

## It's personal

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Valedictory lecture  
Prof. Paul De Bra  
October 13, 2017



/ Department of Mathematics and Computer Science

**TU** / **e** Technische Universiteit  
**Eindhoven**  
University of Technology

# It's Personal

Where innovation starts

Valedictory lecture Prof. Paul De Bra

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# It's Personal

Presented on October 13, 2017  
at Eindhoven University of Technology



# Introduction

Mijnheer de Rector Magnificus, ladies and gentlemen,

Aan het begin van deze rede wil ik mij allereerst verontschuldigen tegenover alle niet-Engelstaligen in het publiek. Ik zal deze rede in het Engels houden, en ik ben mij ten zeerste bewust van het principe “one size does not fit all”. De rede “past” u dan misschien niet. Ik ben wel erg blij dat u toch bent gekomen om mijn afscheid samen met mij te vieren. Na het inhoudelijke gedeelte in het Engels, keer ik nog even naar het Nederlands terug, of toch naar wat daarvoor moet doorgaan.

For more than two decades not just my work but also my personal life has been guided by the observation that “one size does not fit all”. I transformed this into the title of this valedictory lecture: “It’s Personal”. And when I asked our protocol office (P&P) what I was allowed to include in this lecture and what not, they told me that “everything” was allowed because... it’s personal. So here we go!

The difference between a “good fit” and a “bad fit” can be measured *objectively* as *usability*, and *subjectively* as *user satisfaction*. The two images below illustrate both the objective and subjective aspect of “fit”.



Figure 1

Bad fit versus good fit.

I always demonstrate the problem with “one size fits all” in my Adaptive Systems class by means of the “one size” TU/e bathrobe. All TU/e employees once received this bathrobe (actually a dressing gown) as part of the Christmas gift box. It appears to fit nobody. If the university does not know the physical size of any of their employees, can we then expect them to know their *academic quality* and *ambition*? My research has mainly been about making a *personalized* approach possible in the physical, online and academic world.



Figure 2

TU/e one size bathrobe.

TU/e is renowned for small-scale teaching, for direct personal contact between students and teachers. How can we maintain this when student numbers are going through the roof? The answer again lies in my personalization research. In the fall of 1997 I gave my inaugural lecture “Informatie aangepast aan de gebruiker” [3], which translates to “information adapted to the user”. I applied my research mainly in the area of education. With the help of some brilliant researchers and developers I created technology for giving students a *personal* learning experience. Let us follow the journey that led to this development, and also try to understand why, after two decades, that technology isn’t being used more often than it already is.

But first, a bit of history...

# Data, Information, Text and Hypertext

I started studying mathematics at the University of Antwerp in 1977. My goal was to become a high-school math teacher. During my study a new subject was becoming available as a specialization within math, called *computer science*. I found this really interesting and took every available computer science course. I did a Master project in the area of *databases*, under the guidance of professor Jan Paredaens who taught *all* computer science courses.

I combined the four-year Master (or “licentiaat”) in mathematics with the one-year teacher training program. This meant completing five years of study in four years. We didn’t waste time in Belgium! After graduating I did not become a math teacher but started a PhD in *database theory*. My research tools at the time were paper, pencil and eraser, apart from a few usable brain cells of course. We did not have any computers in computer science...

I have a very broad range of interests, including electronics, model railroads, playing and arranging music, and computers. Already as a PhD student I acquired a new skill: the art of begging, which is currently the most time-consuming activity for academics. My first begging activity resulted in the department being able to buy a “small” Unix computer to enable students to practice programming. And I became the department’s first system administrator. I also took on a few software development projects for companies, to earn money to buy a computer for myself. One of the projects was for “Pol den drukker” who offered to print my PhD thesis for free. I also found the time to write a book [2] on automating model railroads and I built a demo model railroad for the publisher to use during book fairs. This book appeared in I don’t know how many languages, certainly more than five.

My PhD thesis on “Horizontal Decompositions in the Relational Database Model” was ready by early 1987. Without going into details, the aim of using horizontal decompositions is to be able to handle *exceptions* to database constraints. Databases often store information about people. *Exceptions* to some rules need to be handled to deal with *personal* circumstances.

In the summer of 1987 I visited AT&T Bell Labs in Murray Hill, New Jersey. I was given the opportunity to study what was being done at the labs, and I should develop something “interesting”. I combined the document processing software *troff* and the then brand new *C interpreter* and *dynamic linker* (developed by the late Ted Kowalski<sup>1</sup>) to enable *troff* to load and execute plug-ins.<sup>2</sup> The plug-in concept would become popular only about five years later, when web browser plug-ins were starting to appear. My summer visit led to an invitation to become a post-doc at Bell Labs. From working on the theory of systems for handling *administrative data*, I moved on to working on systems for handling *textual data*.

Bell Labs was a very friendly place to work. It felt very *personal*. Several colleagues used aliases from Lord of the Rings, like Eowyn and Frodo. Everyone had their own computer, named after Snow White’s dwarfs: Happy, Bashful, Dopey, Sleepy, Sneezy and Doc. One dwarf was still missing from the collection so when I got my own microvax I named it Grumpy. Later I bought a personal computer “for myself”, for a “measly” \$8,000, and named it Snazzy. The PC was already three times faster than the Vax. It was really “snazzy”.

