

Professor H. Jaap van den Herik

The Power of the Blind Spot

Valedictory Lecture



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The Power of the Blind Spot

Valedictory Lecture, in abbreviated form presented by

Professor H. Jaap van den Herik

at the public Farewell to the office of Professor of
Law and Computer Science at eLaw – Center for Law and Digital Technologies
of the Faculty of Law
of Leiden University
on Friday, October 8th, 2021



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The Netherlands

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for taking care of the text
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for their comments on the English text

Jaap van den Herik (1947) studied Mathematics at the Vrije Universiteit Amsterdam (with honours), obtained his PhD at Delft University of Technology in 1983 (subject: Artificial Intelligence), and was appointed professor of Computer Science at Maastricht University in 1987. In 1988 he accepted a part-time appointment as professor of the named chair *Legal Informatics* at Leiden University. In 2008 he changed universities (from Maastricht to Tilburg) and accepted a professorship of Computer Science at the Faculty of Humanities of Tilburg University, where he gave shape to the new research area *e-Humanities*. With effect from January 1, 2014, his appointment at Leiden University was broadened to professor of *Law and Computer Science* at the Faculty of Law and the Faculty of Science. Together with Joost Kok and Jacqueline Meulman, he founded the *Leiden Centre of Data Science* (LCDS).

In the Netherlands he has (co-)initiated various research areas and has put them on the (inter)national research map by designing a unifying structure for them and giving the activities shape and character. Four telling instances are: Computer Chess (CSVN, 1980; honorary member), Artificial Intelligence ((B)NVKI, 1981; honorary member), Legal Knowledge Systems (JURIX foundation, 1989; Honorary President), and Data Science (LCDS, 2014). He was also active within NWO (Chairperson of ToKeN 2000, TOKEN, and CATCH), as well as Chair of Big Grid (NWO-NCF) and Vice-Chair of NCF, and Co-Founder and Executive Board Member of the Leiden-Delft-Erasmus Centre for BOLD Cities. Van den Herik has been a successful supervisor of 90 promoti/tae.

Internationally, he promoted Computer Chess as a leading AI research area in the ICCA/ICGA Journal (Honorary Editor) for 33 years. He has been an ECCAI fellow (now EurAI fellow) since 2003 and a research member of CLAIRE. In 2012, he was co-recipient (PI Jos Vermaseren) of an ERC Advanced Research Grant for the HEPGAME (High Energy Physics equations and GAMEs) project.

He is a member of the Royal Holland Society of Science and Humanities (KHMW) and of the Batavian Society for Experimental Philosophy. From a social point of view, he is active as a board member at SeniorWeb, science advisor at the Max Euwe Centre (MEC) and strategic advisor at HCSS.

In March 2018, the Committee of Deans gave him the opportunity to further develop LCDS into a multidisciplinary direction, viz. into the direction of Legal Technologies. Together with CPL (Nikol Hopman) and Jan Scholtes (and supported by the FdR, FGGA and FW&N), he set up the professional course LLTP (Leiden Legal Technology Program). Financial support was obtained from the Municipality of The Hague and the Ministry of Justice and Security.

Big Grid	- Dutch e-Science Grid (NCF, NBIC, Nikhef, SURF SARA)
(B)NVKI	- BeNeLux Association for AI
BOLD	- Big, Open and Linked Data
CATCH	- Continuous Access To Cultural Heritage
CLAIRE	- Confederation of Laboratories for Artificial Intelligence Research in Europe
CPL	- Centre for Professional Learning
CSVN	- Computer Chess Association Netherlands
ECCAI	- European Coordinating Committee for AI
EurAI	- European Association for Artificial Intelligence
FdR	- Faculty of Law
FGGA	- Faculty of Governance and Global Affairs
FW&N	- Faculty of Science
HCSS	- The Hague Centre for Strategic Studies
HPC	- High Performance Computing
ICCA	- International Computer Chess Association
ICGA	- International Computer Games Association
LCDS	- Leiden Centre of Data Science
LLTP	- Leiden Legal Technology Program
MEC	- Max Euwe Centre
NBIC	- Netherlands Bio-Informatics Centre
NCF	- National Computing Facilities
NIKHEF	- National Institute for Subatomic Physics
NWO	- Dutch Research Council
PI	- Principal Investigator
SURF SARA	- National HPC and e-Science support center
ToKeN 2000	- Access To Knowledge and its enhancements in the Netherlands, later TOKEN

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Madam Rector Magnificus,
Madam President of the Executive Board,
Mr. Vice-chairman of the Executive Board,
Madam Minister for Migration,
Fellow Professors of the Faculty of Law,
Fellow Professors of Leiden University,
Fellow Professors and Fellow Researchers,
And furthermore, all of you who wish to add lustre to this
gathering with your presence,

Highly Esteemed Audience!

Today I will deliver my valedictory lecture as professor of Law and Computer Science at Leiden University, Faculty of Law. In recent years I have been able to combine this position with an appointment as Founding Father and Director of the Leiden Centre of Data Science, LCDS. My lecture, however, will cover the period from 1988 to 2021. I will outline the development of Artificial Intelligence within the law. The emphasis will be on the way in which this took place in the Faculty of Law.

This lecture will last forty minutes and is structured as follows: the core question (10 minutes), the people who took up the challenge (25 minutes) and then my pillars (teachers, coaches, friends and opponents, 5 minutes).

1. High Expectations

From 1986 to 1989, Alfred van Staden was the Dean of the Faculty of Law. It was in those days that the word ‘computer’ was mentioned for the first time in the meetings of the Faculty Board. What is a computer? Do we have to go along with it? Does it help us? Fred was a modest man, but a man with insight and energy. He said to the Board of the LUF (Leiden University Fund): there should be an endowed chair of Legal Informatics. Subsequently, the then LUF-chairman Seerp Gratama went to work relentlessly. Within a short period of time, the LUF produced an institutional proposal for a named

Chair in Legal Informatics that was fit to be submitted to Her Majesty the Queen (Queen Beatrix). She gave her blessing and the recruitment could start. There was a preparatory committee headed by Kees Schuyt and an advisory committee headed by Hans Nieuwenhuis, and then there was the Dean who acted as a real leader. I was lucky, because in 1983 I had completed my dissertation at the Delft University of Technology with the title *Computer Chess, Chess World and Artificial Intelligence*.

In the Netherlands, it was the first dissertation on Artificial Intelligence (from now on also referred to as AI). The receiving tone was mainly set by the people who had only read the expectations for the future: “Before 2000, a computer program will outperform the human World Champion at chess”. Chess Grand Master Hein Donner, but also players such as Hans Ree, Hans Böhm, and Paul van der Sterren did not believe it. Neither did my supervisor Adrian de Groot and my (mental) coach Professor Max Euwe. Grand Master Genna Sosonko was my only supporter.

I cannot help but make a sidestep here. After all, you may be wondering how I proposed the title of my current valedictory lecture? The idea started on June 21, 1983. I obtained my PhD and my supervisor Adrian de Groot was the last to act as opponent. He received a few extra minutes from Rector Magnificus Sikkema who asked the beadle not to pronounce “Hora est”. The hall was stunned. This was unique in the academic world. The astonishment in the room grew even greater when the exchange of arguments took place at the cutting edge.

De Groot stated: “Computers will never be capable of beating the human world chess champion. That requires intuition and intuition cannot be programmed.” I countered that intuition is based on knowledge that is stored in the unconscious or subconscious of man and that one of the tasks of Artificial Intelligence was and is, to make that knowledge explicit.

Arguments were exchanged back and forth, and the audience listened breathlessly. In reality, it was a repeat of previous meetings in Leiden, Amsterdam, and Groningen for both of us. After some time, the Rector Magnificus concluded the discussion with the comment: "Gentlemen, your time is over. It is a draw. I am closing the ceremony."

At the beginning of July (two weeks later) I received a request from the magazine *Intermediair* to briefly comment on an article submitted for publication by Prof. dr. A.D. de Groot (1983). It was titled: *On Chess-players' Intuition or: Van den Herik's Blind Spot*. To my wife, I could not suppress my admiration for my supervisor: "What a great fighter this man is to defend the subject with such fervour." You can read the text in *Intermediair*. Here, it is also worth noting that fourteen years later on May 11, 1997, the Deep Blue program beat the human World Chess Champion Garry Kasparov in a match by a score

no longer had to be submitted to Her Majesty, because the approval of the establishment of a chair and appointment of a professor no longer belonged to the tasks of our Majesty. This made my chair one of the last chairs established by our Majesty. I was determined to fully live up to the high expectations of the crown. I started the task on June 1, 1988, with the support of the LUF-curatorium consisting of Hans Franken, Bert van Delden, and Hans Knook. They were later appointed as my *curatores* for life.

