

MAGAZINE

OF HEINRICH HEINE UNIVERSITY DÜSSELDORF



HOW AND WHERE DID THE FIRST CELLS LIVE?

Pioneering studies in evolutionary biology

▶ **VICE-RECTOR
VISITS ISRAEL:**
Cooperation agreement
with Tel Aviv University

▶ **POLITICAL
UNTRUTHS:**
How many lies can our
democracy take?

▶ **CONSUMER
POLICY 2.0:**
Risks and oppor-
tunities of 'Nudging'

03 Editorial

04 **How and where did the first cells live?**

Evolutionary biology: “LUCA” is the common ancestor of all life

08 **Partnership with Israel’s elite university**

Interview with Professor Dr. Andrea von Hülsen-Esch, Vice-President for International Relations

11 **German Academic Exchange Service invited scholarship holders from 88 countries to meeting in Düsseldorf**

12 **Believe nothing of what you hear ...**

Untruths are no rarity in politics. Does that mean lies are allowed or do they harm democracy?

16 **A new chance for climate change**

The Paris Agreement and the limits of law

19 **Molecular Enzyme Technology: Wastewater as a source for new biomolecules**

20 **“Are there toilets in heaven too, Daddy?”**

“Boat to the Stars”: the “Sternenboot” palliative care team accompanies children on their final journey.

22 **“Nudging”: A new approach in consumer policy?**

New insights from behavioural economics and psychology



Photo: Silvia Reimann



Photo: private

Legal notice

Publisher:

Communications Office of HHU Düsseldorf in cooperation with the Office of the Vice-President for International Relations and the International Office

Title image:

Silvia Reimann

Layout and typesetting:

zweizueins GbR, www.zweizueins.net

Editorial team:

Rolf Willhardt (head), Dr. Victoria Meinschäfer, Susanne Dopheide

Editorial assistance:

Dr. Arne Claussen, Prof. Dr. Peter Kenning, Prof. Dr. Charlotte Kreuter-Kirchhof, Dr. Stefan Marschall

Translation:

Sharon Oranski, www.oranski.de

Reprinting of articles only with editor's permission.

Editorial



Dear Reader

First of all, please let me send you my very best wishes for 2017! May it be a peaceful year which allows us all to pull closer together in the framework of productive partnerships and fruitful cooperation. With this new issue of our HHU Magazine, we would like to tell you about the many different projects underway at Heinrich Heine University Düsseldorf.

Last year, the main priority of the office of the Vice-President for International Relations was the audit “Internationalization of Universities” of the German Rectors’ Conference. This process was finalized with the award of the official seal on the 23rd of November. For HHU, the successful completion of the evaluation procedure meant a big step towards the consolidation and expansion of its international activities. This will form the basis in 2017 for the review of our internationalization strategy which I look forward to presenting to you in the next issue of our HHU Magazine.

A new initiative within our internationalization strategy is the UN12JOB programme, which was officially launched on the 5th of July 2016 in the form of a first network meeting. The aim of the programme is to improve the chances of the some 1,500 international students at HHU of finding a foothold in the German employment market. Apart from students, representatives from politics and the business community also took part in the meeting. The programme is sponsored by the German Academic Exchange Service with funds from the Foreign Office and is a model project for other German universities (www.uni-duesseldorf.de/internationales).

The opportunity from the 15th to the 18th of May to accompany Svenja Schulze, Minister for Innovation, Science and Research of the State of North Rhine-Westphalia, as an official member of her delegation opened up new possibilities for international cooperation. The aim of the visit, in which three

further representatives from selected universities in NRW also participated, was to foster partnerships between North Rhine-Westphalian and Israeli higher education and research institutions. In the framework of the visit, a Cooperation Agreement at university level was signed between HHU and Tel Aviv University (TAU). How important such delegations are was seen in the many enquiries I received afterwards for contacts to TAU from departments and institutes at HHU. An interview about my visit is included in this issue.

2016 saw a gradual improvement in Germany in the situation for refugees with an interest in studying. Heinrich Heine University also decided to set up a programme to help such candidates to prepare for studies at HHU. It is targeted at a selected group of highly motivated refugees who are already proficient in German or English and had either already started studying in their home countries or know that they would like to go to university. The new programme with the name “fit4heine” comprises four modules: Language Skills, Buddy Mentoring, Culture, and Knowledge. It is sponsored by various programmes run by the German Academic Exchange Service and the State Government of North Rhine-Westphalia.

You can read all about what’s been happening in our faculties and research units over the past months on the following pages of our HHU Magazine. I wish you an enjoyable read and all of us continued productive cooperation at international level!

Yours sincerely

Professor Andrea von Hülsen-Esch
Vice-President for International Relations

Email: Prorektorin.Internationales@hhu.de

How and where did the first cells live?

Evolutionary biology: “LUCA” is the common ancestor of all life

Life began in an iron-rich deep-sea spring. That’s the conclusion arrived at by a team of biologists led by Professor Dr. William Martin from the Institute of Molecular Evolution at Heinrich Heine University Düsseldorf. Through genetic comparisons of cells living today, they discovered the properties of “LUCA”, the common ancestor of all life. They reported on its metabolism and other living conditions in the journal “Nature Microbiology”.