During my time at Bell Labs two of my colleagues, John Puttress and Nuno Guimaraes, were developing a *hypertext* system. Hypertext made it possible to not consider a “document” as one large (hierarchically) structured text, but as separate fragments of text connected by links. They followed the “Hypertext Abstract Machine” architecture, more commonly referred to as “HAM” [12] and they named their system “EGGS” [18]. (That made for a nice breakfast...) Hypertext allows users to create a *personal* reading experience by choosing which links to follow among the connected fragments.

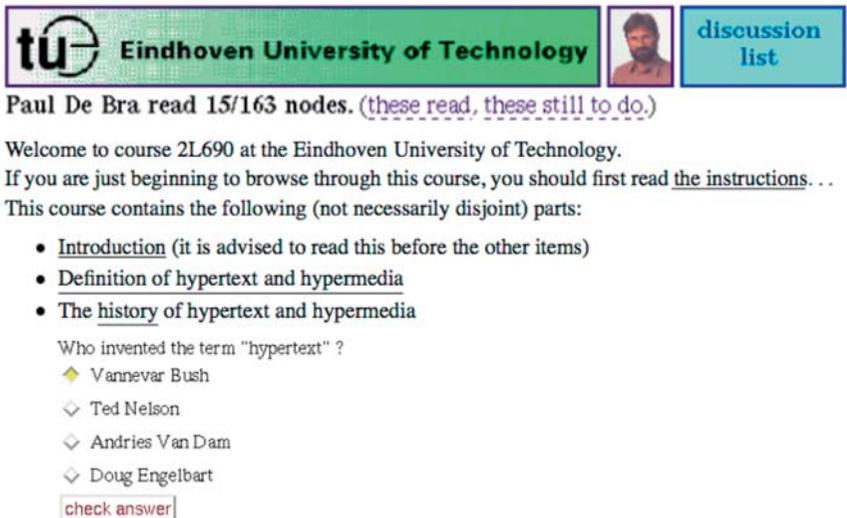
Soon after my return to Belgium I was asked whether I could be persuaded to accept a position as “universitair hoofddocent” in databases, at Eindhoven University of Technology. After an interview with professors Kees van Hee and Dieter Hammer and after considering whether I could afford earning a lot less than I did as a Bell Labs post-doc, I said “yes”. But I had no intention to continue research in databases: the future of information was in hypertext.

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<sup>1</sup> Ted Kowalski is better known for his development of *fsck* (pronounced as “fisk”).

<sup>2</sup> This was never released because to make this safe it would require a Sandbox environment, which is another technology that was only developed much later.

The first TU/e PhD student in databases, supervised by Jan Paredaens, graduated and joined me in hypertext research. This was Geert-Jan Houben, who is now professor in Web Information Systems at the TU Delft. I wanted to bridge the gap between the “techies” who were designing and building hypertext systems and the “literati” who were creating hypertexts, or “hyperdocuments” as we tend to call them. To this end I developed a course on the topic of hypertext in which students studied the concepts of hypertext by means of a course text in hypertext form and they created a hyperdocument as an assignment. It was early 1993, and it was not easy at that time to choose a hypertext *platform* that could serve the hypertext course. I chose to use World Wide Web, a newly developed but still very primitive hypertext platform with a client-server architecture that was very simple to install and to use.



**tu** Eindhoven University of Technology  **discussion list**

Paul De Bra read 15/163 nodes. (these read, these still to do.)

Welcome to course 2L690 at the Eindhoven University of Technology.  
 If you are just beginning to browse through this course, you should first read the instructions. . .  
 This course contains the following (not necessarily disjoint) parts:

- Introduction (it is advised to read this before the other items)
- Definition of hypertext and hypermedia
- The history of hypertext and hypermedia

Who invented the term "hypertext" ?

- ◆ Vannevar Bush
- ◇ Ted Nelson
- ◇ Andries Van Dam
- ◇ Doug Engelbart

Figure 3

The Hypertext Course (early edition).

Because the hypertext course was online, with embedded online tests and a final assignment that had to be submitted online, we could easily offer the course to students from other universities. The course was taken officially, for credit, by students from Delft, Twente, Tilburg and the Open University Netherlands, and even abroad, with students from Antwerp and Louvain (Leuven) and unofficially by many more. In today's terminology we would call this a “MOOC” or Massive Open Online Course, but that term was still at least a decade in the making.

The creation of the hypertext course and teaching it to several universities is a typical example of my personal style of working, for which there is a nice Dutch expression: “niet lullen maar poetsen”. First doing the work and only then advertising it follows the guiding principle of “Don’t count your chickens before they hatch”. This style does not suit the Netherlands very well. The local specialty here is “selling hot air”. I did not announce the course in the university newsletter Cursor, I did not negotiate a “price” beforehand, in terms of preparation and teaching hours. I just did the work. About five years later Cursor wrote about another course by another professor as being the first online course at TU/e, and 20 years later they announced the first “MOOC”... Today we have new terms for such news articles: we call them either “fake news” or “alternative facts”.

