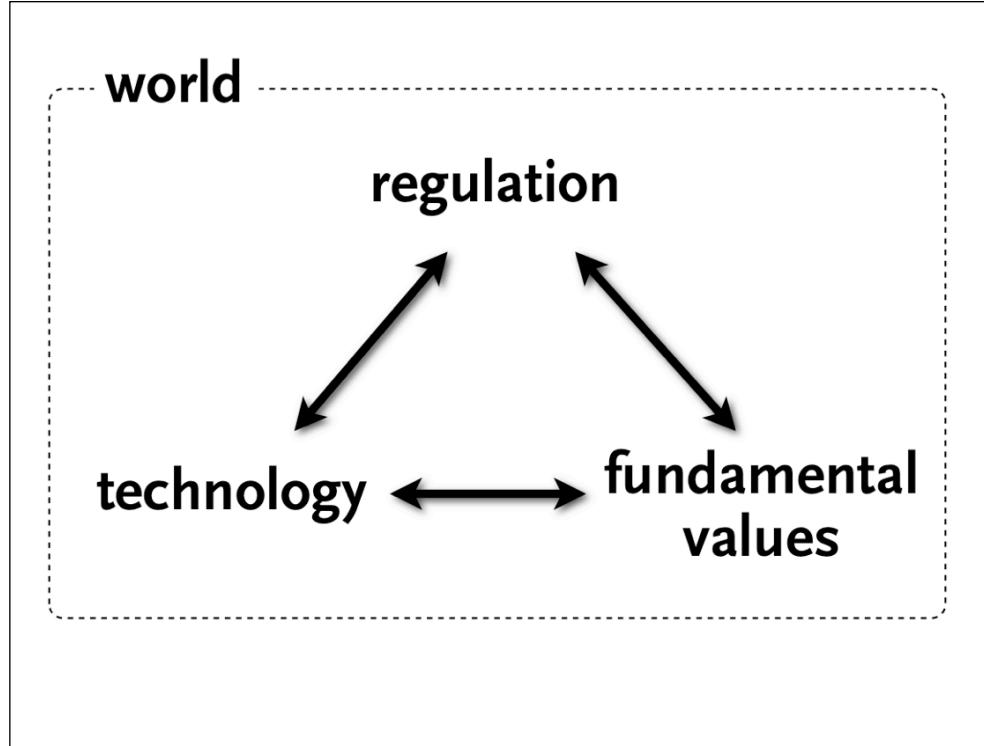


# The blessings and curses of the data deluge

## perspectives of a data warrior

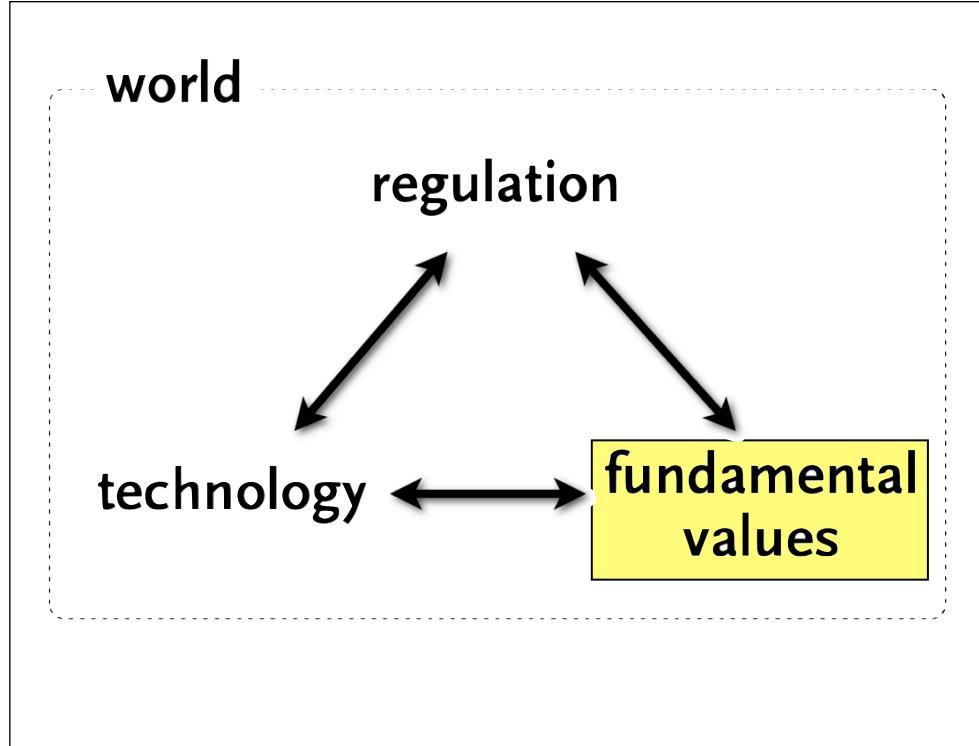
prof.dr. Ronald Leenes  
[r.e.leenes@uvt.nl](mailto:r.e.leenes@uvt.nl)

TIILT - Tilburg Institute for Law, Technology, and Society



I am interested in the relation between technology, regulation and fundamental rights or values, such as privacy, autonomy, property, dignity etc

Usually there are conflicting values at any time



In my little story today, we have

In the blue corner



freedom of expression



and freedom of information.

These are strong values. As technology activist Steward Brand

**“information wants to  
be free”**

Stewart Brand late 1960s

put it in the late 60s, information wants to be free.

And some see



the pirate bay as a clear example of this.

Not everyone agrees, especially not those who are in the red corner where we have



roperty

property, or more precisely



**report**

intellectual property.

The symbols associated to this corner are



well known  
copyright, trademarks and the like

Now of course the colours may different depending on where you stand  
and I can image you have trouble distinguishing blue from red.

