"Cyber Risk and Connected/ Autonomous Vehicles"
at Keble College at the University of Oxford, by Dr. Sandra Wachter

"Baby, who is gonna drive my car?"
In spring 2016 the Cyber Security Oxford network https://www.cybersecurity.ox.ac.uk/ hosted the Connected/Autonomous Vehicles Conference, where members from the private sector, academia and government met at Keble College to discuss hurdles and opportunities of autonomous vehicles.

The proclaimed goal of the presentations was to offer an overview of state of the art research and the current obstacles encountered during this endeavour. In addition, members from regulatory bodies talked about the difficulties involved in designing an effective and successful legal framework that guards against risks but does not impede innovation. All participants assessed the societal opportunities and risks of innovation and evaluated legal instruments to govern the development of autonomous vehicles.

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"Where are we going?"

The enthusiasm at the conference was pronounced and the optimistic views on the potential of autonomous vehicles were overwhelming. Surprisingly, both the speakers and the audience had difficulty articulating the major advantages of driverless cars. Although experts generally agree that driverless cars will have a positive impact on road safety (eg traffic accidents), the participants admitted that there is still significant uncertainty surrounding promised opportunities. The questions of whether or not driverless cars will help decrease traffic congestion and will enhance energy and fuel efficiency are still unanswered.

"Fasten your seatbelts"

Even though the participants were enthusiastic about the rise of autonomous vehicles, they were aware that several critical issues are looming on the horizon. Cyber-attacks, for instance, are a pressing issue, not least because current systems are still immature. Newspapers are filled with stories about hackers successfully cracking these systems as the current software is still vulnerable to these attacks. Things as simple as a laser pointer can cause the system to crash. However, not all obstacles are human generated. Adverse weather conditions may cause the vehicles to fail. Sunny or snowy weather can dramatically change a street's appearance and as a result, the vehicle might not be able to recognise the familiar routes and roads. No matter how advanced the system, it will not be resistant to all attacks. It is important to note that this is not a new problem that occurred with the advent of autonomous vehicles. Every technology has associated risks that can only be mitigated but not fully eliminated.

"Asking for directions"

While there is generally agreement that rapid technological development makes legal regulation difficult, it is of upmost importance to continuously adopt and reconcile existing legal norms. Furthermore, the experts asserted that regulators are often unable to foresee and assess associated risks and are therefore unable to act before problems occur. The government's lack of expertise was named as one of the main reasons for its inability to regulate emerging fields. Consequently, governments are often forced to respond to the situation rather than proactively shaping regulatory policies. Additionally, it was mentioned that the nature of autonomous vehicles causes problems as well. Vehicles (cars, planes, busses etc) are often used to travel large distances and as such may pass through territories where different legal frameworks apply. Consequently, solutions to these problems must be sought at an international level to ensure clarity.

Moreover, the speakers admitted that several areas are unregulated, which leads to uncertainties. One unregulated minefield is national and international data protection regulations. Questions such as data ownership, data legacy, informed consent, data collection and data exchange remain open to consideration. The speakers advocated for clarity surrounding issues of liability and for improvements in various legal areas. Who should be responsible for system failures? The software vendor, the car company, the insurance company, the software engineer or the car owner? What happens if people are sharing a car?

Acro Building, Keble College, University of Oxford, ©Sandra Wachter

"Many roads lead to Rome"
After the presentations the workshop started. At the heart of the discussion groups were regulatory issues. The question of whether the government, an international regulatory body or a multi-stake-holder system is the most promising led to heated discussions. Further views on the scope and the limit of the invested power were exchanged. For example, is it reasonable for regulators to have the power to enforce a registering or licensing process for car owners? Is a law that dictates mandatory insurance desirable?

In my opinion one crucial issue was not addressed: ethical coding. This term describes the process of implementing certain values into the programming process. For example, software programmers are confronted with the decision of who to kill in case of an accident. There are possible situations where autonomous cars need to harm someone in order to prioritize the safety of another person. Do we want an algorithm that always keeps the driver safe? Even if pedestrians such as children would need to be harmed in order to save the drivers' life? The importance of how to successfully integrate ethical considerations into the script cannot be understated. After bringing this point up during the workshop, my statement found support.

"Roads? Where we're going, we don't need roads"
After the break-out session some of the speakers formed a discussion panel and engaged in an open dialog with the audience. During this session the speakers used this opportunity to promote future national and international cooperation and pledged for legal consistency. Gaining user trust, achieving governmental support and cooperation between academia and the private sector will help to fully harness the momentum of this new technology. The narrative was to abandon old conceptions and establish a new mind-set in order to pursue a more holistic approach. The future is now and we need to get behind the wheel and steer the path for a vital economy.

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"Are we there yet?"
This event was an immense success and led to enriching and fruitful discussions. The international and interdisciplinary crowd shed light on several important topics. Even though most of the experts had technological backgrounds, I was pleasantly surprised to see the growing interest in legal and ethical questions. Moreover, they welcomed new legislation and encouraged the development of new guidelines. This is astonishing since law is often considered a peripheral concern. The experts identified the law as a source of security and stability rather than a hindrance. This view is in line with the general notion that it is paramount that government, academia and the private sector work together to find the best possible solution for all parties involved. An open and public dialog and a multidisciplinary approach is required to successfully assess the opportunities and risks of developing autonomous vehicles and this conference was a valuable first step in achieving this goal.