Because the online course had no lectures there was no formula for how many hours of work this teaching job should get in the “werkverdeling” or “division of tasks”. The education director proposed a number of hours, obviously a lower number than for a course with lectures and instructions. More efficient teaching meant, and still means, that you get more teaching duties, and if you claim that you need lots of lecture and instruction hours, you can only handle fewer teaching duties. This *inefficiency bonus* is very well known and may explain why, after my first e-learning initiative, there were no more such initiatives for at least the next decade. Even today the department is still struggling to come up with a system that uses an *efficiency bonus* to stimulate the development of e-learning and blended learning activities.

Now for some more recent history...

# Information adapted to the user

Studying with the new online (hyper)text course was not without problems. Students could not manage the navigation freedom offered by hypertext. They got “lost in hyperspace” and arrived at pages they could not yet understand because of missing prerequisite knowledge. The *usability* of the hypertext was thus rather poor. To solve this I made the course *adaptive*, or in other words, “automatically personalized”. Parts of a page, either content or links, were included or excluded based on what the system “knew” about the user: which pages were visited before and which tests had been completed. I implemented this by means of C-preprocessor constructs. This was convenient as every computer included the C-preprocessor already. Unfortunately using these constructs made *authoring the adaptation* too difficult. Especially the “literati” did not speak the C-preprocessor language. And even writing a book on “Leren Programmeren met C” [17] or “Learning how to Program, using C” wasn’t going to solve this.

The C-preprocessor statements were replaced by HTML comments one year later and the back-end system received its name: AHA! (with the exclamation mark as part of the name), meaning “the Adaptive Hypermedia Architecture” (see for instance [5]). Obviously the *design* of the adaptation was still just as easy or difficult as with the previous syntax, but by using HTML comments for adaptation commands it became possible to write HTML pages through an off-the-shelf HTML editor. Licia Calvi from the language department of the University of Antwerp used AHA! for her PhD work [11].

In the period in which I was first discovering and later advocating the use of *adaptive hypermedia* I met Peter Brusilovsky, who was also studying the use of adaptive hypermedia in education and he even started doing that a few years before me. Together we became known as the apostles of adaptive hypermedia: Peter and Paul.



Figure 4

Peter and Paul at Saint Paul's cathedral in Rome.

I was hired as full professor and chair of the Information Systems group in 1996. At last there was the potential for my salary to start increasing and eventually reach the level of a post-doc salary at Bell Labs. My duties as full professor meant that I had much less time for research and development than before. I had to devote a lot of time to begging for money to hire people to do the research and development I would have liked very much to do by myself. Alas, that is how universities work: we hire the very best researchers we can find and then make sure they never have time to do any more research themselves. From then on their success depends mostly on the talent and motivation of the people they hire as associates.

The National Science Foundation NWO funded fundamental research on hypertext models, resulting in the highly referenced Adaptive Hypermedia Architecture Model (or "AHAM") which became the PhD topic of Hongjing Wu [6], and later the newer Generic Adaptation Framework (or "GAF") which was the PhD topic of Evgeny Knutov [15]. The NLnet Foundation sponsored the further development of AHA!. First Natasha Stash and, later, David Smits developed new versions. They received help from many students, most notably the "BBB's": Brendan Rousseau,

Bart Berden en Barend de Lange [4]. Together they co-authored the most cited paper about AHA! and wrote a lot of new code. For the first time bugs started to appear in AHA! and had to be fixed.

A bit of a side-track in this line of work was the investigation of different variations on *multiple-choice tests* that are used to assess whether students achieved the desired learning outcomes of a course. This was the PhD research of Katja Vasilyeva. The research was focused on generating personalized, adaptive feedback, and this was found to be beneficial for the learning process. The research also resulted in some other findings. It showed that in a multiple-choice test students do not like to reveal whether they are certain of their answer or whether they are guessing. They also really hate a grading scheme that results in a negative mark for a “certain but wrong” answer. Shifting the scale to positive without affecting the actual exam grade appears to solve this. Strange, but true. In research you know where you start but you don't know what you will end up finding. And as long as you find something “interesting” that's ok.

My quest for staying years ahead of everyone else led to the very first adaptive conference paper [10], published in 2006. And when David Smits was ready to write and defend his PhD thesis in 2012, it was time for another world's first: I managed to persuade the “College voor Promoties” to accept an adaptive hyperdocument as a PhD thesis submission and publication. Five years on, David's thesis is still the only adaptive PhD thesis in the world. We did write some regular, non-adaptive papers about this work, to reduce the risk of it being forgotten as part of the “Digital Dark Ages” (many references exist, including [16]).

# Expert-driven versus data-driven adaptation

The European GRAPPLE project [9] was my biggest achievement both in the skill of “begging for money” and in the area of research on e-learning personalization: with a total budget of 5.4 million euro 15 partners from 9 countries worked together on the “Generic Responsive Adaptive Personalized Learning Environment”. As part of this project our AHA! system became GALE, the “Grapple Adaptive Learning Environment” [7, 21]. A key element in GRAPPLE was the ability to share user data between servers and institutes. The adaptation in a course could be based partly on what the learner studied in other courses, from the same or a different institute. We could, therefore, support *adaptive life-long learning*.