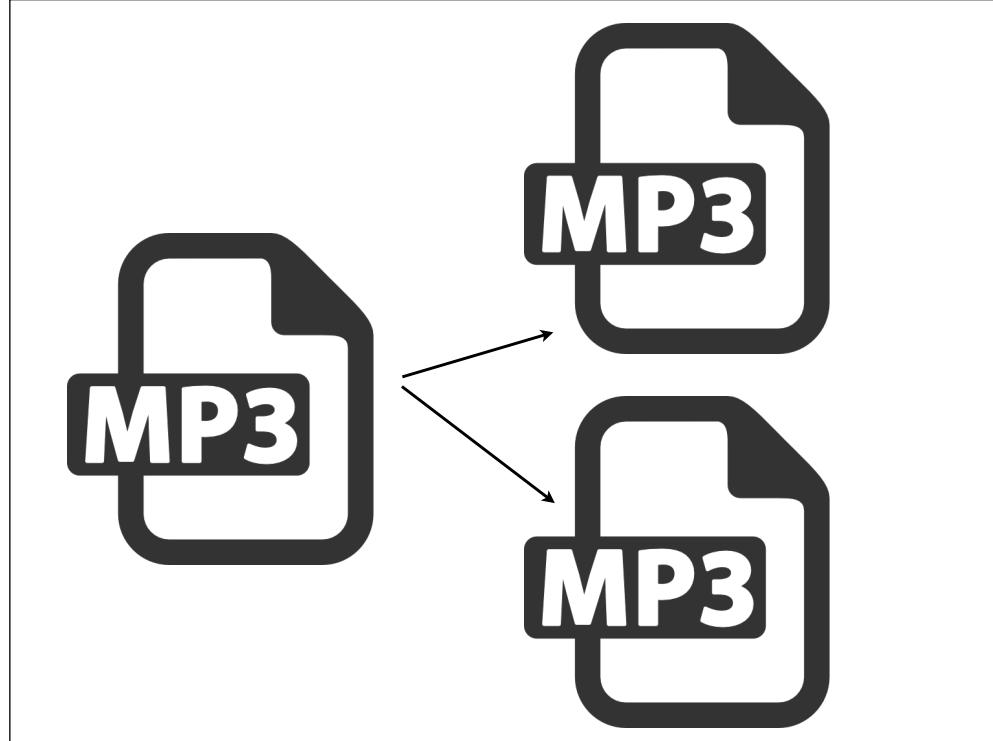
After all, most of you in the audience will one day earn their living



using their brain, rather than



than using their hands.



A crucial distinction between intellectual work and physical labour is of course that the costs of reproducing intellectual work are much lower than copying physical work.

Bits can be copied for almost nothing

Ok, I am tasked to talk about

# **openness**

**versus**

# **protection**

**openness vs protection**

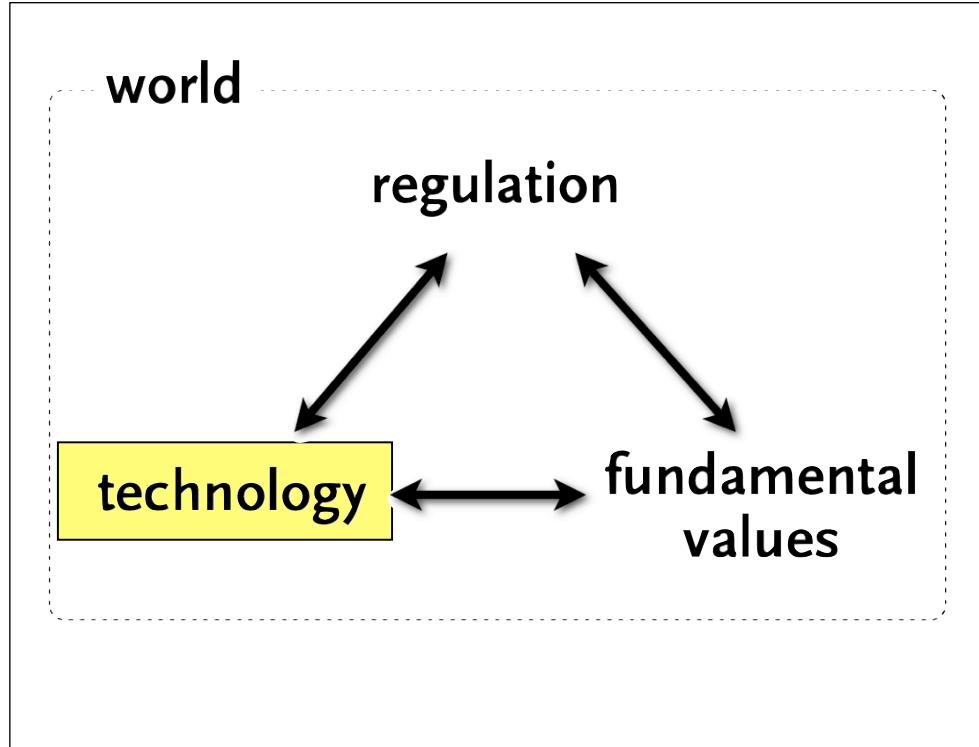
**(already doing so)**

and more specifically

effects on science?

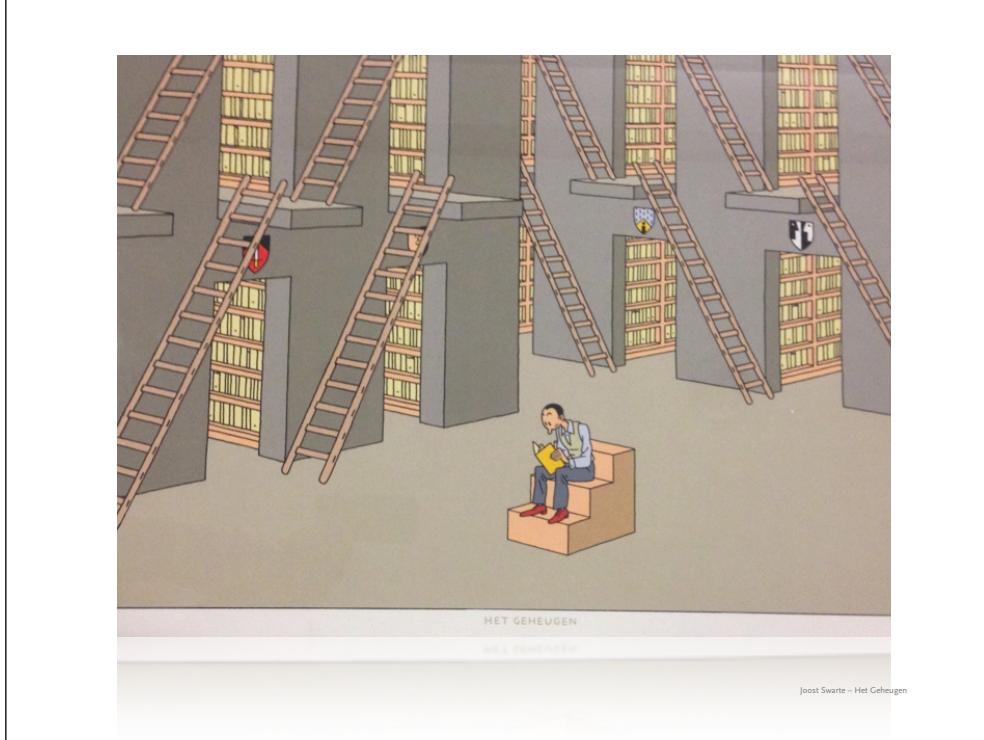
how this plays out in science.