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of 3 ½ - 2 ½.

Adrian de Groot, *Intermediair*, 1983.

Back to the three Grand Masters of Political Science, Sociology, and Law: Van Staden, Schuyt and J.H. Nieuwenhuis. Tributes (then and now) from my side to the three mentioned, for proposing me for this position. In the introductory meeting I promised them that I would do my utmost to provide the new chair with the right impetus. The Executive Board of the University ratified the appointment proposal, having obtained affirmative information from the sister faculties. The proposal

2. Can Computers Judge Court Cases?

From the question *Can Computers Play Chess?* to *Can Computers Judge Court Cases?* was just a small step for me. Inspired by Alan Turing's (1950) *Can Computers Think?*, during my nomination period I was already thinking along those lines. It was audacious, I knew that, so I kept it to myself. In November 1988 I was invited by the Chairman of the Executive Board of the University (Dr. Oomen) for an introductory meeting. Soon we talked about my inaugural lecture in Leiden. I then handed him the inaugural lecture that I gave in October 1988 in Maastricht (Van den Herik, 1988) and told him that I was proficient in chess, but not yet in law. "How long do you think this will take?" he asked. "Three years", I replied.

Of course, that was too long, because any newly appointed professor in Leiden was obliged to give his/her inaugural address within a year. "That puts us both in a difficult position", I said. It was the right choice of words for an administrator. Now we could solve a problem together. "I'll get my secretary to start on the agenda", Oomen said. "Then we can do business right away." We met on June 21, 1991 at 4 p.m. in the Great Auditorium of the Academy Building of Leiden University.

This appointment was the start of almost three years of hard work. There appeared to be surprisingly few books entitled *The Thinking of a Judge*. Obviously, I was looking for the counterpart of A.D. de Groot's (1946, 1965) work: *Thought and Choice in Chess*. There were many publications on philosophy and law, such as Wiarda (1972), J.H. Nieuwenhuis (1976), Hage (1981, 1987), Dworkin (1986), Prins (1986), Ashley (1988), Witteveen (1988), and later Hirsch Ballin (1990) was added. It was all new to me and I devoured it as an aspiring law student. Laws, rules, norms, vague norms, open texture, open norms, and much more. Fortunately, at that time I was surrounded by a team of very talented colleagues, namely Aernout Schmidt, Jaap Hage, Franke van der Klaauw, and Corien Prins. In

the meantime, Hans Franken proposed to work with us in terms of content. That seemed like a very good idea. And so we, Hans and I, became colleagues *proximi*, with the names Legal Information Technology (Jaap van den Herik) and Information Technology Law (Hans Franken). This was the start of an exciting development.

The official start was on June 21, 1991. Wim van der Poel, one of the founders of Computer Science in the Netherlands, said to me when he heard the title: "That's a great find!" When I wanted to explain something to him, he said: "No, no, I completely understand, that title is good." For me that was a huge encouragement, because there were many people who thought otherwise. The main hall in the Academy was packed, two extra rooms were connected with image and sound. The intellectual preparation was perfect – thanks to Bob Herschberg. There was doubt in the professors' benches. For instance, Ferry Feldbrugge spoke to his neighbour Peter Kooijmans (my spokesperson) after the applause: "Who have we appointed now?" Peter Kooijmans: "Ferry, this will all be fine. I know him."

The next day, two newspapers opened on page 1 (the front page) featuring this new development. *De Telegraaf* (¾ page) and *de Volkskrant* (¼ page).

3. At Work, Today and Then

Stories are good and beautiful stories are better, but then there must be achievements. To build something you need ideas, and also people, a lot of goodwill and a little bit of money. My inaugural lecture was full of ideas that were the starting point of the work envisaged in 1991 and which have proved their worth up to today. In addition, the contents of these ideas made it also possible to support the next step in 2019 towards legal technologies.

The essential element for a good intellectual development is a good organisation, an organisation within the Faculty's own organisation and within the large organisation of the University. All organisations have to support the new development and hence should support eLaw (then still called Law and Computer Science). For a proper flourishing, you need contacts and contracts throughout the Netherlands. Moreover, for a fruitful development in a multidisciplinary way, multidisciplinary contacts throughout the Netherlands and preferably also outside the Netherlands are even more necessary. In brief, the list of wishes was large. One day a week was not that much, but the enthusiasm as shown by Aernout, Jaap, Franke, Corien, and Hans was large. Maybe they did not all believe in our mission then, but they found it compelling. Elsewhere in the Netherlands, the eyes were already on our group. As a case in point, Kees de Vey Mestdagh approached me in 1989 with the idea of founding JURIX, the foundation of JURIdical eXpert systems in the Netherlands and Belgium (Jaap chairman, Kees secretary and PR, Carolus Grütters treasurer).

4. The Power of the PhD Student

Ideas are good, but small groups that wish to develop big ideas are usually not capable of performing great things in academia without PhD students (barring the rare exception). Thus we were pleasantly surprised when the Faculty of Law (via the multidisciplinary Jurimetry group of the social Security (JUS)) was the first entity to grant us a PhD student (Jaap de Wildt) and later another one (Jeanette Quast). Then NWO awarded us a project (two PhD students, viz. Robert van Kralingen and Pepijn Visser). Now we were well equipped to start.

Since Loevinger's (1948) fundamental article entitled *Jurimetrics: The Next Step Forward*, it has been clear to any legal researcher that measurement is important for taking the next step in law. Hans Franken (1973) also benefitted from this idea in his dissertation entitled: *Prosecution Policy, a jurimetric study concerning the prosecution policy of the Public Ministry regarding article 26 Road Traffic Law*.

In general, we may state that the competence of a PhD student is recorded in his/her dissertation. Such an academic result is a signal to colleagues that substantial progress has been made, or even a memorable result has been achieved. We know that the scientific world may have an impact on the social world. Here, it is also clear that the legal world can have a different perspective on which rules and values should be developed.

I have divided the twenty-five legal AI dissertations that I wish to discuss today into four classes [7-7-7-4], namely,
Class 1: The Run Up (1988-1999)
Class 2: Foundations of Law and Society (2000-2009)
Class 3: A Look into the Future (2010-2016)
Class 4: Refinements Leading to Improved Understanding (2017-2021)

4.1 The run up (1988-1999)

*De Wildt, Quast, Van Kralingen, Visser, Verheij,
E.W. Oskamp, Weusten (7)*

Jaap de Wildt: Judges and Vague Norms

Hans Franken came up with the idea to take Jurimetrics as one of the starting points for our ambitious research programme. It seemed like a good start. Moreover, it fitted seamlessly with JUS's research. Partly because of this, our first PhD student **Jaap de Wildt** was engaged in "a jurimetric investigation into the explanation of the concept of 'suitable work' from the Unemployment Insurance Act". As you may know, I like short titles - if you have something to communicate, do it briefly. Preferably in five or fewer words. So, you understand I just mentioned the subtitle. The title of the dissertation was: *Judges and Vague Norms*. I learned many things from the dissertation, the collaboration went smoothly and Jaap de Wildt obtained his PhD on June 22, 1993 with Hans and myself as supervisors. At the time the function of reviewer was still in use in Leiden; our reviewer was Jaap Riphagen. (Further details are in Appendix 1.)

The underlying problem statement (PS) by De Wildt (1993) was as follows.

PS: *To what extent is it possible to formalise a (vague) legal concept?*

The PS then focussed on two research questions (RQs), namely,

RQ1: Can a court decision on a particular legal concept be adequately described as a function of the relevant case characteristics?

RQ2: To what extent can general rules be derived from court decisions on the interpretation of (vague) legal concepts?

It became a very interesting dissertation. Here, I restrict myself to De Wildt's results that relate only to the vague norm concerning *suitable work*.

De Wildt has analysed 104 decisions of the Central Appeals Board (CRvB). An extensive model was drawn up for the subclasses (1) the wage level and (2) the nature and level of the work offered, and a smaller model for subclass (3) geographical factors. The research shows that seven factors have a significant meaning (see the dissertation). The developed knowledge system arrives at the same decision as the CRvB in 98 cases. This is a particularly satisfactory result for a first study in this field. For further results, I refer you to the dissertation.