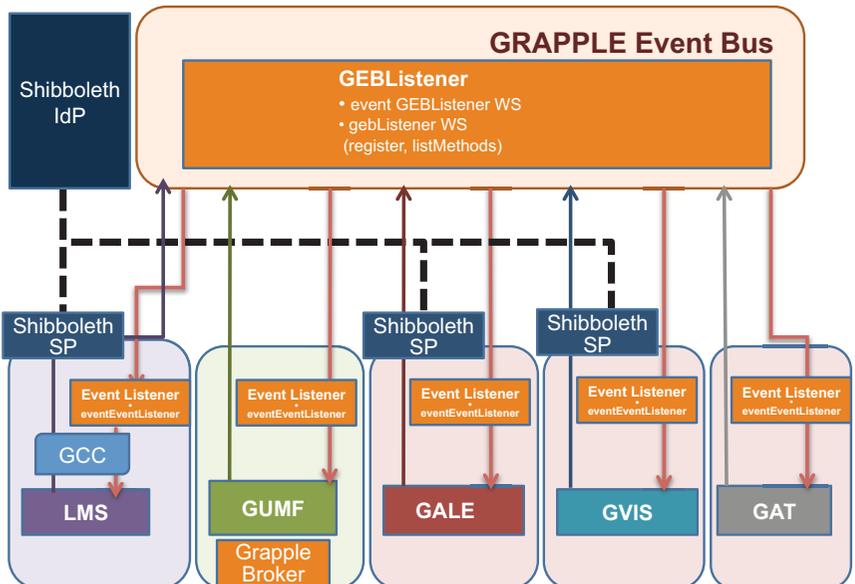


Figure 5

The GRAPPLE architecture.

We also looked at the influence of personality traits on the learning process, such as *cognitive styles* or *learning styles*. Adaptation to learning styles led to Natasha Stash’s PhD thesis [22] and later to the European *Autism and Uni* project [8] to

help the transition of autistic students from high school to university. As the Eindhoven region is the “autism capital” of the Netherlands [20], TU/e was ideally placed to participate in this project not only because of the available expertise but also because of the potential user population.

The research on adaptation I mentioned so far is purely *expert-driven*: an expert designs the adaptation rules. A first step away from this manual labor is the use of databases with semantic relations, and generating adaptation from the database by using *template rules*. When a user likes a painting by Rembrandt he or she may also like other paintings by Rembrandt, or even by Pieter Lastman, Rembrandt’s teacher. Liking other paintings by the same painter or his teacher are generic or template rules. In very general terms, using the relations in order to generate adaptation and recommendations is called *content-based filtering*.

NWO has sponsored a large number of research initiatives in the area of Cultural Heritage, in the CATCH<sup>3</sup> research program, mainly thanks to professor Jaap van den Herik. This research area is now part of what is called “Digital Humanities”.

The screenshot displays the 'Tour de Rijks' art recommender interface. At the top, there is a search bar and navigation tabs for 'ART RECOMMENDER', 'RIJKS TOURGUIDE', and 'FULL PROFILE'. The main content area is divided into several sections:

- Rate these artworks:** A carousel of five artworks is shown. Below the carousel is a 'Rate it' section with a star rating and an 'Add to tour' button.
- Rated topics:** A list of topics with star ratings and 'Add to tour' buttons:
 

Topic	Rating
Steen, Jan	★★★★★
Rembrandt van Rijn	★★★★★
Chiaroscuro	★★★★★
Religion in the Republic	★★★★★
Group	★★★★★
Militia paintings	★★★★★
- Recommendations:** A section with filters for 'Include in results' (Creators, Creation Sites, Material Medium, Material Support, Styles, Themes). It shows '30 Recommended artworks' and '20 Recommended topics'. The artworks are displayed in a grid with 'Add to tour' buttons. The topics are listed with star ratings:
 

Topic	Rating
Rotterdam	★★★★★
Portraiture	★★★★★
Leiden	★★★★★
Dog	★★★★★
Lutes	★★★★★

The Rijksmuseum logo is visible in the bottom right corner.

Figure 6

The CHIP art recommender.

<sup>3</sup> Continuous Access To Cultural Heritage.

I submitted a project proposal together with Telematica Institute and the Rijksmuseum. We hired Lora Aroyo as assistant professor and she coordinated our CHIP project [24] on “Cultural Heritage Information Presentation and Personalization”. The CHIP project was a “bootstrapping” project, early on in her academic career that probably helped her in eventually becoming a full professor in Human-Computer Interaction at the Free University in Amsterdam. Below is a screenshot of the final Art Recommender that came out of this project, mostly implemented by Natasha Stash, assisted by programmers from different CATCH project teams. The CHIP project also led to the PhD thesis of Yiwen Wang [23]. The CHIP recommender offers several ways to inspect what the system believes your interests are, and it also has checkboxes that let you influence how it computes the recommendations. Such “scrutability” of the user model and of the adaptation is still not available in most other adaptive applications.

# Beyond Web-Engineering

Through the CHIP project I started seeing the growing potential of not only using semantic relationships but also usage data in adaptive applications without involving expert-written rules. To move the research more in this new direction of *data-driven adaptation* I hired two young researchers in data mining just over 10 years ago, in 2006. They were Toon Calders, who is now professor at the University of Antwerp, and Mykola Pechenizkiy, who is now professor in data-mining at TU/e.

