informational capitalism.

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Dr. Aleš Završnik

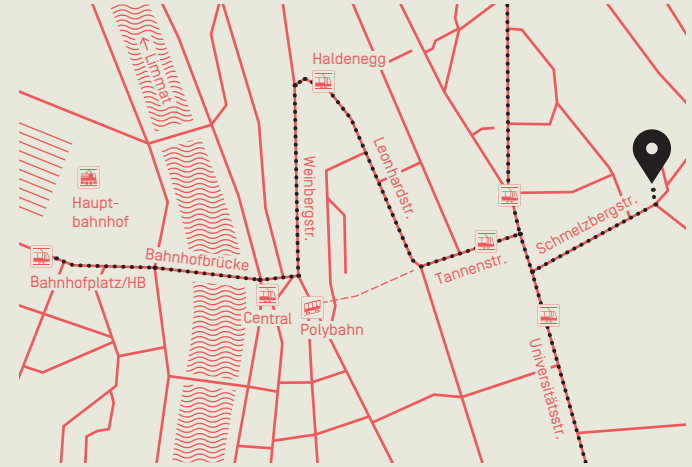
## “Automated Justice”: From the Rule of Law to the Rule of Algorithm?

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The Arnold Foundation algorithm, which is being rolled out in 21 jurisdictions in the USA (Dewan, 2015), uses 1.5 million criminal cases to predict defendants’ behaviour.

Similarly, study of 1.36 million pre-trial detention cases conducted by Stanford University scholars purports that a computer can predict whether a suspect will flee or re-offend better than a human judge (Kleinberg, Lakkaraju, Leskovec, et al. 2017). The paper focuses on big data and “algorithmic” analytics in criminal justice settings, where the new language of mathematics (Amoore, 2014) is used for blurring contemporary regulatory boundaries, undercutting the safeguards built into regulatory regimes, and abolishing subjectivity and case-specific narratives. The paper traces the origins of big data in industry and looks at how the underlying assumptions, such as “doing more with less,” “the numbers speak for themselves” etc., are being transferred to criminal justice system domain where these assumptions have negative consequences for fundamental liberties, such as presumption of innocence and due process of law. By examining the existing cases of predictive analytics in criminal justice settings the paper shows, how “big data and algorithms” change criminal justice from narrative to database (Franko Aas 2005) and furthermore towards automated decision-making. This is a transition towards of erasure of subjectivity.

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Registration  
Not for Speakers (attendees only): Please register at:  
reservation@collegium.ethz.ch. Registration closes on  
10 April 2018. The event is free of charge.



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