Jeanette Quast: Computers and Vague Norms

When I saw that Jaap de Wildt's research was going to be a success, I dared to take the next step and **Jeanette Quast** dared too. Thus, the title of her dissertation became *Computers and Vague Norms*, with the subtitle "A computer model for the handling of legal cases". Coherence is important for every research group and the choice of these titles only makes the connection clearer. For a PhD student it is important to know what you are doing and what your colleagues are doing, as well as the direction of the research.

So far, a variety of legal knowledge systems had been developed that offered support in dealing with legal knowledge. I mention Juricas (De Mulder, 1984), Pallas ex Machina (PEM) (Schmidt, 1987), TESSEC (M.A. Nieuwenhuis, 1989) and PROLEXS (A. Oskamp, 1990), but making real legal decisions was not yet an accepted subject of research. Wim Voermans (1995), then still a fervent member of JURIX, came a bit close with his dissertation research: *Steering in the fog..., but with a radar*.

Jeanette Quast had all the skills needed for good multidisciplinary research: knowledge of KADS, an interest in programming, a pioneering feeling, and experience in setting up a large program entitled LEIDRAAD. Her problem statement was: Is it possible to describe knowledge about the application of a certain vague standard in such a way that this

description can also be used in the application of other vague standards?

Two of her basic assumptions were:

- (1) the implementation of statutory regulations leaves much to be desired; and
- (2) the implementation of legal regulations can be improved through automation.

Her research work progressed steadily. Together with Leo Aarts (Co-Supervisor) we refined time and again the general treatment of a case. We discussed exhaustively the initiation module, the instruction module, the module selecting the points of contention, the reasoning module, explanation module, and follow-up module. The result was more than satisfactory. Her program LEIDRAAD became a generic model (Quast *et al.*, 1996). In addition, there was the overall assessment module; that indicated also excellent quality. The qualifications were confirmed by the Promotion Committee of Leiden University (doctorate awarded). Moreover, there was a Committee that was given the task to select the scientifically best dissertation within the alpha-gamma sector. Jeanette's thesis was listed second, but for internal reasons the first prize was not awarded, and then the second prize did not become a first prize. In brief, an unrecognized breakthrough that I hereby record after 25 years.

Robert van Kralingen: Frame-based Conceptual Models of Statute Law

Pepijn Visser: Knowledge Specification for Multiple Legal Tasks
After this successful start of the AI and Law research for JUS, the next challenge was to supervise our two NWO researchers, **Robert van Kralingen** and **Pepijn Visser**. Assuming that all legal colleagues of De Wildt and Quast were able to imagine the essence of their investigation, it was completely different with Van Kralingen and Visser. The titles of their resulting dissertations, *Frame-based Conceptual Models of Statute Law*

and *Knowledge Specification for Multiple Legal Tasks*, were too difficult to understand at first glance. Clearly, those titles indicate at best that they deal with a contribution to the theoretical approach to developing legal knowledge systems.

Van Kralingen (a lawyer by training) took a schematic conceptual model of law as his starting point. His theory is applied to the Unemployment Insurance Act. The model can also be used in analysing the law. Visser (with a background in AI and information theory) was looking for a knowledge specification for multiple legal tasks, which usually leads to an abundance of specifications. Visser investigated how you can reduce this number. He arrived at a two-part formal ontology. Both researchers received their PhD on the same day: October 10, 1995. It was a heyday for Law and Computer Science.

Bart Verheij: Rules, Reasons, Arguments

Bart Verheij was and is a gifted mathematician who was captivated at that time by the idea that computers can reason. In 1992 he was appointed to the so-called Archimedes project funded by the Foundation of Knowledge-Based Systems (SKBS). The project was carried out in Maastricht where Verheij was guided by Jaap van den Herik and Jaap Hage. Initially, Verheij's research interest was in the field of multimedia information retrieval, but gradually his attention shifted to argumentation. In this context, argumentation is regarded as a process. The purpose of the process is to justify conclusions (cf. Pollock, 1987). It is an old idea that comes from philosophy and has roots that go back even to Aristotle (cf. Rescher, 1977).

Verheij makes a distinction between: (1) properties of rules and reasons and (2) the role of the argumentation process. For rules and reasons, he examines the following three questions.

- (a) What is the role of rules and reasons in argumentation with refutable arguments?

- (b) Which properties of rules and reasons are relevant for argumentation and refutation?

- (c) How do these properties relate to each other?

For the argumentation process, he examines the following two questions.

- (d) What is the role of the argumentation process in argumentation with refutable arguments?
- (e) How is the refutation of an argument determined by the structure of the argument, other arguments, and the argumentation stage?

To arrive at statements and conclusions, Verheij uses two formalisms of different nature, Reason-Based Logic and CumulA (Cumulative Argumentation).

Re-reading the dissertation is highly recommended: many questions are asked and many answers are given. The title of the dissertation is still intriguing because of its simplicity: *Rules, Reasons, Arguments*, subtitled by: "Formal studies of argumentation and defeat".

Eduard Oskamp: Information Technology and Sentencing

The slogan: "Rules are good, heuristics are better, but empirical evidence is even better" was an important guideline for researchers around 1990. With this knowledge, **Eduard Oskamp** started the *Information Technology and Sentencing* project in 1993, which was funded by the Scientific Research and Documentation Center (WODC) of the Ministry of Justice. It was a project under the umbrella of the Information Technology and Law (ITeR) program.

One of the major problems in justice is the inequality of sentencing in essentially equal cases. As you know, equality of law is one of the most important pillars on which our legal system rests. Leijten (1989) described two almost identical

criminal cases, in which two children were killed by a car driver through gross negligence. They had ended completely differently. It was one of the many triggers that encouraged the WODC to investigate the inequality.

It was then abundantly clear that rules and law had a difficult relationship. Also, the help of heuristics to support rules had not proved to be a sufficient solution. It should be completely different, it should be more empirically oriented. The question was therefore: how can we make theoretical research use Case-Based Reasoning? I was aware of one such a study. That was Antal van den Bosch's (1997) research in the field of Linguistics in Maastricht. He stated: "The rules of grammar are not sufficient to describe the behaviour of the language adequately, it requires case-based reasoning". That statement was a turning point in linguistics and in retrospect that also applies to *The development of a database* (subtitle of Oskamp's dissertation) for *Computer Support in Sentencing*.

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At this moment, I need only refer to today's symposium and in particular to the lecture by Henk Naves (President of the Council for the Judiciary (RvdR)) who told us: "Judiciary wants three quarters of judgments online". The question now is: when will it be achieved? At the present time the judiciary is still in the early stages of using machine learning and big data.

Let us go back to the beginning of the beginning, back to E.W. Oskamp, to the program Information Provision for Sentencing (IVS). On page 16 of his dissertation, Oskamp introduces the general case-based reasoning cycle in Figure 1.1. It is an overview that provides deep insight into the AI entity judging a court case. Many AI and Law researchers have made good use of this schematic representation. It has turned out to be the springboard that is currently in the spotlight.

Marnix Weusten: Building Legal Knowledge Systems

Many lawyers are like architects. They design a house, a university or a palace and then leave the actual building to

others. PhD candidate **Marnix Weusten**, however, was cut from completely different cloth. He worked briefly in the legal profession and designed an alimony program (1984-1985). As a lawyer, he subsequently developed (85/86) the first computer program RELAX in the field of Relative Competence approved by the software management working group of the Dutch Association for the Judiciary (NVR). He worked at the Center for Policy and Management (UU, with Albert Koers) and was active in JURIX. Albert and I believed that Marnix should show his talents in writing a dissertation. That incentive resulted in a great success.

The aim of the research was to write a methodological book on *The Construction of Legal Knowledge Systems* that would be accessible and understandable to every lawyer. The subtitle would be: "KRT: methodology and tools", where KRT stands for Knowledge Representation and Tools. Here, matters such as the consistency module and the decision system module were discussed.

There were two well-formulated problems, but most attention went to the question whether it works: Can knowledge systems developed in this way be used with any success in practice? The answer to that was affirmative. Using the methodology described, Kluwer published two knowledge systems commercially, namely: Wvp (Law equalling pension rights in the event of divorce) and Ovb (transfer tax). This characterizes our first success at the end of the first period: With knowledge of Law and AI, we had reached both the lawyers and the market. With the 21st century, the time had come to orient ourselves on the foundations of law and society using the new technologies.

4.2 Fundamentals of Law and Society (2000-2009)

Mommers, Verbeek, Hamburg, Coteanu, Schermer, Vanderlooy, Vis (7)

The question that we as a Law and Informatics group asked ourselves at the beginning of the new century was: How can we connect the new Law and AI concepts with the wishes of our colleagues and society? You will see that in the valedictory lecture I also follow the structure of the symposium: first exploratory and inventorying research and then making multidisciplinary connections between science, society, and the law. The ultimate goal is to propagate these connections with the help of successors. You may have seen this in the third part of the symposium: Kaleidoscope of successes.