Data-driven adaptation is a bigger challenge than just applying state-of-the-art data-mining to the area of adaptation and recommendations. The approach of *ensemble learning* [26] illustrates this nicely. It represents the *wisdom of the crowd* principle (a term attributed to Aristotle) that in terms of adaptive hypermedia means that paths taken by many people are worth recommending to new users. An essential element in order for this principle to be valid is that the agents (or users) must be independent. Once we start giving recommendations to new users we are influencing them to the extent that they can no longer be considered independent agents. Vinicius Ramos, a Brazilian PhD student who did a double PhD with us, studied the use of adaptation in our online hypertext course and found that indeed in most cases students do follow the advice the adaptive system gives [19] and thus do not act independently of the adaptation that “pushes” them in one direction. When we keep “improving” the adaptation by using user behavior of old and new users, this *meta-adaptation* or *adaptation of the adaptation* can thus quickly become a *self-fulfilling prophecy*, resulting in what is known as a *filter bubble* (many references about this, e.g. [1]).

I proposed to study data-driven meta-adaptation in a follow-up project to GRAPPLE, but alas despite scoring very high the proposal did not get funded, so this study remains to be done as future work, by others. Project selection is a rather unpredictable process that is not guaranteed to lead to the approval of those projects that are needed most importantly and urgently.

In 1989 I decided that continuing to study databases was not worthwhile any more. Many years later, when we started using semantic data, as in the CHIP project, creating linked open data sets, mostly consisting of triples such as “*painter paints painting*”, new database technology needed to emerge, and new database languages designed as well. In 2009 I hired George Fletcher, a young database researcher who had already developed a triple-store called “TripleT” [13, 25] and who is now our associate professor in Data Engineering. Storage structures and query algorithms for handling semantic triple structures that together form graphs are fundamentally different from the “classical” data structures and algorithms used in administrative databases. Both new companies specializing in graph databases and traditional database companies trying to stay up to date are scrambling to take the fundamental new research findings from George Fletcher and his students on board. I hope TU/e will fully realize the value of this human asset before one of the companies also takes George Fletcher himself on board.

The Web-Engineering group has evolved into a Data-Mining group and a Data-Engineering group over the past years, ensuring that TU/e can remain at the forefront of the research in handling and analyzing the ever-growing amounts of data that are being produced and communicated online. We have come full circle: 25 years after deciding to stop studying data and databases, the research that replaced it generated the need to start studying data and databases again, and this is now going “full steam ahead”.

# Now even more personal

I would like to close this lecture with a reflection on lessons learnt about the scientific community, university life and life in general. I am skipping some episodes. We don't have forever...

I guess that every professor who reaches their valedictory lecture can say that they have been lucky. I am certainly no exception. But there is a dark side to this, and that has to do with the way decisions on research funding are being made. New researchers we hire should first of all get some basic research funding, so they can show their excellence directly through their own research output. Acquiring *additional* funding should then be a matter of writing some excellent research proposals and getting funding for these projects based upon the quality of the proposals. The left part of figure 7 shows the resulting distribution of research funding. Upper management and politicians believe, or at least make us believe, that this is how it works. The reality observed by researchers is that subsidy rounds closely resemble lotteries, and a "lottery" is actually the most positive description I can come up with. Winning the lottery enables you to hire more people who can help prepare more proposals, thus increasing your number of lottery tickets and thus your chances of winning. Also, the creation of "top" grants, "veni, vidi, vici", ERC and other methods of distributing a shrinking overall research budget over fewer and fewer researchers or research groups leads to a very skewed distribution, as illustrated by the right part of figure 7. The model of basic funding plus extras is gone. The basic funding has mostly disappeared, and only a few "top" researchers get more funding than all other researchers combined. Oxfam reported that the eight richest people in the world own more than the poorest half of the human population combined<sup>4</sup> and everyone agrees this is an outrage. Research funding is now moving in the same direction. This is not only an outrage, this is killing the large workforce we need to provide academic level science and technology education to our ever-growing student population!

<sup>4</sup> Oxfam press release: <https://www.oxfam.org/en/pressroom/pressreleases/2017-01-16/just-8-men-own-same-wealth-half-world>.

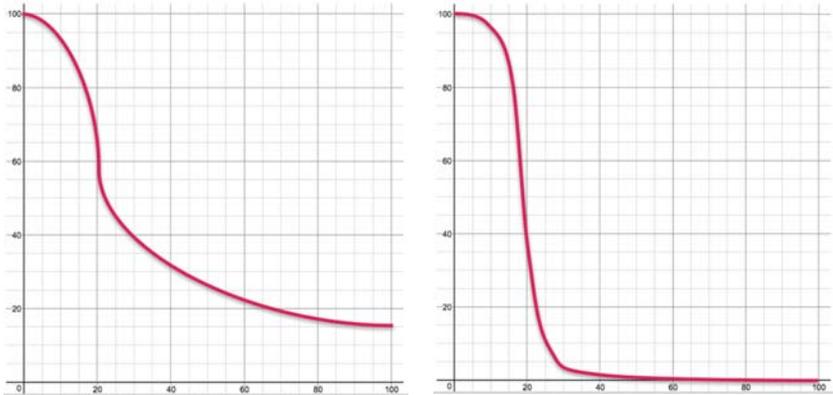


Figure 7

Evolution of research funding (not exactly to scale).