First we have to understand how



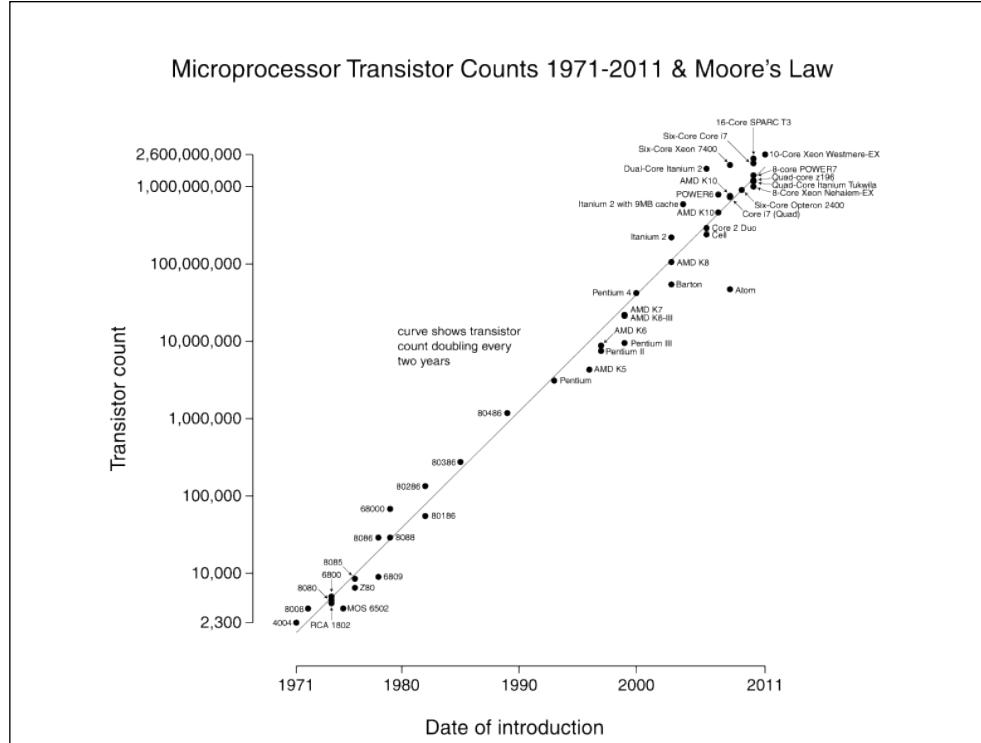
technology affects science

I am about the age of your parents. When I started



we had to go to the library for knowledge.

Thanks to Moore's law



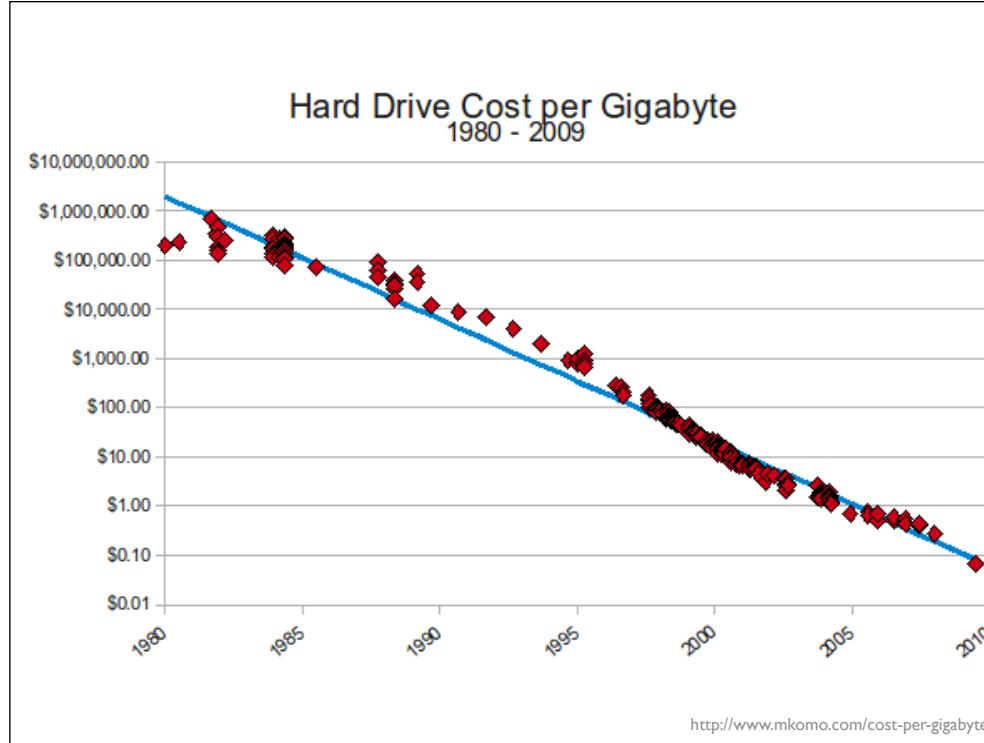


[http://plyojump.com/classes/images/computer\\_history/1950sComputer.jpg](http://plyojump.com/classes/images/computer_history/1950sComputer.jpg)

these machines,



we nowadays carry the computing power of these machines in our pocket.  
Even in this early iPhone.



Storage cost continues to go downward.

This has a very important consequence.



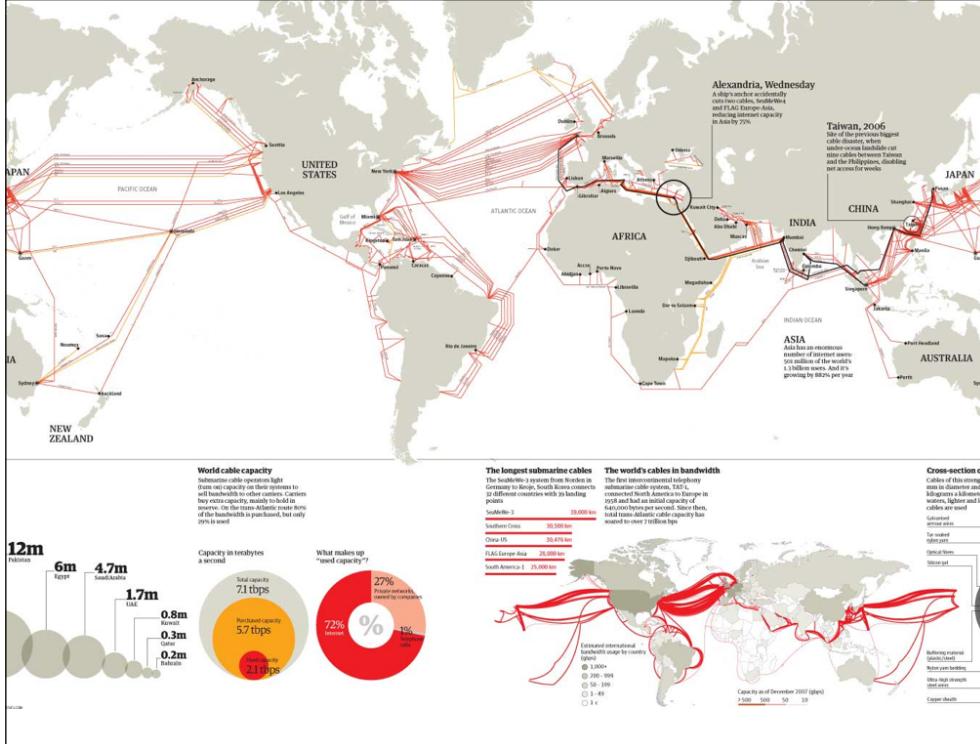
Deleting data becomes too expensive.