BY ARNE CLAUSSEN

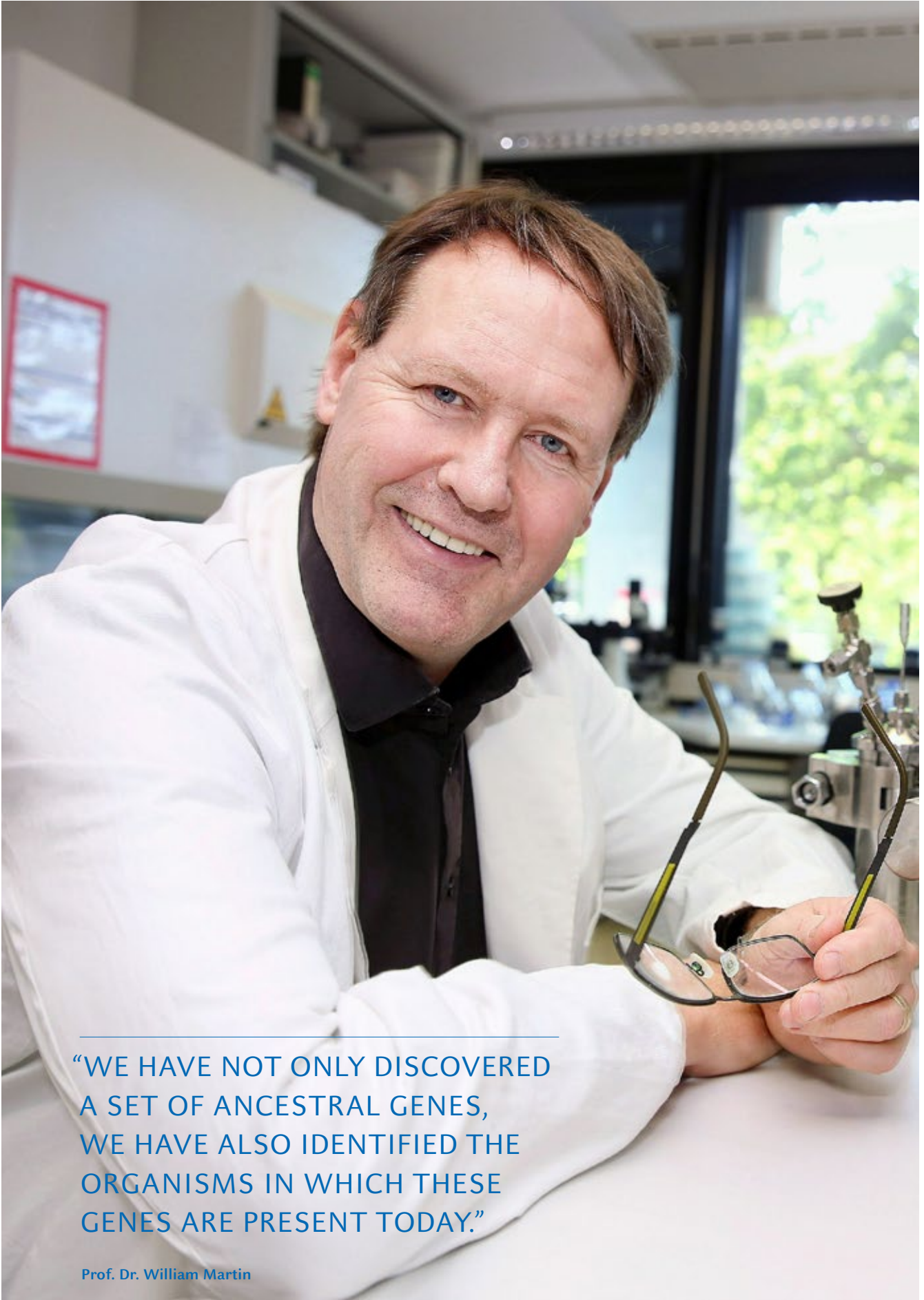
How and where did the first cells live on Earth in its early history? And on what did they subsist? According to a study by researchers in Düsseldorf, the common ancestor of all life or, as it is formally known, the “Last Universal Common Ancestor” (LUCA) lived about 3.8 billion years ago in a hot deep-sea hydrothermal spring. It could do without oxygen and subsisted on hydrogen and carbon dioxide: gases which are always plentifully available in deep-sea springs. It was able to fix nitrogen; its metabolism required metals as catalysts. LUCA is the link between the chemical origin of life and the first free-living cells. Deciphering its properties is an important step in the investigation of early evolution.

Professor Dr. William Martin and his colleagues at HHU’s Institute of Molecular Evolution started with the genes of modern organisms and deduced from them how and where LUCA lived. It was already known from previous studies that LUCA could save and read genetic information. However, no data existed so far on how and where LUCA had lived. The research team analysed the sequence information in 6.1 million protein-coding genes of about 2,000 prokaryotes – the sim-

plest unicellular organisms, which include bacteria and archaea. Their goal was to find all genes whose phylogeny could be traced back to LUCA. As the most important result of their work, the researchers presented a list of 355 genes that LUCA possessed and that provide insights into LUCA’s habitat and lifestyle.

Common ancestor was anaerobic

The 355 genes characterise the last universal common ancestor as an anaerobic organism, which means that it did not need oxygen to survive. It thrived at temperatures around 100°C. Its metabolism was dependent on carbon dioxide, hydrogen and nitrogen and its energy demand was covered by simple chemical reactions without the aid of light. In addition, its enzymes reveal that transition metals, such as iron, nickel and molybdenum as well as other elements, such as sulphur and selenium, played an important role in its biology. LUCA’s metabolism was thus similar to that of some groups of modern organisms, in particular acetate-producing clostridia (found



“WE HAVE NOT ONLY DISCOVERED
A SET OF ANCESTRAL GENES,
WE HAVE ALSO IDENTIFIED THE
ORGANISMS IN WHICH THESE
GENES ARE PRESENT TODAY.”

Prof. Dr. William Martin

Photo: Lukas Fiel



Photo: Lukas Piel

Professor Martin and members of his research team. Bio-informatics play a special role.

among bacteria) and methane-producing methanogens (found among archaea).

The findings support the theory that life evolved in deep-sea hydrothermal springs and that the first organisms living there were autotrophs – organisms that synthesise all their essential nutrients, such as amino acids and vitamins, from carbon dioxide. Professor Martin points out the important implications for further research: “We have not only discovered a set of ancestral genes, we have also identified the organisms in which these genes are present today.” These groups still populate the habitats (deep-sea springs and the Earth’s barren crust) which the researchers found to have been LUCA’s. “This would indicate”, Professor Martin continues, “that they have never left the ecological niche in which life evolved around four billion years ago.”

Microbial communities in deep-sea springs can hence give us an immediate insight into the life of the very first

microbes – as if a time machine had transported the ancient habitat of the first cells into the present day. Professor Dr. James McNerney, evolutionary biologist at the University of Manchester, writes in his commentary on the Düsseldorf researchers’ publication: “These findings on the metabolism of the last universal common ancestor tell us about the life of organisms which existed before it came to the primary division of prokaryotes into bacteria and archaea. The new study provides a very intriguing insight into life four billion years ago.”