There are many more aspects of being “lucky”, many with a positive influence on my academic life. I have made some decisions that have shaped my future in ways I did not foresee but which, in hindsight, were very good decisions. I chose to study mathematics, not my hobbies of engineering and music. This led me to meet Jan Paredaens who guided me towards my academic career. I completed the high school teacher training program which much later meant that I was exempt from following the BKO or Basic Teaching Qualification program at TU/e. I chose a post-doc at Bell Labs over an easier, comfortable post-doc at the University of Antwerp without realizing that this “international experience” would later become an important item on my CV. I accepted a job offer as “universitair hoofddocent” without fully understanding what this position could mean for my future career. At TU/e there was a policy that when there is a vacancy for a chair (a full professor heading a research group) this should be advertised worldwide to find the best candidate, and being an internal candidate is a disadvantage<sup>5</sup>. If I had known or been told about this policy, I would probably have declined the job offer. I managed to hire very talented, motivated and hardworking people so that together we could build a strong Web Engineering group. I hope that our university will realize that keeping this talent can only be achieved by offering them good career opportunities. I started my TU/e career as associate professor within three years of completing my PhD and became full professor nine years

<sup>5</sup> See <http://www.win.tue.nl/reglementen/persbel.pdf> (last accessed Aug. 16, 2017) for the department’s policy as it was defined in 2001 (but never changed since). “Voor leerstoelhouders dient internationaal naar de beste persoon gezocht te worden. Interne kandidaten hebben hierbij een achterstand.”

after my PhD, at the age of 37. There are colleagues who achieved this at an even younger age. I see no reason why the same cannot happen anymore.

On a positive note, less personal this time, there are many areas in which TU/e has made a lot of progress and that are certainly worth mentioning here. In 1989 there was no housing for newly hired employees. After Rina and I had moved to Eindhoven, the guest bedroom in our house became at some point Hongjing's room, then Natasha's room, then Lora's room... this is no longer needed. Housing is not only arranged but even available on campus and our guest bedroom is now an accordion repair shop.

When I started working at TU/e I had to figure out all by myself how the university worked. Nowadays TU/e organizes introduction meetings for new scientific staff, at different levels, for people from other countries as well as from the Netherlands. A network of colleagues now forms itself much more easily than before.

Also, when I started working at TU/e there was a constant uncertainty about whether accepted conference papers could be presented. Pushing people to publish but then not promising that they can go to a conference to present their work generated an awkward working atmosphere. When I became chair, I promised to my associates and students that I would always approve travel requests to present research results.

Likewise, when I started working at TU/e in 1989, I expected that it would be self-evident that as a computer scientist in the computer science department of a technical university I needed a computer. I did not ask for a very special computer, just a common Sun workstation. To my surprise, and also disappointment, it first of all took ten months for anything to happen and then I received a primitive, outdated PC, somewhat like the one I bought in Antwerp, four years earlier, from my own project money, nothing like the workstation I asked for, and nothing like my "snazzy" personal computer. Having the outdated machine was still better than only having paper, pencil and eraser, but most of what this computer did was heat my office. And it didn't do a good job even at that.

When it came to getting a login and email I assumed it would be possible to keep the name "debra" I had used everywhere up to that point. But no, this was against the standard naming scheme and "could not be done". Well, I can be quite stubborn. For two years I refused to give my TU/e email address to anyone and I continued to use `debra@research.att.com`. Eventually, after a long wait, the

system administrators gave in and I became “debra”. I also had a very long fight with the TU/e administration to simply get my name spelled correctly everywhere. Does it matter? Well, to me it does. A name is *personal* after all. The policies have all changed for the better: nowadays we try to have a usable computer available for every new employee from day one. And for their email, new staff members can now choose any alias or nickname they like as long as it isn’t ridiculous and hasn’t been taken yet.

There are more improvements, like the quality and selection of food in the cafeteria, the AV facilities in lecture halls, the publicly available piano for everyone to play, too many improvements to name all of them. I must wrap up.

## Tot slot

Time's up, maar ik wil toch nog expliciet een kort woord van dank uitspreken en proberen om een aantal mensen te vernoemen, die mijn leven en mijn carrière zin en plezier hebben gegeven.

Mijn vader heeft mij geleerd dat het leven bestaat uit hard studeren, hard werken... en belasting betalen. Hij had ook heel vaste, of zeg maar vastgeroeste, gewoontes en dat zit helaas in de genen... Dat maakt het niet gemakkelijk om met mij samen te leven. Toch houdt Rina dit nu al meer dan 25 jaar vol en zonder haar onvoorwaardelijke steun al die jaren, zou ik hier niet hebben gestaan. Rina is twee keer met mij mee verhuisd, en vooral de verhuizing naar dat verre vreemde Nederland, was moeilijk. Een land met vreemde gewoontes, een heel vreemde soort Vlaams, dokters die hun patiënten niet ernstig nemen en bakkers die 's zondags gesloten zijn en niet weten wat pistolets en koffiekoeken zijn. Rina heeft ook mijn geklaag moeten aanhoren over de zesjesmentaliteit en de studenten die niet vijf jaar studie in vier jaar doen, maar vier jaar studie in vijf of zes jaar, of nóg langer. Maar er zijn ook goeie dingen in Nederland. Er wordt bijvoorbeeld heel behoorlijk accordeon gespeeld.