Besides, people are realising that



**DATA**  
is the new oil

there is valuable information to be found in all the data we collect.  
the final motor of change is of course



## The internet.

What does this mean for me. Well for one that I haven't set a foot in the library for a couple of years now.  
Instead

The screenshot shows a Google Scholar search results page for the query "leenes". The search bar at the top contains "leenes". Below it, the "Scholar" section is selected, showing approximately 3,500 results found in 0.07 seconds. A "My library" button is visible.

**User profiles for leenes**

Gerbens-Leenes - Verified email at utwente.nl - Cited by 1470  
Ronald Leenes - Verified email at tilburguniversity.edu - Cited by 903

**The water footprint of bioenergy**

W Gerbens-Leenes, AY Hoekstra... - Proceedings of the ..., 2009 - National Acad Sciences  
Abstract All energy scenarios show a shift toward an increased percentage of renewable energy sources, including biomass. This study gives an overview of water footprints (WFs) of bioenergy from 12 crops that currently contribute the most to global agricultural production ...  
Cited by 360 Related articles All 34 versions Cite Save

**Consumption patterns and their effects on land required for food**

PW Gerbens-Leenes, S Nonhebel - Ecological Economics, 2002 - Elsevier  
Vast amounts of land are required for the production of food, but the area suitable for growing crops is limited. In this paper, attention is paid to the relationship between food consumption patterns and agricultural land requirements. Land requirements per food ...  
Cited by 194 Related articles All 13 versions Cite Save

**The water footprint of energy from biomass: A quantitative assessment and consequences of an increasing share of bio-energy in energy supply**

PW Gerbens-Leenes, AY Hoekstra, T Van der Meer - Ecological economics, 2009 - Elsevier  
This paper assesses the water footprint (WF) of different primary energy carriers derived from biomass expressed as the amount of water consumed to produce a unit of energy (m<sup>3</sup>/GJ). The paper observes large differences among the WFs for specific types of ...  
Cited by 184 Related articles All 16 versions Cite Save

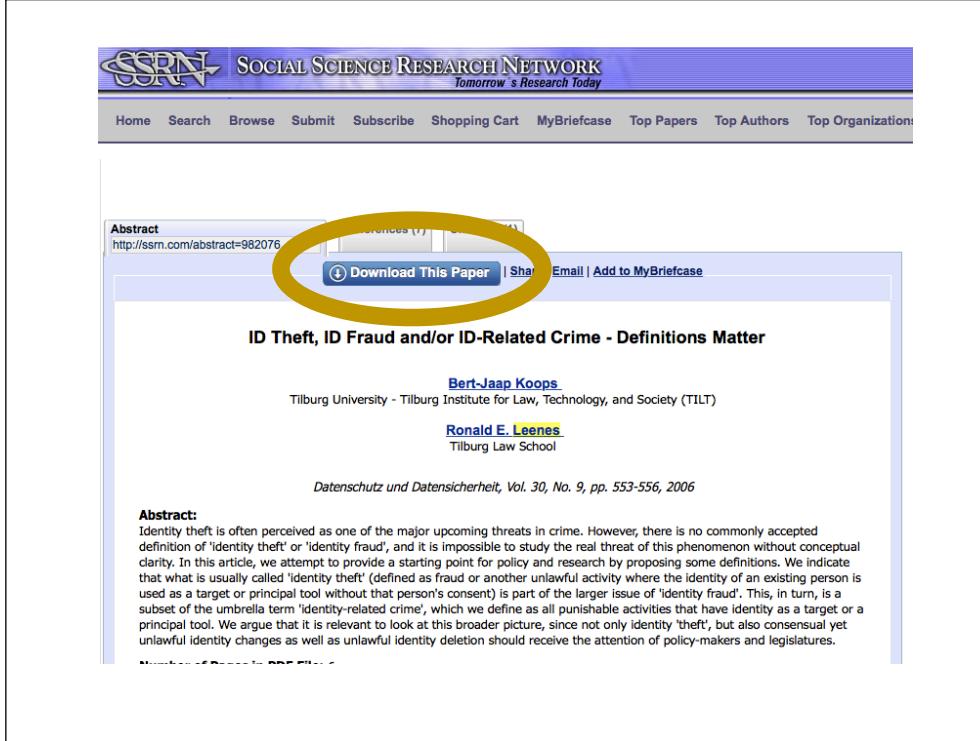
include patents  
 include citations  
 Create alert

This is my source of information, or

The screenshot shows the homepage of the Social Science Research Network (SSRN). At the top, there's a navigation bar with links for Home, Search, Browse, Submit, Subscribe, Shopping Cart, MyBriefcase, Top Papers, and Top Authors. A "QuickSearch SSRN eLibrary" search bar is also present. On the left side, there's a "MEMBER SIGN IN" form and a "RESEARCH NETWORKS:" section listing various academic fields like Accounting, Anthropology & Archaeology, Cognitive Science, Corporate Governance, Economics, Entrepreneurship, Finance, Health Economics, Hebrew, Humanities: Classics, Humanities: Literature, and Humanities: Music, each associated with a specific acronym (ARN, AARN, CSN, CGN, ERN, ERPN, FEN, HEN, HRN, CRN, LIT, etc.). In the center, there's a large box titled "Enter SSRN eLibrary" co-hosted by Chicago Booth, KOREA UNIVERSITY, and Stanford Law School. This box contains links for Top Papers, Top Authors, Top Organizations, Search, Browse, Research Paper Series, Partners in Publishing, Organization Home Pages, and Conferences. To the right, there's a section titled "SSRN's Objective and Commitments to Users" featuring a message from Michael C. Jensen. Below this are sections for "Recent Announcements" (including news about the Paris December 2014 Finance Meeting, the American University School of International Service joining Economics Departments, and the London School of Economics Law Department joining the Research Papers - Legal Studies section), and "Leading Social Science Research Delivered Daily".

this.

Great



Not only do I not have to go to the library to find stuff, I can also click to download

**“information wants to  
be free”**

Stewart Brand late 1960s

So a lesson might be that information indeed wants to be free

**LESSON**

**openness!**

Let's take a step back.

in the example I was able to provide a version of the paper for download for free.

~~LESSON~~

**openness!**

That is exception, rather than norm unfortunately.

# **Understanding Society**

The motto of Tilburg University is Understanding Society and that is what I try to do.

But equally important is



sharing the insights. We want the world to learn and do better

For dissemination we have traditionally been reliant on



**publishers**

publishers. They are king.