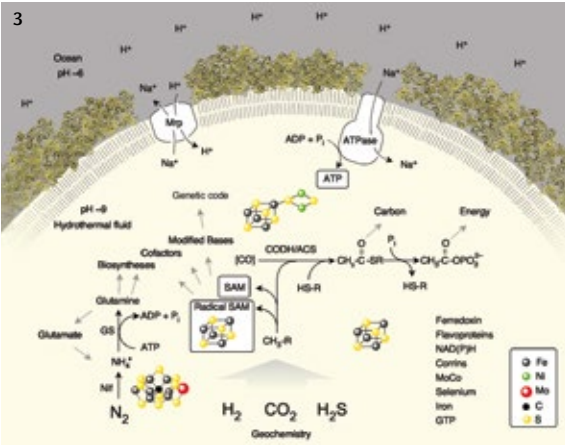
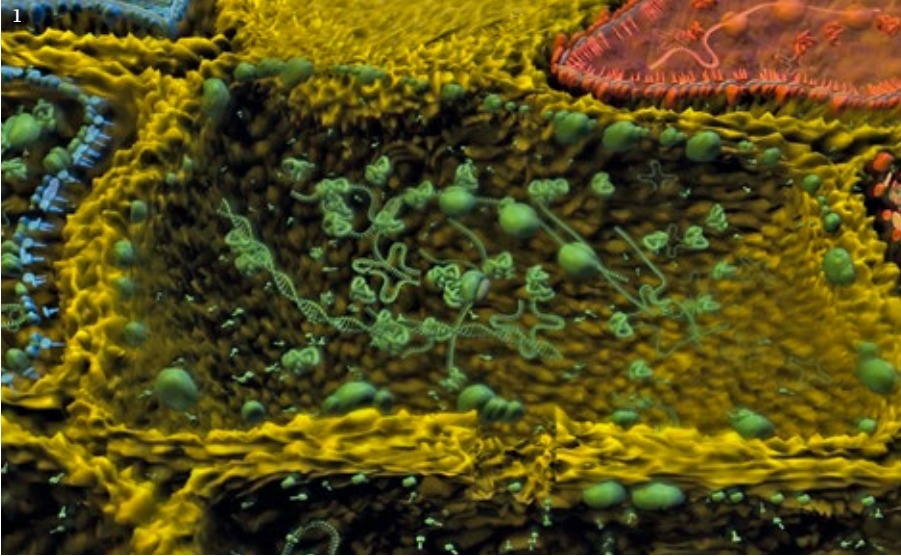
Search for extra-terrestrial life

The study also impacts on the search for life elsewhere in our solar system. If our cellular ancestors evolved in hydro-

thermal springs, then the sun played no essential role in the origin of life. Life would be the outcome purely of geochemical energy. On Enceladus, one of Saturn’s moons, there are signs of the existence of such geochemical energy in the form of hydrothermal activity. “Whether geochemistry there will progress in the direction of life remains an exciting question”, says Professor Martin.

“THIS WOULD INDICATE THAT THEY HAVE NEVER LEFT THE ECOLOGICAL NICHE IN WHICH LIFE EVOLVED AROUND FOUR BILLION YEARS AGO.”

Professor Dr. William Martin, Institute of Molecular Evolution



1: As 3D animation: LUCA could look like this.

2: The team's "mini reactor".

3 The diagram shows LUCA's metabolism.

5: Professor Martin joined HHU in 1999.

6: Professor Martin with Dr. Mayo Röttger, who is in charge of work in the Bioinformatics Unit, and Dr. Verena Zimorski. (4) She is responsible for research work in the area of chemical evolution.



Photos: William Martin (1, 3), Silvia Reimann (2, 5), Lukas Piel (4, 6)

Partnership with Israel's elite university

Interview with Professor Dr. Andrea von Hülsen-Esch, Vice-President for International Relations

BY VICTORIA MEINSCHÄFER AND ROLF WILLHARDT

From 15-18 May, a small delegation of representatives from universities in North Rhine-Westphalia visited Israel together with Svenja Schulze, NRW's Minister for Innovation, Science and Research. The aim was to learn more about Israeli research facilities, intensify contacts and sign partnership agreements. Heinrich Heine University was represented by Dr. Guido Quetsch ("European Studies") and Professor Dr. Andrea von Hülsen-Esch, Vice-President for International Relations, who finalised a partnership agreement with Tel Aviv University (TAU) on behalf of HHU.

MAGAZINE: Vice-President, preparing such a visit has a long lead time because you have to think carefully about whom you want to meet. Whom did you talk to and what was the outcome of these meetings?

Andrea von Hülsen-Esch: Our main alliance is with TAU, the largest university in Israel and the one which is strongest in

research. I 'launched', as it were, this partnership during my first visit to Tel Aviv the year before, when we discussed areas in which we could work together more closely with Avi Primor, Israel's former ambassador to Israel and now member of

"We are already working together!"

our University Council, and Professor Dr. Raanan Rein, TAU's Vice-President for International Relations. And by the time this visit to Israel came round we had already reached the stage where we were ready to sign a cooperation agreement and think about further research projects.

MAGAZINE: When will the alliance start in practice?

Andrea von Hülsen-Esch: We are already working together!



Photos: private

► Signing the contract in Tel Aviv: Seated next to Professor Dr. Andrea von Hülsen-Esch is Professor Dr. Raanan Rein, Vice-President for International Relations; standing next to Minister Svenja Schulze is Professor Dr. Yoav Henis, Vice-President for Research and Development at Tel Aviv University. The two universities will work together in the fields of gerontology, linguistics and plant sciences.

Beach silhouette. With a population of over 400,000, Tel Aviv is Israel's second largest city. Tel Aviv University has 30,000 students and fosters many research partnerships around the world.



A three-day conference on the topic of gerontology took place in June in which seven colleagues from TAU participated. In addition, there are applications for cooperation agreements from three faculties and a new exchange programme for Masters students and doctoral researchers. And linguists are currently working together on a cutting-edge research project.

MAGAZINE: How were you able to fill this new partnership, which first of all existed only on paper, with life so quickly?

Andrea von Hülsen-Esch: Contacts grew very fast once more regular and frequent communication began to take place. The vice-presidents forwarded all enquiries to their respective colleagues and we are seeing that initial talks are already leading to active cooperation. What's special is that our partnership is with an elite university, which is very advantageous for us. Tel Aviv is a university with an extremely strong research focus.

MAGAZINE: With 30,000 students and nine faculties, Tel Aviv University is the largest university in Israel, fosters research alliances with partners around the world and has produced several Nobel prizewinners during its 60-year history. In what concrete areas are cooperative projects between HHU and TAU envisaged?

“WHAT’S SPECIAL IS THAT OUR PARTNERSHIP IS WITH AN ELITE UNIVERSITY, WHICH IS VERY ADVANTAGEOUS FOR US.”

Professor Dr. Andrea von Hülsen-Esch, Vice-President for International Relations

Andrea von Hülsen-Esch: In plant sciences, linguistics and gerontology, where work at HHU is interdisciplinary and anchored in several faculties. Next year, for example, colleagues from Israel will teach at the Department of Art History and several smaller scale workshops will take place in Israel and at HHU to prepare a large research proposal. Both sides are also interested in working together on the topic of entrepreneurship.