Hard studeren en werken, heeft ook onze kinderen geholpen. Door dat harde werken is Jürgen uiteindelijk professor geworden in het Centre de recherche en linguistique LaDisco van de ULB. En hoewel hij graag danst, heeft de naam niets met disco te maken. Ingrid heeft naast haar gezin, eerst de mbo en daarna ook de hbo-opleiding verpleegkunde weten af te maken. Wij zijn op allebei erg trots. Maar dat zij het nest hebben verlaten en maar heel af en toe een keer terugkomen, valt wel zwaar. Wij gebruiken nu muziek om de stilte in het "empty nest" te verdrijven.

Mijn carrière is heel duidelijk richting gegeven door Jan Paredaens en later ook volop gesteund door Kees van Hee. Zij verdienen mijn bijzondere dank, omdat ik van hen heb geleerd hoe een hoogleraar behoort te werken. Jan heeft mij niet alleen op het spoor van de databases gezet, maar ook laten zien dat de informaticus een alleskunner moet zijn. Hij was niet bang om een breed scala van onderwerpen te onderwijzen, en dat heb ik later ook gedaan, met naast de databases nog mens-machine interactie, artificial intelligence, data mining en mijn

onderzoeksonderwerp van adaptive systems. Jan en Kees hebben mij geleerd dat je het beste uit medewerkers haalt door hen de vrijheid te geven om hun eigen weg te zoeken. Kees liet mij bijvoorbeeld een modelspoorbaan ontwerpen, waar de studenten dan een automatisering voor konden programmeren. Mijn ervaring uit het schrijven van een boek hierover werd dus uiteindelijk ook nog nuttig voor de TU/e.

Wat betreft het begeleiden van promovendi heb ik geleerd dat je het beste de deur kan openhouden voor vragen en discussie en de promovendus zijn eigen weg kan laten zoeken. Dan is het gewoon wachten tot het proefschrift klaar is. Zo zal niet elke promovendus slagen en daarom past deze aanpak ook niet bij het Nederlandse systeem van *outputfinanciering*. Maar de promovendus wordt er wel een *onafhankelijke onderzoeker* van. En daar staat het diploma van doctor toch voor?

In navolging van Jan Paredaens en Kees van Hee, heb ik het aan de universiteit in eerste instantie altijd opgenomen voor “mijn” mensen. Mijn leidinggeven bestond er vooral uit dat ik mijn mensen de leiding gaf over hun eigen ontwikkeling en dat ik hen zoveel als mogelijk afschermdde van al het bestuurlijke dat daarbij kwam kijken. Mijn succes meet ik niet aan mijn eigen H-index, maar aan wat de mensen die in mijn groep hebben gewerkt, konden bereiken. Geert-Jan Houben, Lora Aroyo, Toon Calders en Mykola Pechenizkiy hebben het al tot hoogleraar geschopt. George Fletcher wordt volgens mij de volgende, maar hij moet nog door de contraproductieve facultaire carrièrevertragingmolen zien te komen.

Een mooie illustratie van het leidinggeven door ten dienste te staan van mijn medewerkers, is de jaarlijkse Antwerpse traditie om op Verloren Maandag iedereen op worstenbroden en appelbollen te trakteren. Maar ik sta ook open voor andere tradities. In mijn groep is een heel bijzondere synergie ontstaan tussen Amerika en Rusland. En wanneer we dan samen aan tafel zitten aan het Thanksgiving-diner denk ik: Het is toch allemaal goedgekomen.



Figure 8

Verloren maandag in 2006.



Figure 9

Thanksgiving-diner 2016.

Natuurlijk zijn mijn collega-hoogleraren, waarvan er velen in het cortège meelopen, en met hen alle wetenschappelijke staf, belangrijk voor het samen uitbouwen van de TU/e tot een universiteit met een uitstekende reputatie in vele vakgebieden. Een universiteit waar ik trots op ben. Maar de wetenschappelijke staf kan het niet alleen. Ik wil allereerst de secretaresses noemen en bedanken, die mij gedurende mijn hele carrière doorheen het kluwen van administratie hebben geleid. Dat zijn vooral, en in chronologische volgorde, Lydia en Francine (UA), Karen (BL), Fem, Jolande, Riet en Ine (TU/e). Ik wil ook expliciet de andere ondersteuners noemen die ik nog nooit eerder bij een afscheidsrede heb horen vernoemen, maar die sterk hebben bijgedragen aan het wij-gevoel en het plezier dat ik heb gehad in mijn werk. Veel dank aan Kees, Paul, Herman en alle andere technici die altijd meteen klaarstonden om technische problemen op te lossen, om faciliteiten te regelen, die ik weer eens was vergeten aan te vragen, en om keer op keer een gestolen beamer te komen vervangen. Dank ook aan de (vooral) dames van de catering, de medewerkers van de studentenadministratie, de receptie, de bibliotheek, de bewaking, de schoonmaak, de pedellen en alle anderen die ik nu vergeet om expliciet te noemen. Jullie zijn voor mij niet alleen de smeerolie, maar vormen mee de motor van de universiteit.