Laurens Mommers: Applied Legal Epistemology

In brief, around the turn of the century we started with the foundations of science. NWO had once again awarded us a research project in a competition organized by MAGW (Society and Humanities). We had managed to attract the talented junior researcher **Laurens Mommers** for this project. The title of his research was: *Applied legal epistemology*, with the subtitle “Building a knowledge-based ontology of the legal domain”.

Mommers assumes that philosophical theories about knowledge can contribute to the quality of knowledge representation. He then distinguishes three dimensions: knowledge acquisition, the knowledge object, and the justification of the acquired knowledge. He thus combines the research results achieved by Van Kralingen, Visser and Oskamp, and also provides them with a stable base. He then gives an overview of ontological claims from different legal theoretical points of view. On this basis, he discusses in detail two objects of legal knowledge that are the result of a process of reasoning: systemisations and interpretations. It is the culmination of the work by Toulmin (1958) and Verheij (1996). Finally, the theory is applied to some central features of Dutch law, such

as guilt and criminality. He received his PhD on June 20, 2002. His work has been very inspiring for PhD students after him. In any case, Daniel Dimov has been able to apply and continue that work in the field of *Crowdsourced Online Dispute Resolution*.

Joop Verbeek: Police and the New International Information Market

At this point we move on to interpretations. The importance of interpretations arises especially in the exchange of information, such as it takes place at the police and other investigative authorities. The problem is growing exponentially when it comes to international data exchange. AI, Law, and the police found each other around the turn of the century near the three-country point close to Maastricht. With financial support from the European Union, the then chief of police of Limburg-South, Henk Mostert, managed to set up two wonderful projects under the names PALMA (Police Connections Aachen-Liège Maastricht) and EMMI (Euregional Multi Medial Information Provision). Professors Jaap van den Herik and Theo de Roos supported Mostert with his application. Expert knowledge was provided by Leo Plugge (computer scientist at UM) and the very active PhD student **Joop Verbeek**. He was a skilled lawyer, adept at maintaining computer connections and an organiser through and through.

The problem statement was: *Can a legal framework be developed that allows a secure link between national police networks in the context of European border-regional information cooperation?*

This was followed by a legal question, a technical question, and three additional research questions. All five were very interesting. The best thing I can do in this valedictory lecture is to recommend the dissertation *Police and the New International Information Market*, with the subtitle: “Border-Regional Police Data Exchange and Digital Expertise”.

Verbeek describes various sub-projects that were financed by the Ministry of the Interior and Kingdom Relations. This led to a lot of attention being paid to requests for legal assistance, spontaneous provision, covenants and the Schengen Manual. Important questions in this regard are: when is linking prohibited or allowed, and when can it be automated and under which conditions? The PhD defence took place on October 14, 2004. It was a highlight for many police organisations.

Fred Hamburg: A Computer Model for Supporting Euthanasia Decisions

The aforementioned research by E.W. Oskamp (1998) dealt with the delicate issue of legal inequality where legal equality was of great importance to those involved. The outcome was the establishment of a database. With this thought external PhD candidate **Fred Hamburg** approached me. It was a special conversation. The topic was euthanasia decisions.

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You already understand that the ultimate question was: Can all the practical considerations that arise in decisions about the 'quality of life' in cases of euthanasia (for adults) in principle be accommodated in a knowledge system? As you can imagine, this was the start of a somewhat lengthy preliminary process. As a scientific researcher I found Hamburg's question intriguing. As a professor, I thought who (which team) could answer this question? And why should I be part of that team? Fred had himself well prepared for the last question. "I don't know anyone else in the AI world in the Netherlands whom I could approach with this question. It's about intelligent systems. Please, think about it once more." That's how we ended our first conversation. I decided to consult some close friends and started with Heleen Dupuis. She is the elder sister of my schoolmate Foppe Dupuis. In the meantime, my respect for Fred Hamburg grew continuously since we did not know each other in advance and he still approached me with such a challenging scientific and societal question. Apparently, I needed the comfort zone of my friends to seriously discuss

his research question, while he had just openly and directly approached me with his research proposal. Yet, one thing was certain for me: serious people with exceptional ideas deserve to be supported.

After extensive preliminary consultations, I had formed a trio that would take care of the supervision. In addition to Heleen and myself, I had asked Eric Postma (psychologist and AI expert). Then I had requested the Committee for Promotions to make an exception to the usual number of no more than two supervisors. Our case was considered exceptional and so the four of us were able to get to work. We were at the start of four very interesting years. There was too much going on for a brief mention in a valedictory speech.

As PhD student Fred Hamburg worked hard and very seriously. On p. 93 of his thesis you can see the CBR cycle taken from E.W. Oskamp (1998) on which Hamburg based his model. His aim was to demonstrate the inconsistency of decision-making practices at the time. As a touchstone, Hamburg took two crucial decisions of the Supreme Court (the Chabot judgement and the Brongersma judgement) and showed that they are essentially contradictory.

He then came up with proposals in which computer decisions play an important role. The big question, however, is to what extent is society ready to accept a computer's judgement seriously. To gain some insight into this tangible question, the supervisors and the candidate organised a symposium, with speakers being Bishop Eijk (now Cardinal), Christian Union Group Chair André Rouvoet (later Vice-Premier) and ethicist James Kennedy. The discussion was conducted with mutual respect and in advance of the ceremonial defence (which took place the following day), candidate Hamburg received compliments for his work.

Cristina Coteanu: Cyber Consumer Law

The quality of our group's research had meanwhile acquired

international dimensions. As a consequence, it happened that the Romanian diplomat **Cristina Coteanu** invited me to supervise her PhD plans. She was stationed in Brussels working with the Romanian Ministry of Foreign Affairs and wished to write a dissertation on Cyber Consumer Law. This was an opportunity that I enthusiastically accepted after two preparatory conversations in which we discussed her elaborated ideas. She was ambitious, a good researcher possessing ample knowledge of the topic. Here too I secured myself an excellent co-supervisor in the person of Georg Howells, professor at the University of Lancaster. The research went smoothly and with good results regarding standardisation in online contracts, electronic agents in online consumer transactions and online dispute resolution.

When we got a little over halfway through the research, around chapter 7 (entitled Disclosure of Online Information), Cristina told me at the end of a meeting that the previous week she had been appointed Secretary of State of the Ministry of Justice. Consequently, she said: "I might have a little less time in the future to devote myself to the dissertation." I was perplexed. Chapters 8, 9 and 10 were barely under construction. I was very aware of my responsibility at that time. How was I supposed to support this young woman? I was sure I wouldn't drop her. "Listen", I said, "There is only one way we can complete this thesis and that is with your dedication and my directions." My proposal is: "You work on it every day from 9 p.m. to 11 p.m., even if you are visiting the Minister of Justice of Greece next week (as she had just told me). You say in advance that you are available until 8:30 p.m. and that you have to be in your hotel room by 9 p.m. because you have an appointment with your supervisor." She replied: "That's how we're going to do it. I think that's a good idea."

Of course, with the approval and permission of Rector Breimer, I had asked Minister Piet Hein Donner (not doctorated himself) to join the Doctorate Committee. Donner

had been granted dispensation and promised to attend, but at the very last moment he was called to the House of Parliament by a number of Representatives to account for his policy. The defence took place on December 20, 2005.

Bart Schermer: Software Agents, Surveillance, and the Right to Privacy

At the end of the 20th century, Law and Computer Science had changed its name to eLaw@Leiden, Center for Law in the Information Society; twenty years later, it changed to Center for Law and Digital Technologies. With the support of the E.M. Meijers Institute of Legal Studies and ECP.NL, **Bart Schermer** was appointed as a PhD student at eLaw. His task was to design a legal framework for the application of software agents in surveillance. The problem statement was as follows: *Is it possible to maintain privacy and freedom when software agents are able to overcome the information overload as a barrier to effective surveillance?*

It became a wonderful dissertation in which new perspectives on privacy were extensively investigated on the basis of five qualitative and five quantitative effects. The line of research was as follows: ordinary agent systems (2005-2008), international systems (2008-2012), open systems (2012-2015), and fully scalable systems (2015-2020). A selection of the concepts discussed included: the autonomy of the agents, the legal status of the agents, identification, authentication, authorization, and integrity. On May 9, 2007 there was a symposium before the public defence, under the title: *Artificial Intelligence and Detection*, led by Alexander Pechtold. The general conclusion after the defence was that we have many things to ponder and re-ponder. More is going to change than we thought.