Why

# reputation

It is all about reputation.

scientists need to publish in top journals for their career to progress.  
top journals are top because they attract top editors  
top editors attract top papers.  
all facilitated by the publishers, who effectively create



a brilliant

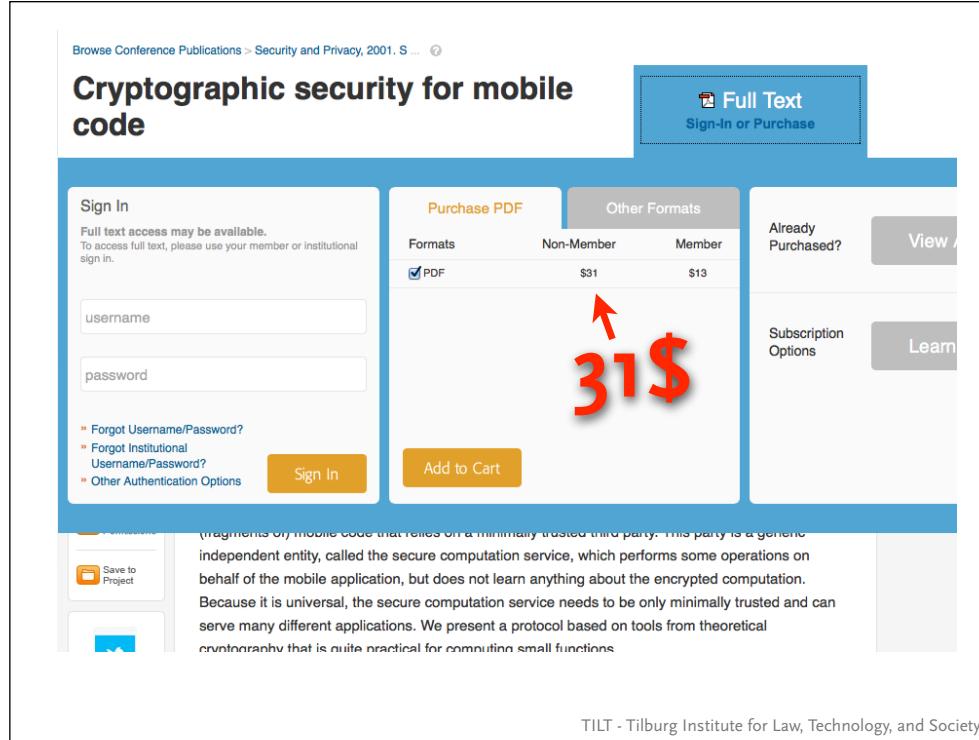
**(perverse)**

albeit perverse



lock-in

Now of course publishers are online



and they allow you to purchase articles.  
Here is an example

So, I have to pay 31\$ for a paper whose contents I have not yet seen.  
so people say who cares.



You might say, I am at Wageningen University, everything is available in my online library.

Well, even so. In my work I depend a lot on papers



IEEE, ACM

published by the Association of Computing Machinery and the IEEE, which are not in our library.

So I do care about these fees

And I see plenty people in the audience from countries where money does not grow on trees. So, yes, I do care.

Now how bad is it?

**Leenes & Lucivero (2014)**  
**to appear in LIT vol 6, number 2**

I had a research assistant check out what I would have to pay for the material we reference in this paper



## Scientific and Technological Evolution through the Legal Prism: Visions of a Multi-Faceted Relationship through the Lens of French and EU Law

**Author:** Vergès, Etienne

**Source:** [Law, Innovation and Technology](#), Volume 6, Number 1, May 2014, pp. 74-93(20)

**Publisher:** [Hart Publishing](#)

Buy Article:

**\$40.29 plus tax**

([Refund Policy](#))

[ADD TO CART](#)

[BUY NOW](#)

TILT - Tilburg Institute for Law, Technology, and Society

It's about robots and how they should behave in the real world check.  
Check it out.

It's only 40,29 + taxes

(BTW, I don't get a single penny ever)