Ik waardeer ook de bezorgdheid die velen hebben geuit over mijn toekomstige tijdsbesteding. Ik hang mijn toga wat vroeger aan de wilgen dan de meeste van mijn collega's. Maar... hoe lang heb ik eigenlijk gewerkt? Een aantal collega's zal hun werkweken inschatten op 60 uur of meer. Laat ik voorzichtiger zijn, ook al vanwege mijn muziek-activiteiten. Ik reken even met 50 uur werken per week en dat ongeveer 48 weken per jaar. Een standaard werkweek is 40 uur, een werkjaar is 1680 uur. Sinds mijn afstuderen in 1981 kom ik dan uit op iets meer dan 51 werkjaren. Ik heb altijd geleerd dat een volledige carrière bestaat uit 45 voltijdse jaren. Door vijf jaar studie in vier jaar te halen en dan 51 jaar werk in 36 kalenderjaren meen ik het "hard studeren en hard werken" naar behoren te hebben ingevuld. En alle subsidies die ik bij elkaar gebedeld heb, dekken ruimschoots die 36 jaren aan salaris, dus als dat geld ook aan mijn salaris was besteed, had ik al die jaren eigenlijk gratis voor mijn verschillende werkgevers gewerkt...

Al word ik nu een arme gepensioneerde, ik ben ervan overtuigd dat dit mij beter zal bevallen, dan al die jaren dat ik een rijke bedelaar was. Het is nu tijd voor muziek spelen, arrangeren, instrumenten repareren, klussen, fietsen, reizen, vrijwilligerswerk en nog veel meer, maar vooral tijd voor Rina en voor ons samen. Rina heeft al die jaren te weinig aandacht van mij gekregen, want ik was altijd aan

het werken. Ik ga proberen om dat een beetje goed te maken met wat activiteiten die wij allebei leuk vinden en waarvoor we eindelijk tijd krijgen. Ik wil eindigen met een citaat uit een lied van Jasperina de Jong [14]: “De seizoenen komen terug, de jaren niet.” Daarom wil ik nu alvast aan de resterende jaren beginnen.

Ik heb gezegd.

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# Curriculum Vitae

**Prof. dr. Paul De Bra served as Full Professor in Databases and Hypermedia in the Department of Computer Science at Eindhoven University of Technology (TU/e) and as chair of the Web Engineering group.**

Paul De Bra started his university life at the University of Antwerp, Belgium, where he first obtained a Master degree, or “licentiaat”, in Mathematics as well as a teaching qualification, in 1981. His thesis won the IBM Belgium award for best Master thesis and the VFI award of the Association for Fundamental Computer Science (Vereniging voor Fundamentele Informatica). He continued his study towards a doctorate under the guidance of prof. dr. Jan Paredaens and graduated in 1987, with a thesis on “Horizontal Decomposition in the Relational Database Model” that won the IBM Belgium award for best PhD thesis.

During 1988 and 1989 he was a post-doctoral researcher at AT&T Bell Laboratories in Murray Hill, New Jersey, developing technology for WYSIWYG interfaces for document processing.

After a brief intermezzo as a software engineer at Agfa Gevaert in Antwerp, he joined TU/e in December 1989, first as an associate professor in databases, and from August 1996 as a full professor and chair of the Information Systems group.

Since he started working at TU/e his research shifted from databases to the area of hypertext and hypermedia, and he became especially known for research on adaptive Web-based systems.

He initiated both theoretical research and practical development, the theory leading to the most cited reference models in adaptive hypermedia, AHAM and GAF, and the development leading to the most cited and used adaptive hypermedia systems AHA! and GALE.

Besides his teaching, research and grant acquisition tasks at TU/e, he served in a number of additional functions. He was a part-time professor at the University of Antwerp from 1987 to 2007, scientific director of the Dutch research school SIKS

on Information and Knowledge Systems from 2009 to 2017, President of User Modeling Inc., the non-profit organization that organizes the yearly conference on User Modeling, Adaptation and Personalization, from 2011 to 2017, and at TU/e he was Graduate Program Director of Computer Science from 2014 to 2017. He also represented TU/e and chaired the program advisory board of HOVO Brabant, the initiative of the universities and higher education institutions in Brabant to organize higher education for seniors, and he was representative of TU/e in the World Wide Web Consortium.

Apart from a professional career in computer science, Paul De Bra has also been very active in music. In 1978 he obtained the government's silver medal for piano. He was a member of the accordion orchestra Avanti for 44 years and for about 30 years he was conductor of that orchestra. Later he joined Accordeana in Helmond as well as the Netherlands Symphonic Accordion Orchestra and out of these orchestras he helped start two accordion quintets: ARTE and Kwintissimo. He has arranged and published (for free) many pieces for accordion ensemble or orchestra, taken up by orchestras from "here" all the way down to New Zealand.





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