Bart Schermer's vision serves as a good guide for the continuation of this speech.

Stijn Vanderlooy: Ranking and Reliable Classification
Thijs Vis: Intelligence, Police and Security Service: Compatible Quantities?

The collaboration between De Roos, Van den Herik, and the police created a fruitful harmonious research model with a good spin-off. Within the framework of ToKeN 2000 there was also interest from NWO in stimulating multidisciplinary projects. The joint (Leiden-Maastricht) project proposal entitled *Intelligent Policing* was accepted by NWO, and two talented PhD students were appointed, **Stijn Vanderlooy** as AI researcher and **Thijs Vis** as legal researcher.

Although an adequate classification is a main task of any scientific research, investigations on classification frequently pose particularly hard problems. In practice, classification models appear to be used only for relatively simple tasks, such as predicting the whereabouts of a criminal person, profiling, fraud detection, and the risk of recidivism. In more difficult problems, domain-specific obstacles play a role. In that sense, the new research was in line with the research by Blokland and Nieuwbeerta (2006), who identified and quantified the exchange of costs and benefits in predicting the risks of recidivism. Our research had a different angle. The problem statement was: *To what extent can machine learning classifiers be used to increase the effectiveness and efficiency of law enforcement?* Vanderlooy explored three possibilities to answer this question: (1) sequencing the elements to be examined, (2) excluding classifiers that exhibit a known behaviour, and (3) replacing the binary classification with multi-class classifications. All three of these approaches have produced very good results. This is partly because Eyke Hüllermeier (Philipps Universität Marburg) was willing to participate in the project. [Incidentally, the mathematical results of this project have recently been improved by an inspiring contribution delivered by PhD candidate Quinten Meertens (2021), with Hüllermeier involved as advisor.]

In a sense, Vanderlooy's mathematical power overshadowed the contribution by Thijs Vis, who moved from Leiden to Tilburg during the project. But it all worked out fine. Please excuse me for the following, but Thijs (Vis, 2016) needed, as he himself wrote in my *Liber Amicorum, The Tilburg Years*, "a kick in the ass". So, in the end, all went well, even very well. Thijs wrote almost 400 pages to explain all the ins and outs of the security services. In plain language, the research question involved was: What exactly is the relationship between the General Intelligence and Security Service (AIVD) and the Criminal Intelligence Unit (CIE) of the Dutch police? I quote the last sentence (recommendation) of the dissertation: "It therefore applies to both the AIVD and the CIE/RIO (and the police in general) that investments must be made in mutual interaction and in building trust. [RIO stands for Regional Information Organisation.]

4.3 A Look into the Future (2010-2016)

Koelewijn, Kielman, Siewicz, Ong, Voulon, De Kock, Meesters (7)

The foundations of Law and Society were affected by the tragic events of September 11, 2001. Then it became clear to NWO that there was a new task for the old ToKeN 2000 program for the next fifteen years, namely ensuring Accessibility and Access to Knowledge in the Netherlands (ToKeN; without year of identification of goals) in at least three areas (Cultural Heritage, Police and Justice, and Health Sciences). The implementation was started almost immediately. One of the projects that qualified in the competition was the ANITA project (project leader Kees de Vey Mestdagh). [ANITA stands for Administration Normative Information Transaction Agents.] ANITA consisted of five sub-projects, two of which were carried out in Leiden under the direction of Van den Herik, Schmidt, and Mommers.

Wouter Koelewijn: Privacy and Police Data

Hugo Kielman: Police Data Processing and Privacy

Two friends, two PhD students, two different subjects in the same field. The subtitles alone clearly show that the studies matched each other flawlessly. **Wouter Koelewijn** investigated the situation “About automated normative information exchange”, while **Hugo Kielman’s** dissertation discussed “Towards an effective guarantee”. Koelewijn looked more at the technique and Kielman at the law. They were the Stan Laurel and Oliver Hardy of eLaw. To get their message across, they gave half a lecture each in which they interrupted each other continuously. That also happened earlier this afternoon (the last session of the symposium).

Koelewijn’s problem statement was: *To what extent can the use of software agents and normative multi-agent techniques contribute to the improvement and regulation of the electronic exchange of police data?* He then formulated four research questions, the third question of which was: “How is the current

exchange of criminal intelligence structured and what are the (legal) bottlenecks in it?”

This research question prompted extensive fieldwork. The Dutch police were thoroughly questioned and that led to honest answers. Kudos to the police officers who in this way took the practice of their profession a step forward. Below I mention only the five *main* bottlenecks that are discussed in detail in the thesis: (1) legal knowledge is difficult-to-access, (2) insufficient data control, (3) insufficient standardisation, (4) closed corporate culture, and (5) insufficient privacy safeguards.

Kielman’s research ran parallel with Koelewijn’s, so he knew the five main bottlenecks pointed out by Koelewijn. His problem statement was: *To what extent does the Police Data Act guarantee (a) the proper performance of the police task and (b) the fundamental rights of citizens more effectively than the Police Registers Act?* This research had an impactful methodological side. How were the police officers to be questioned by both Koelewijn and Kielman? My background with Police Chief Henk Mostert helped me enormously, as did the enthusiasm of police organisation expert Johan Oostveen and the drive of the Chief Commissioner for Zuid-Holland-Zuid and later head of the KLPD, Ruud Bik. They gave us the right advice.

The researchers worked day and night in a field full of tension. Two main approaches were clear opponents: instrumentalism and legal protection. The main task of the police is located in the actual maintenance of the rule of law. In practice, however, the other task also takes shape: providing help to those who need it. During the investigation, it appears on the police-agenda that more powers are needed for the legitimising effect of maintaining the rule of law. The concepts of *informational investigation method* and *informational privacy* clash here again, just as in the 1970 census, but now it is the technological progress that is a point of discussion. This contrast is quite clearly presented by Kielman in his concluding remarks. He

strives for balance and ends his dissertation as follows. “Once the balance has been reached it will be possible to amend legislation, so that a more effective system of assurance is created.” Nicely said, but more than ten years later we are still waiting for a balance.

Krzysztof Siewicz: Towards an Improved Regulatory Framework of Free Software

Law and Informatics also has its far-away corners. As a case in point, I mention the 2005–2006 academic year, when Nuffic, as part of the Huygens Scholarship Programme, granted a sabbatical to Polish researcher **Krzysztof Siewicz** for his study on Free Software.

His approach was ‘towards better legal protection of free software’. Siewicz was following the footprints of Stallman (1986) and Lessig (1999). *The essence of Free Software is that users are allowed to perform all copyright-relevant acts*. Indeed, this sentence alone raises the eyebrows of a number of lawyers. Still, it is an interesting topic. For instance, an operating system such as LINUX was created this way.

Hence, it has been developed through the efforts of a community. However, in that community there still must be a framework of rules that users have to adhere to. That is why the subtitle of the thesis is: “Protecting user freedoms in a world of software communities and eGovernment”. It is a very nice technical dissertation that comes into its own in the excellent review by Ronald Leenes (2011) in *Rechtsgeleerd Magazijn Themis* under the title: ‘Copyright under control’.

Rebecca Ong: Mobile Communication and the Protection of Children

Multidisciplinarity and Internationalisation are the keywords of our research. As one of the founders of AI research in the Netherlands, I felt compelled to give substance to this. I saw at home with children and grandchildren how fast developments had gone, what should you encourage and where should you

place question marks? So, **Rebecca Ong**’s proposal fell into fertile ground. Hong Kong has a different cultural background with an emerging technological development, and thus was a good opportunity for further internationalisation. After some preliminary exchange of research ideas we were both enthusiastic to start.

Her first problem statement was: *How does mobile communication technology through the use of the new generation of telephones pose a threat to children and adolescents in terms of content, contact, and commercialization?* Her second problem statement was: *How should we proceed to identify the shortcomings in the existing regulations regarding the protection of this vulnerable group?*

During the research period both questions were answered perfectly. She was the first in the world to investigate this issue with regard to technology. She was also ahead of technological developments during her defence period. The ceremonial defence was set on April 22, 2010. However, due to the ash rain from the Icelandic Volcano Eyjafjallajökull, she was unable to fly to the Netherlands. Rector Paul van der Heijden gave permission for the first online defence in Leiden (it was – as he said – by very high exception).