45	Richard H Thaler and Cass R Sunstein, <i>Nudge: Improving Decisions About Health, Wealth, and Happiness</i> (Basic Books, 2008)	€ 23,28	x	http://yalepress.yale.edu/book.asp?isbn=9780300122237 https://archive.org/details/DesignOfEverydayThings
46	Donald A Norman, <i>The Psychology of Everyday Things</i> (Basic Books, 2013)	€ -	x	Registration needed for purchase
47	Roger Brownword, 'Code, Control, and Choice: Why East is East' (2013)	€ -	x	http://onlinelibrary.wiley.com/doi/10.1111/j.1748-121X.2005.tb00050.x/full www.euroncap.com/rewards/technologies/lane.aspx
48	(Overview of status and limitations)	€ -	x	http://psych.hanover.edu/classes/cognition/papers/tversky81.pdf http://www.springer.com/law/international/book/978-94-007-0666-2 www.youtube.com/watch?v=dvXhpnxKvb0
49	Amos Tversky and Daniel Kahneman, 'The Framing of Decisions' (1981)	€ -	x	http://www.bookstores.com/books/Shaw-R/Percceiving-Acting-as-Intentionality.html http://ingeniaconnect.com/search/article?option1=tka&value1=r http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662860/ http://assets.conference-spot.it/fileserv/file/65828/filename/1- http://adaptation-ttn.eu and https://sites.google.com/site/ttnfaust http://www.ardt-rhonealpes.fr/document/library/get_file?uid=x
50	Bibi Van den Berg and Ronald Leenes, 'Keeping up Appearances: Volvo instruction video'	€ 136,84	x	x
51	JJ Gibson, 'The Theory of Affordances' in R Shaw and J Brandom (eds), <i>Robots as Tools for Techno-Regulation</i> (2013)	€ 34,92	x	http://www.ingentaconnect.com/search/article?option1=tka&value1=r http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662860/ http://assets.conference-spot.it/fileserv/file/65828/filename/1- http://adaptation-ttn.eu and https://sites.google.com/site/ttnfaust http://www.ardt-rhonealpes.fr/document/library/get_file?uid=x
52	Bibi Van den Berg, 'Robots as Tools for Techno-Regulation' (2013)	€ 32,42	x	x
53	Aimee Van Wijnsbergh, 'Designing Robots for Care: Care Centre	€ -	x	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662860/ http://assets.conference-spot.it/fileserv/file/65828/filename/1- http://adaptation-ttn.eu and https://sites.google.com/site/ttnfaust http://www.ardt-rhonealpes.fr/document/library/get_file?uid=x
54	R Hoogendoorn, B Van Arem and S Hoogendoorn, 'Automated Driving: EU projects working on "human factors" in automated driving'	€ -	x	x
55	Margriet van Schijndel-de Nooij, Bastiaan Kroese, Thijmen van den Eijnden, DWP Ruiter, <i>De vorm behouden: Verslag van een levenswerk</i> (Pruit, 2013)	€ -	x	Cannot find it (only in library)
56	Maurice Schellekens, 'Automated Cars: A Legal Analysis in Guide' (2013)	€ -	x	Cannot find it (only in library)
57	Luciano Floridi, 'Artificial Companions and their Philosophical Challenges' (2013)	€ 15,52	x	http://www.pdcnet.org/pdc/bvdn.nsf/purchase?openform&fp=du www.parliament.uk/briefing-papers/post-pn-443.pdf http://link.springer.com/article/10.1023/A:1013232F2B%3AMIND.00000 http://link.springer.com/article/10.1007%2F10676-004-3422-1 http://www.i-i-e.net/inhalte/006_006_Marino_Tamburini.pdf http://www.researchgate.net/publication/220414917_imaging_in http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=1698687 http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=4162483 http://www.tandfonline.com/doi/pdf/10.1080/13600869.2013.80 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1953967 http://link.springer.com/chapter/10.1007%2F978-94-007-2903-2 http://link.springer.com/article/10.1023/A:1011274720031 http://www.i-i-e.net/inhalte/006_006_Asaro.pdf http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5980254 x
58	Dante Marino and Guglielmo Tamburini, 'Learning Robots and Human Interaction' (2013)	€ -	x	Registration needed for purchase
59	DJ Calverley, 'Imagining a Non-biological Machine as a Legal Person' (2013)	€ -	x	For members, 10,09
60	S Kolski, D Ferguson, M Bellino, R Siegwart, 'Autonomous Driving: A Survey' (2013)	€ 24,06	-	For members, 10,09
61	P Falcone, F Borrelli, J Asgari, HE Tseng, D Howat, 'Predictive Autonomous Vehicles' (2013)	€ 24,06	-	For members, 10,09
62	Luciano Floridi and JA Sanders, 'On the Morality of Artificial Agents' (2013)	€ 47,54	x	Andreas Matthias, 'The Responsibility Gap: Ascribing Responsibility for the Actions of Autonomous Agents' (2013)
63	Bert-Jaap Koops and Ronald Leenes, 'Privacy Regulation Cannot be Ignored' (2013)	€ 29,00	x	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662860/ http://assets.conference-spot.it/fileserv/file/65828/filename/1- http://adaptation-ttn.eu and https://sites.google.com/site/ttnfaust http://www.ardt-rhonealpes.fr/document/library/get_file?uid=x
64	Bert-Jaap Koops, 'The (In)flexibility of Techno-regulation and the Responsibility Gap' (2013)	€ -	x	x
65	Ugo Pagallo, 'On the Principle of Privacy By Design and its Limitations' (2013)	€ 33,92	x	Jaap Hage, <i>Reasoning with Rules: An Essay On Legal Reasoning</i> (2013)
66	Peter Asaro, 'What Should We Want From a Robotic Ethic?' (2006)	€ 47,54	x	For members, 10,09
67	Gabriele Ferri, Alessandro Manzi, Pericle Salvini, Barbara Mazzoli, F Cavallo, M Aquilano, MC Carozza and P Dario, 'Implementation of a Robotic System for the Rehabilitation of Stroke Patients' (2013)	€ 24,06	-	Cannot find it
68	Ronald Dworkin, <i>Law's Empire</i> (Harvard University Press, 1986)	€ -	x	For members, 10,09
69	M Glitz, 'On Non-Functional Requirements' ( <i>Requirements Engineering</i> ) (2013)	€ 24,06	-	For members, 10,09
70	Daniel Gross and Eric Yu, 'From Non-Functional Requirements to Requirements Engineering' (2013)	€ 47,54	x	For members, 10,09
71	Seda Gürses, Carmen Troncoso and Claudia Diaz, 'Engineering Principles for Non-Functional Requirements' (2013)	€ -	x	For members, 10,09
72	Trevor Bench-Capon and Frans Coenen, 'Isomorphism in Legal Knowledge' (2013)	€ 47,54	x	Cannot find it
73	Travis Breaux, 'Legal Requirements Acquisition for the Specification of Legal Knowledge' (2013)	€ -	x	For members, 10,09
74	Mireille Hildebrandt, 'Law at a Crossroads: Losing the Thread of Law' (2013)	€ -	x	For members, 10,09
75	David J Smith, 'Changing Situations and Changing People' in □A Bert-Jaap Koops, 'Criteria for Normative Technology: The Acceptability of Engineering Principles' (2013)	€ 42,68	x	For members, 10,09
76	Total:	€ 1,345,57	x	x

TILT - Tilburg Institute for Law, Technology, and Society

for the paper, we have used 84 references.  
 An incomplete list shows that obtaining these would have cost well over 1345 Eur



do we reach the audience we want to reach.

No, of course not.



**bad for science**

it is bad for science

I don't even read the stuff I have to read, simply because I can't afford it.



**bad for society**

It is bad for society because hardly anyone gains from my knowledge



**good for publishers**

it is (relatively) good for publishers though

**LESSON**

**protection!**

so, the lesson might be protection trumps.



There is discussion about different publishing models, commonly known as the green and gold models, but I will leave these for the discussion.

Instead I want to highlight another openness-protection issue in science

# intellectual property

This one relates to intellectual property



We have copyright law that provides creators the temporary exclusive right  
to  
communicate and reproduce

copyright protects the

## **expression of ideas**

expression of ideas, not the idea itself  
So while there is said to be a limited number of plots

# **the seven storylines™**

## **Overcoming the Monster, Rags to Riches, The Quest, Voyage and Return, Comedy, Tragedy, Rebirth**

Christopher Booker in his "Seven Basic Plots -- why we tell stories"

1. Overcoming the monster -- defeating some force which threatens...  
e.g. most Hollywood movies; Star Wars, James Bond.