MAGAZINE: Does the alliance aim in the first instance to bring students together or are you also thinking about an exchange between researchers?

Andrea von Hülsen-Esch: It's absolutely clear that TAU is interested in an exchange from Masters level upwards. Of course they aren't putting any obstacles in the way of an exchange between Bachelor students. But they have such high-calibre partners that they can pick and choose. For example, when they presented their university they also mentioned the impressive number of ERC grants they are awarded each year. A university naturally likes to adorn itself with these, just as with the Nobel prizes and the spin-off enterprises which have resulted from its patents.

MAGAZINE: Isn't it fascinating that the three research fields which are flourishing here at HHU – gerontology, linguistics and plant sciences – are also of such great interest in Israel?

Andrea von Hülsen-Esch: Yes, diabetes is a big problem in Israel too and they are asking themselves “What characterizes old age?” With our “culture of ageing”, we are absolutely in keeping with their research focus. A pleasing result from our June conference at HHU is also that we are trying to put together a research project on diabetes together with Israel and Palestine.



Dinner with alumni and scholarship holders from NRW. Vice-President Professor Dr. Andrea von Hülsen-Esch: "The alumni were very enthusiastic about Germany and what they took back from here for their own lives. An alumna told me that she had acquired a completely different view of her own society. This shows how important the tiny acorns are which grow and that not just big politics count." (left)

Avi Primor, Israel's former ambassador to Germany, and Svenja Schulze, NRW's Minister for Science (right)

MAGAZINE: We have no problem with either of them, but can the two universities work together so easily or is Heinrich Heine University the intermediary?

Andrea von Hülsen-Esch: There is unbelievable diplomatic wrangling. But if both sides make an effort then it's possible. This can also be seen in our trinational "European Studies" programme. There have been positive signs from Palestine.

MAGAZINE: Did you visit other research institutions too?

Andrea von Hülsen-Esch: Yes, we went to the Willy Brandt Center, for example. It's run by a group of young people and is right on the border between West and East Jerusalem. It's a peace institute which also offers our "European Studies" alumni a place to meet should they need it and the centre would also help with visas, which are generally extremely difficult to obtain.

MAGAZINE: You also visited the German Embassy in Tel Aviv?

Andrea von Hülsen-Esch: Yes, the briefing by our ambassador, Dr. Clemens von Goetze, was very interesting. In addition, in the evening we were invited to the ambassador's residence together with scientists and researchers – that's a speciality of Minister Schulze who likes to meet them. It's intriguing to see who holds which posts. There are no quotas at the universities but they have still managed to achieve similar quotas to us here in Germany. Since women also do military service, equal treatment can be seen in all areas. Where they have made much more progress than us is in childcare. The challenge of looking after very young children is far less stressful than in Germany and there is much more flexibility.

MAGAZINE: Was the comparison with Germany obvious?

Andrea von Hülsen-Esch: Yes, both concerning gender equality and the question of migration. There was also a quite unusual roundtable on this topic at the Friedrich Ebert Foundation with about 20 participants – from writers to members of the Knesset – who all have something to do with migration in some way. The discussion, against the background of how we deal with refugees in Germany and how we can integrate them, was incredibly fascinating. The Israelis have to battle with discrimination and exclusion just like we do. We asked them "How do you deal with it?" It was interesting to see that their language and integration courses are comparable to ours. And it was surprising that their range of measures is no wider than ours, although they've been an immigration country as long as the State of Israel has existed.

MAGAZINE: What did you bring back with you from your visit to Israel which is of use for HHU's strategic focus regarding internationalisation?

Andrea von Hülsen-Esch: We must work closely together in targeted areas with selected partners in order, for example, to have a better chance when nominating foreign awardees to important foundations. If we engage in a lively exchange with renowned universities and research institutions then the likelihood of attracting top-class researchers for an alliance or a visit to our university is greater. It's quite clear: It's the researchers who have the right contacts. But it's vital at TAU too that this process is fostered at president's office level as well, that we keep our finger on the pulse. But at the end of the day it all depends on how willing our researchers are to work with international partners and head for new shores.

German Academic Exchange Service invited scholarship holders from 88 countries to meeting in Düsseldorf

“Scientific Progress and Ethical Responsibility”: This exciting interface was the topic of discussion for about 470 students from 88 countries at the meeting of the scholarship holders of the German Academic Exchange Service (DAAD – Deutscher Akademischer Austauschdienst), which took place in Düsseldorf on 8-10 July 2016 at Heinrich Heine University. The conference was opened by Professor Andrea von Hülsen-Esch, the University’s Vice-President for International Relations, and Professor Joybrato Mukherjee, Vice-President of the German Academic Exchange Service.

The aim of research is to improve our quality of life. Yet where are the limits of scientific progress? The German Academic Exchange Service brought together young students and early career researchers as well as experts from various disciplines to discuss this topic.

“At our meetings, medical experts debate with engineers, art historians with computer scientists and biologists with religious studies scholars. The purpose of such an exchange is to stimulate an open dialogue between representatives of different disciplines, nationalities and cultural backgrounds”, says Professor Margret Wintermantel, President of the German Academic Exchange Service.

The topic of “Ethics in the Art Market” was addressed by Dr. Ulli Seegers, Assistant Professor at HHU, in her lecture on “Values and due diligence between discretion and transparency”. Is the aim



Panel discussion at this year’s meeting of German Academic Exchange Service scholarship holders in Düsseldorf

“to protect humanity from research or research from humanity?”

This question was picked up by a scholarship holder from Syria, who is studying mechanical engineering at the University of Duisburg-Essen. Professor

Research and humanity

Jörg Timm, virologist at University Hospital Düsseldorf, spoke on a medical topic which is the subject of public discussion: “Successful combat of hepatitis C worldwide – reality or wishful thinking?”

Five times a year, the German Academic Exchange Service invites scholar-

ship holders to meetings in different cities to welcome newcomers and put them in touch with each other. Apart from the presentations by university lecturers, the events are also a platform for scholarship holders to voice their opinions and present their academic work.

In the course of the meetings, the scholarship holders get to know their supervisors from the German Academic Exchange Service offices and can clarify any important questions they might have. These scholarship holders are either students or doctoral researchers who are spending at least a year at a higher education or research institution in Germany. Ed.

Believe nothing of what you hear...

Untruths are no rarity in politics. Does that mean lies are allowed or do they harm democracy?

Citizens don't bank on politicians always telling them the truth – quite the opposite. (...) “Never are more lies told than before elections, during wars and after the hunt.”