Marten Voulon: Automatic Contracting

You may have lost track of Hans Franken in the meantime, but that would be a mistake. “Jaap, we need to do something together again. I am approached by a PhD student interested in *Automatic Contracting*. Are you interested?” The new PhD student **Marten Voulon** proposed the following problem statement: *In which way and under which conditions does contractual binding arise if an automated system is used to enter into an agreement on behalf of a natural person or legal entity?* Some of his research questions were: How does all this fit into the prevailing doctrine of trust in wills? Should the system be seen as a legal subject? Or as a representative? When does an agreement come into existence? And what about the signature?

In his research, Voulon distinguishes two approaches: an *instrument approach* and an *actor approach*. Voulon is not in favour of the actor approach (see p. 296) and he gives arguments that would be weighed differently today. That is not so remarkable because it has been more than eleven years since the thesis was defended. In brief, *Automatic Contracting* was an excellent title back then and can now serve as a measure of progress. In the dissertation, the questions were answered precisely and correctly. So, it was the start of a well-deserved defence ceremony. However, it soon became clear that we were at the beginning of a turbulent development in this field.

Peter de Kock: Anticipating Criminal Behaviour

The research into case-based reasoning had touched an open nerve: a small difference could lead to a big difference in results. The power of data became more and more apparent in each subsequent study. Data-driven AI was the new leader in AI research technologies. Law enforcement shifted from *prosecuting* a crime to *anticipating* a potential crime. The emphasis was on discovering storylines in crime-related data.

The NCTV, together with the National Police and the Ministry of Defence, invited me to supervise their talented detective **Peter de Kock**. That turned out to be a particularly challenging task because detectives simply find it difficult to fit into academic research. Coming from the creative sector, Peter emphasised scenarios and, within them, the interactions between characters and the system. In his computer model he collected data (and preferably information) about behaviour, goals, motivations, expectations, actions and reactions, successes, and problems.

Here again I had built up a team of collaborators. It consisted, in addition to Peter and myself, of Jan Scholtes and Pieter Spronck. The initiator of the investigation from the police was Ron Boelsma. It is also worth mentioning that we had an Advisory Board that consisted of representatives of the three initiating organisations. The problem statement was simple:

To what extent can a scenario model support investigative organizations in anticipating criminal behaviour? There were four research questions and an intended outcome that I briefly summarize here as the PANDORRA Program. The intention was to also produce partial results. And they came in abundance. Not everything was allowed to be published, but what was published was enthusiastically received. Based on these and other results, Tilburg University appointed Peter as professor by special appointment in 2019.

Paulien Meesters: Intelligent Blue

The big question within the police is: how can the police intelligently approach society? The correct answer - if it exists - to this question should then immediately be added to the teaching material of the Police Academy. We are not yet there, but the police officers are doing their very best to achieve a step towards *Intelligent Blue* via PhD students. In doing so, they place great emphasis on Intelligence-driven policing (IGP). The wish is once again apparent from the problem statement by PhD student **Paulien Meesters**: *To what extent can area-based police achieve Intelligent Blue?*

As a seasoned researcher, Paulien investigates and identifies bottlenecks on the path to Intelligent Blue. She does this supported by empirical research and then mainly looks at three dimensions: alert capacity, adaptive capacity, and responsive capacity. Subsequently, she defines three keys that could help the police using AI techniques. Heading for *Smart Cities* and attempting to get there rather quickly she defines *Smart Areas*. It looks nice and good, but when I think of what recently happened to Peter R. de Vries, I know for sure that we still have a very long way to go. In brief, we must continue stimulating police investigations through motivated PhD students.

4.4 Refinements Lead to Better Insight (2017-2021)

Oerlemans, Dimov, Nakad, Van Eijk (4)

Refining research sounds nice but has three drawbacks: It takes more time, it requires more manpower and it requires the deployment of more advanced AI technology. The question whether these three disadvantages outweigh the results is answered affirmatively by the following four researchers. In particular, I would like to point out that the results of all four researchers provide a better insight into the possibilities of modern technology for delivering clear and fast performance.

Jan-Jaap Oerlemans: Investigating Cybercrime

The subject of cybercrime is nowadays so extensive that an initial definition is necessary to know what we are talking about. The restriction introduced by **Jan-Jaap Oerlemans** is a restriction to Art. 8 ECHR (European Convention on Human Rights). He has an interesting problem statement and five relevant research questions. Here, I mention RQ4: *In what way can the legal framework in Dutch criminal procedure law be improved to adequately regulate the identified investigative methods?* RQ4c is particularly interesting when it comes to applying online undercover methods. An entire chapter is devoted to it (pp. 211-248). The supervisors and the candidate (Pinar Ölcer, Bart Schermer, Jaap and Jan-Jaap) mostly discussed the *visualisation* of the results.

The interesting question is: can we indicate a relationship between the level of detail of the rules (and safety margins) and the seriousness of the invasion of privacy? The answer is: no. But that is still the point. To stimulate thinking, Jan-Jaap suggested a *linear relationship* and for a start he took one that runs along the 45-degree line (see p. 213). May I invite you to reflect on this.

Jan-Jaap also notes that the *quality* of the law is assessed by the ECtHR (European Court on Human Rights). There, Jan-Jaap proposed the following text (see p. 237): “The desired quality

of the law for undercover investigative methods is illustrated in Figure 7.2.” (He then takes an example based on Art. 6 ECHR, and ‘illustrates’ it with a *linear relationship* that has an angle of 60 degrees instead of 45). In brief, his work was of high quality (it brought him the title professor by special appointment), and on top of that he showed that there is a plethora of empirical work left for future PhD students.

Daniel Dimov: Crowdsourced Online Dispute Resolution

The elaboration of new ideas is a Sisyphus labour, because the ideas are rough, unpolished and unfinished. Yet, there are often future pearls among the new ideas. After **Daniel Dimov** graduated from the Radboud University (Nijmegen) in European Law and had received a certificate from The Hague Academy of International Law, he asked me whether I had a topic for him on which he could base his PhD research. Yes I had, and immediately I replied: “Challenging and new in our profession is Crowdsourced Online Dispute Resolution (CODR)”.

I referred him to the publications by Howe (2006) and Mommers (2006). I also asked him to monitor and carefully study developments at eBay. That was a tough assignment for a freshman. Admittedly, the subject appealed enormously to me and I also introduced it to the Ministry of Security and Justice (as it was called at the time) as a new subject to be investigated. At the time, Ronald van den Hoogen organised a conference on new ideas in AI and Law research. I was invited to speak at the conference. There, I met Henriëtte Nakad who spoke about eCourt. Moreover, I heard many things about KEI in the corridors. It was an inspiring afternoon, but I did not envy Ronald because he had to report on the most promising developments. Briefly stated, CODR was a step too far, as was eCourt. Only KEI went through. Meanwhile, things were going well with eBay. We had direct contact with Rule and Nagarajan (2010).

At that time, Mommers left eLaw and eventually became Director of Legal Intelligence. In order to properly complete

the ODR- and ADR-side of the research, I invited Arno Lodder to join our team. It was the beginning of a fruitful collaboration.

In his new research environment, Dimov was doing his job very well. He analysed existing CODR procedures, such as Online Opinion Polls, Online Mock Jury Systems, and Self-Enforceable Decisions. The latter type of CODR procedures was used by, e.g., eBay and Marktplaats.nl. Based on these ideas Daniel designed a framework for the CODR of the future. Technically speaking, the framework was excellently designed, now we could concentrate on social acceptance.

We decided to focus on procedural fairness with an open eye for subjective procedural fairness. Daniel then managed to make an inventory of the necessary elements for the implementation of procedural fairness in CODR procedures. He concluded his study with a model of a fair CODR procedure. The official ceremony on June 27, 2017 was a heyday for the new developments. And what about society? Together (Daniel, Arno, and Jaap) we looked at eBay. We heard from Colin Rule that eBay had abandoned further development of the CODR applications for various reasons.

Henriëtte Nakad - Weststrate: The Notary and Private Adjudication

Over the years, I have learned various new things from some of my PhD students, sometimes even more from others, but I have never learned as much as from supervising **Henriëtte Nakad**. She started as a PhD student in Utrecht and as such I met her in The Hague (see the story above on CODR and Daniel Dimov). Not much later I was pleased to meet Henriëtte's supervisor Professor Ton Jongbloed as well. He invited me to be a member of the assessment committee. Then, all of a sudden, an academic discussion arose in the Faculty of Law in Utrecht University about the possibility of assigning a doctorate for a dissertation on the concept of eCourt. The discussion flew high, quite high, very high in

fact. Here I will not dive into any detail. In the meantime, I had engaged a confidential counsellor in Leiden (Hans Nieuwenhuis). He guided me through all my steps. "Jaap, stay as you are, calm, rational, well-balanced and effective." Consequently, after a while I proposed to all parties involved to transfer the PhD from Utrecht to Leiden, with the intended supervisors being Van den Herik and Gerard Meijer (Professor at EUR and promotus of Henk Snijders). You can understand from this that Jongbloed was caught under the wheels of the negotiations. With the motto *Praesidium academia lugduno batava libertatis*, it seemed to me that Utrecht scenes would not show up in Leiden. Nothing could be further from the truth. The concept of eCourt was no longer an academic discussion nor a technological discussion, but a social discussion: do we want eCourt or not?