2. Rags to Riches - self explanatory really. e.g. Cinderella &  
derivatives (all 27,000 of them)!!!

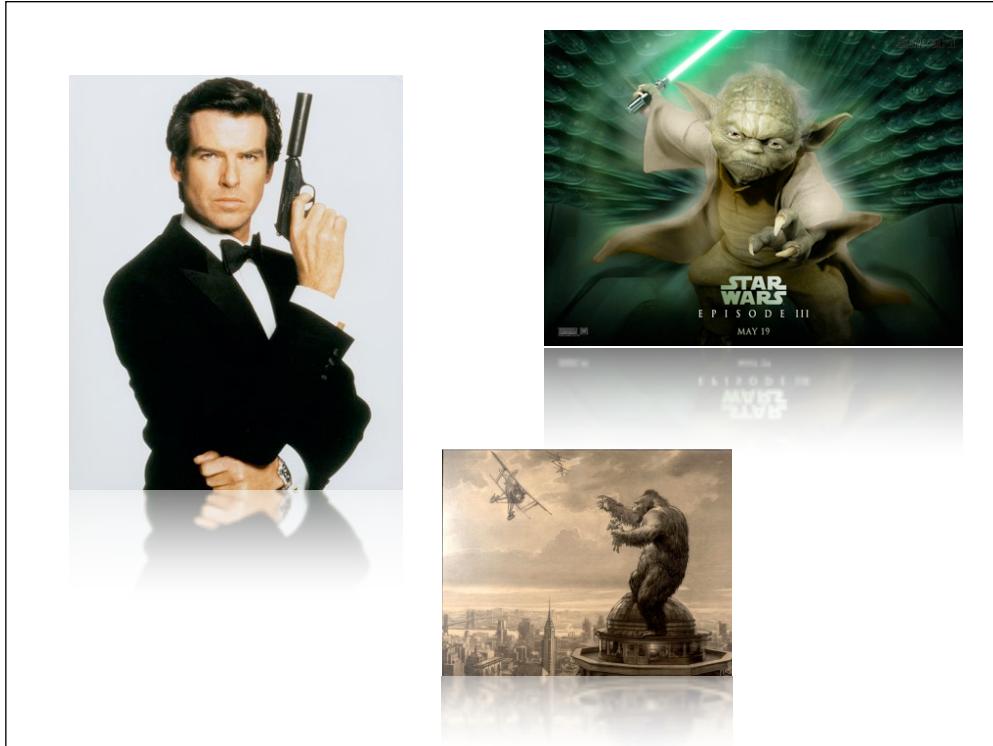
2. The Quest -- typically a group setoff in search of something and  
(usually) find it. e.g. Watership Down, Pilgrim's Progress.

3. Journey and Return -- the hero journeys away from home to somewhere  
different and finally comes back having experienced something and  
maybe changed for the better. e.g. Wizard of Oz, Gullivers Travels.

4. Comedy - not neccesarily a funny plot. Some kind of  
misunderstanding or ignorance is created that keeps parties apart  
which is resolved towards the end bringing them back together. e.g.  
Bridget Jones Diary, War and Peace.

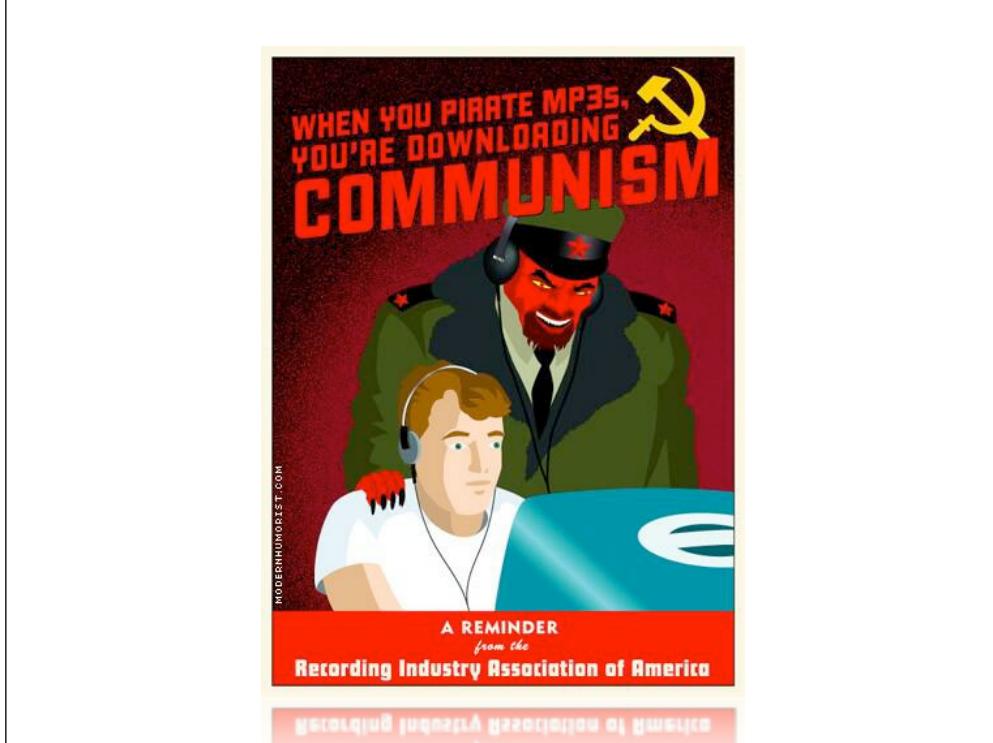
5. Tragedy - Someone is tempted in some way, vanity, greed etc and  
becomes increasingly desperate or trapped by their actions until at a  
climax they usually die. Unless it's a Hollywood movie, when they  
escape to a happy ending. e.g. Devils' Advocate, Hamlet.

6. Rebirth - hero is captured or oppressed and seems to be in a state  
of living death until it seems all is lost when miraculously they are  
freed. e.g. Snow White.



there are many examples of each. Each of them protected

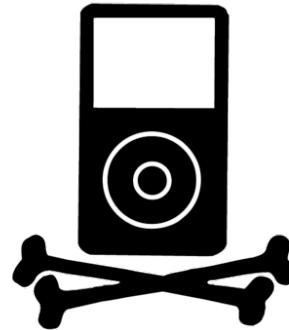
As I said, intellectual property, especially when it is digital, can easily be copied



This troubles some people, especially the entertainment industry.

So, to make copying copyrighted material harder, the industry has come up with technical protection measures, such as Digital Rights Management systems

**DRM IS  
KILLING MUSIC**



**AND IT'S A RIP OFF!**

1990 919 A S T I D N A

Which are not very popular by the guys in the blue corner.

Who try to break these



measures. Which renders them worthless.

So the industry wants to be able to go after people who break these technical protection measures.

The law (after extensive lobbying)



law to the rescue

now protects these technical protection measures.

In many places we see regulation such as the

Digital Millennium Copyright Act



which, among other things

## Digital Millennium Copyright Act of 1998

- section 1201
  - (a) Violations Regarding Circumvention of Technological Measures.—
  - (1)(A) No person shall circumvent a technological measure that effectively controls access to a work protected under this title. The prohibition contained in the preceding sentence shall take effect at the end of the 2-year period beginning on the date of the enactment of this chapter.

contains provisions such as these.

The DMCA has for instance been used to stop people from



their Sony Aibo to have it dance to Jazz music.

The aibo is a robot dog.  
I for one do not see why Sony would be against this enhancement



TILT - Tilburg Institute for Law, Technology, and Society

The chips in printer cartridges are also protected by the DMCA.

But I get distracted. This is not science.



my colleague



<http://www.ru.nl/publish/pages/735910/jacobs.jpg>

Bart Jacobs is active in cyber security.

Part of his research concerns finding (and fixing) security issues in IT systems.

And of course he publishes findings.