BY STEFAN MARSCHALL

This quotation attributed to Otto von Bismarck – or which at least stems from his era – is a clear statement: politics and lies have long been associated with each other. Political lies are therefore not a contemporary phenomenon, even though the circumstances and manner of lying have changed over the course of time. The recent case of a German MP, who had “embellished” her CV over decades, is just one in a long line of other lies in the realm of politics. These often had far more serious consequences: for example the Watergate scandal in the 1970s. The question was who in the White House knew what when about the Nixon administration's involvement in a break-in at the Democratic National

Committee's headquarters in the Watergate office complex. The pack of lies which collapsed ultimately brought US President Richard Nixon down with it.

A topic of great discussion was the lies surrounding the Iraq War in 2003 and the false allegation that the regime of Iraqi dictator Saddam Hussein was in possession of weapons of mass destruction – which served as justification for military intervention. In later years, the truth was not always told during the monetary and banking crisis either in order to prevent panicking in the markets and amongst savers. These few examples show how wide and varied political lies can be and the differences between them: Who is lying to whom?

In what situation? To what purpose? With what consequences? The answers to these questions influence whether a lie is perceived as legitimate.

Justified lies

Whether lies can be justified at all is a controversial issue. Immanuel Kant, for example, was a rigorous opponent of lying. Kant says that every (and he means every) type of lie is a violation of morals and ethics. The philosopher even goes so far as to reject lies to protect another person (out of “human kindness”), because every liar – regardless of his reasons for being dishonest – stands opposed to a common societal agreement on honesty and reciprocal trust.

But there are also thinkers who issue politicians with almost a blank cheque when it comes to lying. Around 500 years ago, for example, Niccolò Machiavelli justified the lies told by the ruling classes. For the legendary political theorist, the prime virtue of rulers is not the love of

“TRUTHFULNESS HAS NEVER BEEN COUNTED AMONG THE POLITICAL VIRTUES, BECAUSE IT HAS LITTLE INDEED TO CONTRIBUTE TO THAT CHANGE OF THE WORLD AND OF CIRCUMSTANCES WHICH IS AMONG THE MOST LEGITIMATE POLITICAL ACTIVITIES.”

Hannah Arendt, philosopher



Photo: Fred Stein

truth. They should far rather be virtuosos of power. In so being, they have the right – for reasons of state even the duty – to be dishonest if it helps them to retain power. Machiavelli regards the politician as being duty-bound and responsible towards the state. This responsibility, the “ethics of responsibility” was also Max Weber’s line of argument at the beginning of the 20th century. In his view, political action must in the first instance be measured by its results. Hence it could be that politicians, in order to avert damage, might have to contravene fundamental ethical principles – including the principle of veracity.

One of the most prominent advocates of political lying was the philosopher Hannah Arendt. She argues that simply telling the truth contradicts the essence of politics. Pronouncing the truth is despotic and leaves no room for debate. She maintains: “Truthfulness has never been counted among the political virtues, because it has little indeed to contribute to that change of the world and of circumstances which is among the most legitimate political activities.”

The conviction that lies are an established part of political communication is also shared by those who are usually the addressees: citizens do not bank on politicians always telling them the truth – quite the opposite. The same figures appear in surveys time and again: the great majority for example of the German population says they do not think politicians are honest. In their view,

Lies as part of political communication?

election promises are not kept and in crises too politicians do not always tell the truth. In fact, they do not include politicians at all amongst the professional groups with an honest reputation. Far more people rate members of parliament as “particularly dishonest” than as “particularly honest”. That means politicians rank alongside advertising professionals and car salesmen, that is, almost at the bottom of the table with the real estate agents and in any case galaxies

away from the frontrunners in the assumed honesty stakes: clergymen and pharmacists.

This shows clearly how citizens suspect that political communication follows different rules than private communication. They do not bank on politicians being as honest as they expect their friends to be. Political communication is – word has got round – strategic communication which is intended to collect points in the battle for votes and power. There may therefore be good reasons for perceiving lies as an indispensable part of politics. And there might also be lies where the end would seem to justify the means. However, this can and should not be understood as a licence to lie, since in the long term political lies can gnaw at the foundations of democratic systems. Lying is inconsistent with central elements of democracy: for example the principle of trust. In complex societies, the population must “entrust” most political decisions to its representatives in parliament and government. This relationship of trust, the basis of representative



Photo: REGIERUNGSonline

► A classic amongst political lies: The comment made by Walter Ulbricht, Chairman of the State Council of the GDR, on the possible building of a wall.

democracy, is however torpedoed by political lies and potentially even severely damaged. Even if citizens often do not expect truthfulness from political players, surveys nevertheless indicate that they would greatly appreciate more honesty from them. For example,

What citizens want: More honesty from politicians

in a representative survey by the Bertelsmann Foundation, 71 percent of the population ranked credibility as the most important and desirable characteristic for politicians – this was the top score amongst all the possible characteristics.

Political lies also contradict the democratic principles of transparency and control. Only when the facts are laid bare do citizens have a clear picture of problems and potential solutions. Transparency is also the pre-condition for control. In particular parliamentary democracy relies on various institutions

being able to check each other and if necessary raise the alarm in the case of irregularities and abuse of power. To do so, these institutions need to know the facts. Finally, lies conflict with the principle of political participation: in effect, only those individuals can get involved – whether in an interest group, a political party or by voting in elections or referendums – who have sufficient and undistorted information on political reality at their disposal. Otherwise the wish for participation is directed in the wrong channels.

In view of this fact, it is important that there are institutions in democratic societies which take care of the monitoring of truthfulness in the political debate. This can be the media, parliamentary committees of inquiry, law courts or Truth Commissions (like in South America and Africa in the 1990s). Social scientist Claus Offe calls such entities “institutions for the truth”. Admittedly, monitoring political truthfulness is difficult: how can we produce watertight proof that a politician has lied or concealed the truth with the deliberate

intention to deceive? Political players rely on their political machinery to supply them with information. But if this is not the case or – as with the “Iraq lie” – the situation has been communicated to them in a biased manner, then are the politicians accountable? Or is the politician in that case more a victim than a perpetrator? Self-deception poses a similar problem: can the lie perhaps be the result of self-delusion? First we delude ourselves before telling others an untruth, which we believe, however, to be the truth. In this case it is hardly a lie but just an error.

This explains why “institutions for the truth’ can rarely answer the question of culpability or liability. Nevertheless they can contribute, apart from clarifying the question of culpability, to truthfulness and the search for truth.