After Hans Nieuwenhuis had passed away, I asked Gerard whether he was prepared, next to his task of supervisor, to be also my confidential advisor. Admittedly, he was the closest person involved, but there were so many things going on and I needed a really straight course. Here, I would like to give a personal compliment to Joanne van der Leun (Dean of the FdR). She spoke to all who approached her about the case: "Thanks for your advice. I hear them, but I decide myself". She then based her decisions on scientific grounds. My last advice to Henriëtte was: "Remove eCourt from the title". The thesis defence took place on October 17, 2018 and the title was: *The Notary and Private Adjudication*.

Rob van Eijk: Web Privacy Measurement in Real-Time Bidding Systems

Did I save the most promising dissertation for the last? Yes, I think so. That, of course, is a personal opinion. I do know that the opinion (very nice dissertation) is wholeheartedly supported by Peter Swire, member of the assessment committee and the PhD committee. Swire is also a professor at the Georgia Institute of Technology and an eight-year advisor to President Clinton's Chief Counselor for Privacy and Data

Protection, and then advisor to President Obama as one of five members of the National Review Group on Intelligence and Communications Technologies. Together with **Rob van Eijk**, Swire was a member of the *How to Prevent the 'Do Not Track' Arms Race* Committee. In this way, Leiden, together with promotus Van Eijk, was at the forefront of developments. That position has been achieved through hard work on the dissertation *Web Privacy Measurement in Real-Time Bidding Systems*. The main aim of the dissertation is to increase transparency by measuring, measuring, and again measuring. Rob van Eijk's contribution is in the subtitle: "A Graph-Based Approach to RTB System Classification". Effectiveness and efficiency of the technique have been demonstrated with the help of a dataset from European national and regional newspapers.

This concludes my discussion on the Power of the PhD student.

5. Five Important Points of Attention

In this section I will give you a brief overview of five points of attention that I learned from the PhD students. The five points can be seen in the context of *scouting* and *supervising*.

A. Perseverance

Whether a candidate truly desires a PhD is completely subordinate to whether he/she has perseverance. A good question is: how do you overcome adversity?

B. A Little Smile

A little smile is an important means of communication, but **humour** is better. A scout who becomes convinced of a candidate just because of a persistent little smile has not paid full attention.

C. Honesty

You have to sense honesty, but that is very difficult. I have witnessed two instances of attempted plagiarism (i.e., repeated plagiarism after a serious warning). Two consequences were: (1) No promotion under Van den Herik's aegis, and (2) A lot of hassle with embassies and lawyers.

D. Contradiction

Contradiction is good and should be encouraged, even if it indicates ignorance. It is an important part of the learning process.

E. The Baton of the Marshal

All PhD students have the Baton of the Marshal in their pack. Only a few will be promoted to the dignity. (Taken from Napoleon.)

6. Closing Remarks and Words of Thanks

After these points of attention, I now come to my closing remarks.

Closing remarks

What do I think of my PhD students? I like them very much! Yet, if you have listened carefully, not one of the 25 has been awarded with honours (*cum laude*). That is because I am very strict and maintain high standards.

Of the 90 PhD students I was allowed to supervise in total, only three obtained their PhD with honours. You can easily calculate that this is less than 5% (the university guideline). Of these 90 PhD candidates, 11 have become full or special professors. By way of comparison, I mention that of the 25 AI and Law PhD candidates, three have become professors (I have already mentioned two of them during this speech, the third is Bart Verheij).

To my shame and sadness, I have to admit that there is only one lady among the eleven professors, namely Professor Mirjam Nielen of Utrecht University. Fortunately, the total female-male ratio (with apologies to the LHBTIQ+) is slightly better, namely 18 promotae and 72 promoti. A slightly better ratio is given by the criterion 'country of origin', 32 come from abroad and 58 from the Netherlands. Overall, I am a satisfied and grateful person.

Words of Thanks

Now I come to my words of sincere thanks. My thanks extend to all those I have mentioned in this lecture and whom I will not repeat here for the sake of time. This even applies to my **trustees** (called curatores).

Of course, I would like to thank all persons involved in the symposium *The Challenge of the Blind Spot*. Hence I call the names of the **invited speakers**, together with the moderators

and the symposium chair: **Simone van der Hof**, Ankie Broekers-Knol, Henk Naves, Hans Franken, Holger Hoos, Saskia Bruines, Adwin Rotscheid, Liesbet van Zoonen, Nikol Hopman, Jan Scholtes, Jan-Jaap Oerlemans, Bart Verheij, Bart Schermer, Rob van Eijk, Hugo Kielman and Wouter Koelewijn, the moderators Joanne van der Leun, Theo de Roos and the symposium chair **Bart Custers**. My gratitude is deep.

I have come this far in science through **Jos Vermaseren**. He introduced me into Theoretical Physics and suggested Frank Linde (Director of NIKHEF) to make me a partner in the ERC Advanced project HEPGAME (High Energy Physics and Games). Together with Jos I have been able to supervise *cum laude* student Ben Ruijl (2017). I will leave it at this.

Administratively, I have come this far thanks to a variety of support staff, secretaries (including a male secretary), management assistants, financial experts, etc. Here, I would like to thank in particular **Joke Hellemons** with whom I was allowed to work in Maastricht, Tilburg, and Leiden for 21 years.

In 2014 I returned to Leiden at the Faculty of Science (after a one day per week stay from 1984-1988) to work with **Joost Kok** and **Jacqueline Meulman**. The *Leiden Centre of Data Science* (LCDS) was a great success (thanks also to **Geert de Snoo**). In March 2018, the Board of Deans gave the go-ahead to make LCDS truly multidisciplinary by establishing collaboration between LCDS, eLaw, and FGGA (later elaborated by CPL). Many thanks to the three deans (**Geert de Snoo**, **Joanne van der Leun**, **Erwin Muller**) for their support of the *Leiden Legal Technology Program* (LLTP).

The success of LLTP was made possible by **Jan Scholtes**, **Nikol Hopman**, and **Nina Bijl**. For the organisation of today I am indebted to **Regina Noort**, **Julia Raimondo**, **Marco van der Ree**, **Erick van Zuylen**, and many others. Thank you all for your commitment.

Finally, I would like to thank **Letty Raaphorst** and our three daughters **Seada, Larissa,** and **Kirsten** for 'being there'.
(Sons-in-law and grandchildren are implicitly included in these thanks.)

I rest my case.

(in Latin: dixi)

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APPENDIX 1

List of Promoti/Promotae in Law Leiden 18, Tilburg 4, Maastricht 2, Utrecht 1 Supervised by Prof. dr. H.J. van den Herik (and others)

22 June 1993, J.H. de Wildt, *Rechters en vage normen*, Universiteit Leiden, Supervisors: Prof. mr. H. Franken and Prof. dr. H.J. van den Herik, Reviewer: Prof. mr. J. Riphagen.

10 October 1995, R.W. van Kralingen, *Frame-based Conceptual Models of Statute Law*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Reviewer: Prof. mr. H. Franken.

10 October 1995, P.R.S. Visser, *Knowledge Specification for Multiple Legal Tasks*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Reviewer: Dr. T.J.M. Bench-Capon.

29 February 1996, J.A. Quast, *Computers en vage normen: een computermodel voor de behandeling van juridische casus*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Co-Supervisor: Dr. L.J.M. Aarts, Reviewer: Prof. dr. J.A. Breuker.

5 December 1996, B. Verheij, *Rules, Reasons, Arguments. Formal studies of argumentation and defeat*, Maastricht University, Supervisor: Prof. dr. H.J. van den Herik, Co-Supervisor: Dr. J.C. Hage.

13 May 1998, E.W. Oskamp, *Computerondersteuning bij Straftoemeting*, Universiteit Leiden, Supervisors: Prof. mr. H. Franken, Prof. dr. H.J. van den Herik, Reviewer: Prof. dr. A. Koers.

10 March 1999, M.C.M. Weusten, *De Bouw van Juridische Kennissystemen*, Universiteit Utrecht, Supervisors: Prof. dr. A.W. Koers and Prof. dr. H.J. van den Herik.