*Privacy and Security Issues in e-Ticketing*  
*Optimisation of Smart Card-based Attribute-proving*

Jaap-Henk Hoepman<sup>1,2</sup>, Bart Jacobs<sup>1</sup>, and Pim Vullers<sup>1\*</sup>

<sup>1</sup> Institute for Computing and Information Sciences,  
Radboud University Nijmegen, The Netherlands.  
[{jhh, bart, p.vullers}@cs.ru.nl](mailto:{jhh, bart, p.vullers}@cs.ru.nl)

<sup>2</sup> TNO Information and Communication Technology, The Netherlands.  
[jaap-henk.hoepman@tno.nl](mailto:jaap-henk.hoepman@tno.nl)

**Abstract** This short note concentrates on an optimisation of the attribute-proving protocol by Batina et al. [1], and provides the improved performance figures. The protocol relies on elliptic curve cryptography with bilinear pairings. These pairings provide signatures that are stable under multiplication with a blinding factor. In this way multiple proofs are unlinkable, and thus provides a privacy-friendly solution. The optimisation involves better exploitation of the (limited) elliptic curve primitives that are available on the current generation of Java Card smart cards. It leads to a reduction of the on-card running times (wrt. to [1]) of roughly a factor three. Total running times with this new protocol are below one second. A further reduction with a factor two or three is needed to achieve performance that is acceptable in practice.

Journal for Law, Technology and Society

Why, well because then people

**“A cryptosystem should be secure even if everything about the system, except the key, is public knowledge.”**

Kerckhoffs' principle

can improve security by fixing flaws.

Security by obscurity is not a good idea.

One of the technologies his group studies is RFID.



An example of a product equipped with such chips is the OV-chipcard, the Dutch public transport card.

Bart's group dug deep into the chip and broke all sorts of protection measures and did other stuff prohibited by DMCA like regulation

They found major

### *Security Flaw in Mifare Classic*

#### *Introduction*

On March 7, 2008, research by the Digital Security group has revealed a security vulnerability in Mifare Classic RFID chips, the most commonly used type of RFID chip worldwide, that affects many applications using Mifare Classic.

We have demonstrated that the proprietary CRYPTO1 encryption algorithm used on these cards allows the (48 bit) cryptographic keys to be relatively easily retrieved. Especially for RFID applications where the same common shared key is used on all RFID cards and card readers, which may be the case for instance in access control buildings, this constitutes a serious risk, as explained in our [press release](#).

This attack recovers the secret key from the MIFARE reader. To mount the attack we first need to gather a tiny amount of data from a genuine reader. With this data we can compute, off-line, the secret key within a second. There is no precomputation required, and only a small amount of RAM. Moreover, when one has an intercepted a "trace" of the communication between a card and a reader, we can compute all the cryptographic keys from this single trace, and decrypt it. We have implemented and executed these attack in practice, and managed to recover the secret keys.

The movie on the right shows a demonstration of the attack on the access control system for our university building.

The research was presented at the [ESORICS 2008 conference](#). The manufacturer of the Mifare Classic, NXP, has tried to obtain a court injunction against publication. But the judge ruled against NXP on July 18, see the university press release ([English](#) and [Dutch](#)) and the court ruling (in [Dutch](#) only).

#### *Results*

**NEW** The main paper is the [ESORICS paper](#), which describes the cryptographic weaknesses of CRYPTO1, and the process of reverse engineering CRYPTO1 and its initialisation.

**NEW** The manuscript "[Making the Best of Mifare Classic](#)" contains countermeasures which can help to prevent state restoration attacks (updated on December 11, 2008).

**NEW** The manuscript "[Dismantling MIFARE Classic, ESORICS 2008](#)" (slides) and "[Making the Best of Mifare Classic, manuscript](#)" (updated December 11, 2008)

- [In snelreinvaart Je privacy kwijt, P&P](#)
- [A Practical Attack on the MIFARE Classic, CARDIS 2008](#)
- [Analysis of the MIFARE Classic Used in the OV-chipkaart Project, Master's thesis Gerhard de Koning Gans](#)
- [Security Analysis of RFID Tags, Master's thesis Roel Verdult](#)
- [Proof of concept, cloning the OV-Chip card, report](#)



The Mifare team of the Digital Security Group of the Radboud University Nijmegen. Standing from left to right: Flavio Garcia, Wouter Teepe, Peter van Rossum, Bart Jacobs, Vinesh Kali. Sitting from left to right: Ruben Muijres, Roel Verdult, Gerhard de Koning Gans, Ravinder Kali. Not on the photograph: Jaap-Henk Hoepman, Ronny Wichers Schreur.

- [Mifare, из какихъ? скажи мне какъ-нибудь иначъ](#)
- [дистанционные карты изъ японъ](#)
- [дистанционные карты изъ японъ](#)
- [дистанционные карты изъ японъ](#)

TILT - Tilburg Institute for Law, Technology, and Society

flaws in the chip powering this card. They wanted to publish their results in a conference paper.

The chip manufacturer



TILT - Tilburg Institute for Law, Technology, and Society

NXP was not amused.

They feared severe consequences for their business and their customers.  
Don't forget the chip is present in billions of devices.

NXP ordered an injunction against publication.

**LESSON**

**protection!**

They called for protection of their intellectual property, which usually is a strong line of defense.

But here, the court opted

~~LESSON~~

**protection!**

for the other outcome:

**LESSON**

**openness!**

openness

**'in a democratic society it  
is of great importance that  
the results of scientific  
research can be  
published...'**

in a democratic society it is of great importance that the results of scientific research can be published - and that society can thus be informed about the shortcomings of a product, so that action can be taken against the risks thereof.

**'... and that society can thus be informed about the shortcomings of a product, so that action can be taken against the risks thereof.'**

in a democratic society it is of great importance that the results of scientific research can be published - and that society can thus be informed about the shortcomings of a product, so that action can be taken against the risks thereof.



**what about you?**

The examples I discussed may seem remote to you.

But also in biotech and other Wageningen domains we come across protection versus openness.



**M O N S A N T O**

Monsanto licenses the use of their patented GMO Canola seed, which is resistant against herbicides, such as Roundup.

Because the seeds are licensed instead of bought. The farmers have to pay fees for using seeds from last year's harvest.

This totally contrasts common practice of using part of last year's harvest for seeding.

1. Monsanto v Schmeiser



My time is up

# **disclaimer, for what it's worth**

Texts, marks, logos, names, graphics, images, photographs, illustrations, artwork, audio clips, video clips, and software copyrighted by their respective owners are used on these slides for non-commercial, educational and personal purposes only. Use of any copyrighted material is not authorized without the written consent of the copyright holder. Every effort has been made to respect the copyrights of other parties. If you believe that your copyright has been misused, please direct your correspondence to: [r.e.leenes@tilburguniversity.edu](mailto:r.e.leenes@tilburguniversity.edu) stating your position and I shall endeavour to correct any misuse as early as possible.

thanks to Kieran O'Hara for providing this template



**weerstand is zinloos**

Is resistance futile?

I will not succumb



information wants to be free and has to be free.

In an age of decreasing costs of distributing information, we should not maintain outdated systems and vested interests unless they have clear value.