However, if these institutions themselves are no longer found to be credible then the problem of trust is twofold. Hence the accusation of the “lying press”, which has been voiced increasingly loudly over the last years, is anything but trivial. A small but notable part of

◀
 Petra Hinz, Social Democrat MP for Duisburg, falsified her CV. She had passed neither A-levels nor university exams in law. On the 31st of August she resigned from her seat and on the 5th of September 2016 she quit the Social Democratic Party.



Photo: bundesregierung.de

the population doubts the media's general credibility. Neither the political elite is trusted nor those who are supposed to monitor it. A double loss of trust!

Double loss of control

The call for more honesty in politics is needed now more than ever precisely

in view of such a dual trust problem. Honest individuals are neither naive nor are they necessarily the losers. The general appreciation of honesty amongst the population is illustrated by examples where a blunt election programme led to an election victory.

Or when politicians became popular (and not populist) who came clean with the electorate. In any case, honest politicians make an important contribu-

tion to consolidating the culture of democracy, whilst political liars can undermine trust in politics and democracy in the long term.

Author Stefan Marschall is professor of Political Science at Heinrich Heine University Düsseldorf. He specialises in Germany's Political System. (This article first appeared on the 28th of July 2016 in the "Christ & Welt" supplement to the ZEIT newspaper (printed with the kind permission of the editor).

The biggest political deceivers

On the 15th of June 1961, Walter Ulbricht, Chairman of the State Council of the GDR, said: "Nobody intends to build a wall." Two months later it was up. US President Richard Nixon abused his office to weaken his political opponent. After denying it several times, he finally resigned. Uwe Barschel, Minister-President of Schleswig-Holstein, disputed having abused his office and gave his "word of honour." The accusations were true. The sexual relationship between Bill Clinton and intern Monica Lewinsky became a political scandal. Clinton denied it for a long time. Then

he confessed. The illegal donation practices of the Christian Democratic Party became public knowledge. Former chancellor Helmut Kohl contradicted himself repeatedly and refused to name the sponsors. US President George W. Bush's justification for the Iraq War was that the Iraqis had at their disposal weapons of mass destruction. None were found. Minister of Defence Karl-Theodor zu Guttenberg was obliged to resign because of his plagiarized doctoral dissertation. He refused to admit to the deception.

A new chance for climate change

The Paris Agreement and the limits of law

In December 2015, the states of the world concluded the Paris Agreement on climate change. It is the first international climate change treaty in which nations worldwide have agreed on measures to combat climate change. The agreement is underpinned by the overwhelming commitment of the countries involved. The Paris Agreement entered into force on the 4th of November 2016.

BY CHARLOTTE KREUTER-KIRCHHOF

The agreement was celebrated as a milestone in international climate change negotiations. At last the long hoped for breakthrough in the international negotiations on climate change was accomplished. Today I would like to examine the question of whether the hope placed in the Paris Agreement is justified. Does it really herald in a turnaround in combating climate change at international level and is the world now saying goodbye to fossil fuels?

Let us first of all look back: the great breakthrough in international climate change negotiations has already been celebrated once, 19 years ago in December 1997, when the Kyoto Protocol was concluded. In the Kyoto Protocol, industrialized countries agreed on binding greenhouse gas emission reduction commitments for the first time. Most countries which ratified the Kyoto Protocol fulfilled their obligations in the first commitment period. The greenhouse gas reduction commitments agreed for the second commitment period until 2020 could also be achieved. However, greenhouse gas emissions

continued to rise at a considerable rate worldwide even after the Kyoto Protocol entered into force. The Protocol led to some industrialized countries reducing their emissions for a certain time, but was not able to protect the Earth's climate system effectively in the longer term.

Milestone for climate change

In view of this outcome, the question arises of whether the Paris Agreement will have a greater impact than the Kyoto Protocol and can become a basis for globally effective mitigation measures. The treaty's chance of success lies in the fact that it recognizes and acknowledges the limits of international law and at the same time uses the power of law to protect the climate system. The Paris Agreement is characterized by five key elements. Each of these key elements reacts to one of the limits of law and in so doing seeks new ways for effective international climate change.

GLOBAL SCOPE OF THE AGREEMENT

The first key element of the Paris Agreement is its global scope. In the treaty, (almost) all the states of the world agreed for the first time to adopt measures to combat climate change. This universality is the basis for the effectiveness of the treaty, since it surmounts one of the limits of law to date, namely the spatial limit of law.

Limits of national sovereignty

To combat climate change is a global task for all nations in the fulfilment of which the sovereignty of individual states effectively reaches its limits. No one country in the world is able to protect the Earth's climate system on its own. The prerequisite for effective climate change is therefore a global treaty. The Paris Agreement fulfils this requirement.

2°C TARGET AS GLOBAL EMISSIONS CEILING

The second key element of the Paris Agreement lies in the agreement on a quantified and consequently verifiable worldwide upper threshold for emissions. The world's countries have agreed to limit global warming to well below 2°C compared to levels in pre-industrial times. One of the surprises at the Paris Conference was that the countries also agreed to aim to limit the increase to 1.5°C compared to these levels. These targets can only be met if in future energy is no longer sourced from fossil fuels. What is needed is a fun-

damental transformation of our energy supply. With its global emission target, the Paris Agreement is reacting to human beings' limited ability of understanding as another of the limits of law. The causes and effects of anthropogenic climate change have not so far been investigated in all their detail. Law is therefore shaping reality on the basis of uncertain facts. The contracting states of the Paris Agreement are overcoming these natural science uncertainties by defining a benchmark. The Paris Agreement ends a discussion on scientific knowledge by defining an agreed intention. It ends a still inadequate level of scientific research by means of a binding standard.

PARADIGM SHIFT IN NATIONS' OBLIGATIONS

The third key element of the Paris Agreement constitutes a paradigm shift in international climate change negotiations. The countries did not consent to any binding reduction commitments but instead agreed to national contributions that each individual country should make in order to achieve the worldwide climate change goal. The countries' nationally determined contributions are the centrepiece of the agreement.

With the agreement on nationally determined contributions, the Paris Agreement is reacting to the limited enforceability of international law as one of the further limits of law. For years, the countries have negotiated on internationally binding emission reduction commitments and then finally failed to comply with their commitments. The surest way to make countries limit their emissions is not legal pressure but



► The fear of an increasingly poor climate and ecological disasters is leading – with rising tendency – to worldwide protest, not only in industrialized countries.

nations' own self-interest. In many cities around the world, people are experiencing how smog and air pollution are threatening their health, preventing prosperity and endangering the future. When temperatures increase worldwide, oceans warm up, sea levels rise, the ice sheet in Greenland and the Antarctic as well as the glaciers melt, ecological balance and mankind's wellbeing are under threat. The nations' individually determined self-interest in climate change forms the backbone of the Paris Agreement. It fuels the hope that the consensus found in Paris will prove to be enduring and viable in practice.