20 June 2002, L. Mommers, *Applied Legal Epistemology, Building a Knowledge-based Ontology of the Legal Domain*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Reviewer: Prof. mr. P.W. Brouwer.

14 October 2004, J.P.G.M. Verbeek, *Politie en de Nieuwe Internationale Informatiemarkt*, Universiteit Maastricht, Supervisors: Prof. dr. H.J. van den Herik and Prof. mr. Th.A. de Roos.

24 November 2005, F. Hamburg, *Een Computermodel voor het Ondersteunen van Euthanasiebeslissingen*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik, Prof. dr. H.M. Dupuis, and Prof. dr. E.O. Postma.

20 December 2005, C. Coteanu, *Cyber Consumer Law, State of the Art and Perspectives*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. G. Howells.

9 May 2007, B.W. Schermer, *Software Agents, Surveillance, and the Right to Privacy: a Legislative Framework for agent-based Surveillance*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Reviewer: Prof. dr. H. Franken.

1 July 2009, S. Vanderlooy, *Ranking and Reliable Classification*, Universiteit Maastricht, Supervisors: Prof. dr. H.J. van den Herik, Prof. mr. Th.A. de Roos, and Prof. dr. E. Hüllermeier.

4 November 2009, W.I. Koelewijn, *Privacy en Politiegegevens. Over geautomatiseerde informatie-uitwisseling*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. mr. A.H.J. Schmidt, Co-Supervisor: Dr. L. Mommers.

14 April 2010, H.H. Kielman, *Politiële gegevensverwerking en Privacy, Naar een effectieve waarborging*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. mr. A.H.J. Schmidt, Co-Supervisor: Dr. L. Mommers.

20 April 2010, K. Siewicz, *Towards an Improved Regulatory Framework of Free Software*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. mr. A.H.J. Schmidt.

22 April 2010, R.Y.C. Ong, *Mobile Communication and the Protection of Children*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Co-Supervisor: Mr. dr. B.W. Schermer.

3 June 2010, M. Voulon, *Automatisch contracteren*, Universiteit Leiden, Supervisors: Prof. dr. H. Franken and Prof. dr. H.J. van den Herik.

6 June 2012, T. Vis, *Intelligence, politie en veiligheidsdienst: verenigbare grootheden?*, Universiteit van Tilburg, Supervisors: Prof. mr. Th.A. de Roos, Prof. dr. H.J. van den Herik, and Prof. dr. A.C.M. Spapens.

30 10 September 2014, P.A.M.G. de Kock, *Anticipating Criminal Behavior*, Universiteit van Tilburg, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. J. Scholtes, Co-Supervisor: Dr. ir. P.H.M. Spronck.

1 December 2014, P.M.A. Meesters, *Intelligent Blauw*, Universiteit van Tilburg, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. Th.A. de Roos.

10 January 2017, J-J. Oerlemans, *Investigating Cybercrime*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Co-Supervisors: Mr. dr. F.P. Ölçer and Mr. dr. B.W. Schermer.

27 June 2017, D. Dimov, *Crowdsourced Online Dispute Resolution*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. A.R. Lodder.

17 October 2018, H.W.R. Nakad-Weststrate, *De Notaris en Private Rechtspraak*, Universiteit Leiden, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. G.J. Meijer.

29 January 2019, R.J.W. van Eijk, *Web Privacy Measurement in Real-Time Bidding Systems, A Graph-Based Approach to RTB system classification*, Universiteit Leiden, Supervisor: Prof. dr. H.J. van den Herik, Co-Supervisor: Dr. M. Dechesne.

APPENDIX 2

List of Promoti/Promotae in the Faculty of Science in Leiden Supervised by Prof. dr. H.J. van den Herik (and others) in Leiden

2 December 2015, J. Gard, *Corporate Venture Management in SMEs*, Leiden University, Supervisors: Prof. dr. B.R. Katzy †, Prof. dr. H.J. van den Herik, and Prof. dr. G.H. Baltes.

20 December 2016, C.R.M. Weber, *Real-time Foresight*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. B.R. Katzy †, Co-Supervisor: Prof. dr. K. Sailer.

17 October 2017, Y. Guo, *Shape Analysis for Phenotype Characterisation from High-throughput Imaging*, Leiden University, Supervisors: Prof. dr. F. Verbeek and Prof. dr. H.J. van den Herik.

2 November 2017, B. Ruijl (cum laude), *Advances in computational methods for QFT calculations*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. A. Plaat, Co-Supervisor: Dr. J.A.M. Vermaseren (NIKHEF).

24 October 2019, E. C. Kuindersma, *Cleared for take-off, Game-based Learning to prepare airline pilots for critical situations*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. A. Plaat, Co-Supervisor: Dr. J. van der Pal.

5 February 2020, A. Toubman, *Calculated Moves, Generating Air Combat Behaviour*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. ir. P.H.M. Spronck, Co-Supervisors: Dr. ir. J.J.M. Roessingh.

17 June 2020, S. A. Mirsoleimani, *Structured Parallel Programming for Monte Carlo Tree Search*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. A. Plaat, Co-Supervisor: Dr. J.A.M. Vermaseren (NIKHEF).

1 December 2020, B. Zadok Blok jr., Leiden University, *Creatief Creatiever Creatiefst*, Supervisors: Prof. dr. S. Haring and Prof. dr. H.J. van den Herik.

28 April 2021, Q.A. Meertens, *Misclassification Bias in Statistical Learning*, Universiteit van Amsterdam/Leiden University. Supervisors: Prof. dr. C.G.H. Diks and Prof. dr. H.J. van den Herik, Co-Supervisor: Dr. F.W. Takes, Universiteit van Amsterdam/Leiden University.

3 June 2021, A. van Rossum, *Nonparametric Bayesian Methods in Robotics*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. ir. H.X. Lin, Co-Supervisor: Dr. ir. J.L.A. Dubbeldam.

17 June 2021, N. Samaeemofrad, *Business Incubators: The Impact of their Support*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. S. Jong kon Chin.

30 June 2021, Lei Pi, *External Knowledge Absorption in Chinese SMEs*, Leiden University, Supervisors: Prof. dr. H.J. van den Herik and Prof. dr. K. Paetzold, Co-Supervisor: Dr.-Ing. R.J. Ortt.

List of Abbreviations

ADR:	Alternative Dispute Resolution	NWO:	Dutch Research Council
AIVD:	General Intelligence and Security Service	ODR:	Online Dispute Resolution
ANITA:	Administration Normative Information Transaction Agents	Ovb:	Transfer Tax
CIE:	Criminal Intelligence Unit	PALMA:	Police Connections Aachen-Liège-Maastricht
CPL:	Centre for Professional Learning	PEM:	Pallas Ex Machina
CRvB:	Central Appeals Board	PROLEXS:	PROtotype of a Legal EXpert System
CvB:	Executive Board	PS:	Problem Statement
eLAW:	Center for Law and Digital Technologies	RELAX:	RELAtive eXpert competence
EMMI:	Euregional Multi Medial Information Provision	RIO:	Regional Information Organisation
ERC:	European Research Council	RQ:	Research Question
FdR:	Faculty of Law	RvdR:	Council for the Judiciary
FGGA:	Faculty of Governance and Global Affairs	SKBS:	Foundation of Knowledge-Based Systems
FWN:	Faculty of Science	TESSEC:	Twente Expertsystem for Social SECURITY
HEPGAME:	High Energy Physics GAME	WODC:	Scientific Research and Documentation Center of the Ministry of Justice
IGP:	Intelligence Gestuurde Politie	Wvp:	Law equalling pension rights in the event of divorce
ITeR:	Information Technology and Law program		
IVS:	Information Provision for Sentencing		
JURICAS:	JURIdical Computer Advice Systems		
JURIX:	JURIdical eXpert systems in the Netherlands and Belgium		
JUS:	JURimetrics of social Security		
KADS:	A Principled Approach to Knowledge Engineering		
KLPD:	National Police Force		
KRT:	Knowledge Representation and Tools		
LCDS:	Leiden Centre of Data Science		
LHBTIQ+:	Lesbian, Homosexual, Bisexual, Transgender, Intersexual, Queer + others		
LLTP:	Leiden Legal Technologies Program		
LUF:	Leids University Fund		
MAGW:	Society and Humanities		
NCTV:	Nationaal Coördinator Terrorismebestrijding en Veiligheid		
NIKHEF:	National Institute for Subatomic Physics		
NVR:	Dutch Association for the Judiciary		



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