At the same time, the Agreement's weaknesses come to light here. The risk of nationally determined contributions lies in the fact that countries only declare their interest in climate change measures but fail to implement such measures in practice. Words must be turned into deeds. In addition, the sum of nationally determined contributions so far is not sufficient to stay below the agreed emissions ceiling. The effectiveness of the Paris Agreement will depend on whether countries will comply with their declared nationally determined contributions and take on greater ones over the course of time.

AMBITION MECHANISM TO MAKE THE AGREEMENT DYNAMIC

At this point, the Paris Agreement acknowledges not only the limits of law but in parallel also makes use of its strengths. The fourth key element of the Paris Agreement is reporting requirements, regular stocktaking as well as an ambition mechanism. The countries must put forward new nationally determined contributions every five years which must not be lower than their previously declared commitments. This mechanism, which is legally binding under international law, triggers a permanent and constantly self-reinforcing process with the aim of reaching the agreed climate change goal.

mechanism, the Paris Agreement can be the engine for consensus building in the future. The formative power of the law continuously aligns the self-interests defined by the countries in their nationally determined contributions with the agreed climate change goal.

SOLIDARITY PACT IN SUPPORT OF DEVELOPING COUNTRIES

The fifth key element of the Paris Agreement is a solidarity pact for developing countries. At the conference in Copenhagen, the industrialized nations had already agreed to mobilize 100 billion US dollars of public and private funds per year from 2020 onwards for the financing of climate change mitigation measures in developing countries. In Paris, the industrialized nations announced their willingness to raise this sum at least until 2025 and afterwards to agree on a comparable financial commitment. The emerging countries too now no longer immediately dismiss their own financial responsibility.

With this solidarity pact, the Paris Agreement is reacting to reality as one of the limits of law. Law can only demand what is possible in practice. The solidarity pact is also based on the fact that many developing countries will not be able to implement effective climate change mitigation and adaptation measures without external support. The aim of the solidarity pact is to give all countries sufficient capacity for climate change mitigation. (...)

As an international treaty, the Paris Agreement on climate change can set in motion global developments to protect the Earth's climate change system, but on its own is no guarantee for such a turnaround. International law only has this power if and as long as it is backed by consensus amongst the nations. The Paris Agreement is therefore a promise from the nations for the future. It is not the end but instead a new beginning for an internationally effective climate change regime. The aim of this process is the decarbonisation of the economy at global level and thus a fundamental change in our energy supply. The law's task in this transformation process is to create a coherent legal framework at national, European and international level and in so doing do justice to the fundamental aspiration of law, that is, to guarantee legal certainty and predictability. (...)

Reaching temporal limits

With this inherent momentum, the Paris Agreement is reacting to the limits of law in time. If we fail to protect the Earth's atmosphere today, we are acting at the expense of others, at the expense of our children and our children's children. That is why the law must overcome temporal limits and set standards today which will last for generations to come. Through the



Photo: Robin Auster

Professor Dr. Charlotte Kreuter-Kirchhof joined Heinrich Heine University Düsseldorf in 2015.

This article is an abridged version of the inaugural lecture given by Professor Dr. Charlotte Kreuter-Kirchhof, Chair of German and Foreign Public Law, European Law and Public International Law.

Molecular Enzyme Technology: Wastewater as a source for new biomolecules

In biofilms from a wastewater pipe, biologists from Jülich and Düsseldorf have found bacteria which produce previously unknown enzymes and surfactants. The biomolecules they discovered are able to degrade lipids and proteins, for example, but also to break up membranes and thus trigger an antibiotic effect. A team led by Professor Dr. Karl-Erich Jaeger has published these results, in cooperation with colleagues from the universities of Hamburg and Göttingen, in the Scientific Reports of the renowned "Nature Publishing Group".

Bacteria are survival artists. They can adapt themselves to a very wide range of habitats – from the icy deserts of the Antarctic to extremely hot deep-sea volcanoes. The respective environment is also mirrored in the microorganisms' biological properties: Intestinal bacteria of termites form acetic acid which is indispensable for digesting wood, sponges live in symbiosis with bacteria whose active biomolecules defend them against predators. "Specialist bacteria populations are found depending on the environmental conditions", explains Karl-Erich Jaeger from the Institute of Molecular Enzyme Technology (IMET) of Heinrich Heine University Düsseldorf located on the campus of Forschungszentrum Jülich.


Highly specialised active biomolecules

"The likelihood of finding new and highly specialised active biomolecules from bacteria increases if we choose the right spot to take samples", he continues. In the search for bacteria which are able to degrade lipids and proteins, Jaeger's team hunted around in a rather unappetizing – but very promising – place: the wastewater pipe of an abattoir.

Instead of preparing cultures of individual bacteria, the researchers isolated the entire DNA – referred to as the metagenome – of the sample.

Why? At present, 99 percent of all microorganisms cannot be cultivated under laboratory conditions. To find and produce potentially active biomolecules, researchers resort to a trick. Both in the search and for production they use the workhorse of microbiology: *Escherichia coli*. These bacteria multiply easily in the laboratory and – under ideal conditions – produce compounds which originate from the inserted foreign genetic material. In a first step, the researchers constructed a metagenomic library from their environmental sample. In this process, various short pieces of the DNA from the wastewater sample are cloned and transferred into *E. coli* bacteria. The result is an enormous collection of *E. coli* cells which each host different pieces of DNA from the metagenome.

"As we expected, we found numerous enzymes which can degrade lipids and proteins", reports Jaeger. "But we were also lucky enough to find a biosurfactant in this way for the first time." This is very pleasing "because such substances can have a wide range of applications", he explains, "for example for the remediation of environmental pollution, as an additive for detergents or for use as antibiotics." The researchers noted first of all that a bacterial culture was evidently able to hydrolyze blood cell membranes. Jaeger points out that "this could have been a sign of a hemolytic enzyme." However, further analysis revealed that the active ingredient they had found had surfactant properties, which means it contains both water-repellent and water-attractant components and is thus able, for example, to form emulsions or solubilize membranes. "This may also explain the compound's antibiotic effect on various types of bacteria which we were later able to prove", adds Jaeger. The results now published can contribute in the long term to the development of new technologies for the food and chemical industries. Ed./V.M.

 Further information under: www.iet.uni-duesseldorf.de



PUBLICATION

Stephan Thies, Sonja Christina Rausch, Filip Kovacic, Alexandra Schmidt-Thaler, Susanne Wilhelm, Frank Rosenau, Rolf Daniel, Wolfgang Streit, Jörg Pietruszka, Karl-Erich Jaeger
"Metagenomic discovery of novel enzymes and biosurfactants in a slaughterhouse biofilm microbial community."

Scientific Reports 6, 27035, DOI: 10.1038/srep27035

“Are there toilets in heaven too, Daddy?”

“Boat to the Stars”: the “Sternenboot” palliative care team accompanies children on their final journey.

According to the WHO’s definition, “Palliative care for children is the active total care of the child’s body, mind and spirit, beginning when a life-threatening illness is diagnosed until death, and also involves giving support to the family.”

BY ROLF WILLHARDT

Can there be anything more dreadful than the death of a child? Only few people can cope with it on an almost daily basis. Since 1983, palliative care for the little outpatients of University Hospital Düsseldorf has been the responsibility of a team of physicians and nurses from the Department of Paediatric Oncology.

The group was set up by Dr. Gisela Janßen. “At that time, I was a young junior doctor fresh to University Hospital Düsseldorf”, she recalls. “In those days, palliative care for children existed only in the USA and Great Britain, in Germany it was unknown. Today it’s an integral part of our medical degree programmes.”

It was already clear back then that more and more parents wanted best of all to keep their sick child at home in his or her final hours, with outpatient medical and nursing care, “experts on hand”, in a familiar environment and not in the detached atmosphere of a hospital. “We started with patients from the Department of Paediatric Oncology”, says

Janßen, an oncology specialist. “At first that meant five or six children per year. By 2000 it was already 50 and now we care for about 100 children and adolescents between 0 and 18 years of age.”

Over the years, the team of physicians and nursing staff, which also includes a social worker, grew. There are currently 16 such palliative teams for children in Germany. “Up until 2006, all

95 percent are
non-cancer patients

the children who came to us were cancer patients”, says Janßen. “From 2007 onwards, other illnesses began to dominate, such as children with neurological diseases or coma patients. Today up to 95 percent are non-cancer cases.”

The paediatric palliative care team at University Hospital Düsseldorf is on call 24 hours a day and looks after patients in a radius of 120 kilometres. That

means journeys all points north, south, east and west of Düsseldorf. The team has three cars at its disposal, two of them with four-wheel drive. (Janßen: “Have you ever driven over icy hills in the snow at night?”) All vehicles are equipped with special medical apparatus to treat specific symptoms such as pain, shortage of breath or spasticity. The two-strong teams are made up of a physician and a nurse. Altogether they clock up some 50,000 kilometres each year.

And how is this outpatient care funded? Professor Ulrich Göbel, director of the Department of Paediatric Oncology at that time, held extensive talks with health insurers and in 2006 succeeded in persuading AOK Rheinland-Hamburg to be the first one to bear the costs. “Up till then we did the house visits – before there was any legal obligation – voluntarily after our normal work at the hospital and with our private cars,” recalls Janßen. In addition, the paediatric palliative care team receives generous support from the parents’ initiative “Paediatric Oncology at University Hospital Düsseldorf”.

How long does treatment last? “We care for our non-cancer patients for between one week and several years”, says Janßen. “Many of them can’t speak and it’s very difficult to know what they want. Is he in pain or is he ‘just’ hungry?” Staff trained in palliative care can mostly rely on many years’ experience. “A palliative care nurse sees things in a different way.”



► Therapy dogs are also used in palliative care. And three year-old Marie was even able to smile again.

◀ There has been a paediatric palliative care team at University Hospital Düsseldorf since 1983. It looks after little patients – meanwhile about 100 each year – in a radius of 120 kilometres. On the bridge: Dr. Gisela Janßen, Senior Physician



The team talks to the parents at regular intervals of about six months. Questions include: How is the child's quality of life? What is good for him? What treatment is helpful? Should therapy be reduced? And the parents? Distressing findings over the years: "About 30 percent of the marriages of parents with severely ill children break down in the final phase of the child's life, the family falls apart in such a situation", reports Janßen. The "Boat to the Stars", the "Sternenboot" paediatric palliative care team (Janßen: "That's the name we gave ourselves after a training programme. It has something to do with 'being in the same boat' and 'near to heaven'.") works together with psychologists and pastoral care workers when confronted with such problems.

And when the end is near? What does it mean to stay? To face up to it? To cope? Dr. Gisela Janßen: "Children must in any case be told in a way which is appropriate for their age." She recalls talking to many families about this extreme situation. And then there are questions such as "Mummy, are you coming with me when I die?" A six year-old boy

wanted to know how he could stay in touch with his parents. "His mother told him that she would put a cell phone in his coffin. And she did." Another child asked quite pragmatically: "Are there toilets in heaven too, Daddy?" She also remembers the sentence: "I'm going to heaven and I'll build a house there for you." Janßen: "Isn't that a wonderful thought?"

Extensive dialogue with parents

A few days before the end is imminent, the team talks at length with the parents. The purpose is to explain gently what will or can happen. When the child has passed away, the death certificate is issued, the child is washed and dressed. Most parents want to be part of this. Funeral plans are discussed. What songs should be sung? One family wanted Carnival music: the little girl had been in such a dance troupe. "We want whatever is good for the family."

The families generally remain in touch with the team, often over ten or

twenty years. "Many of them find it difficult to sever the ties", says Janßen, "for example, the mother of one of the deceased children looks after our website."

One element of palliative care is animal-assisted therapy. This is not just a trip to the zoo but instead – when that is too strenuous – therapy with specially trained dogs. Dr. Janßen remembers Marie, a three year-old girl. "I've got a photograph of her lying completely relaxed next to a dog. Palliative care also has its good days when we can smile and be happy. We accompany families on the journey to death and we want to do it well."

► **Contact:** sternenboot@med.uni-duesseldorf.de



RECOMMENDED READING

Sven Gottschling, "Leben bis zuletzt: Was wir für ein gutes Sterben tun können", Fischer Verlag, Munich 2016, 272 pages, ISBN 978-3-596-03420-8, € 16.99

“Nudging”: A new approach in consumer policy?

New insights from behavioural economics and psychology

BY PETER KENNING

The aim of the German national government’s consumer policy is a “transparent, consumer-friendly market in which good and safe products are produced and sold under fair and sustainable conditions.” To achieve this goal, consumer policy can adopt various instruments and measures and hope that consumers make the right decisions as far as politics are concerned.

However, what must politics do if these hopes are disappointed? What measures can they implement to steer consumer decisions when the national government is pursuing a further objective in this area at the same time, namely that consumers should “decide for themselves”?

Well, in order to allow consumers as great a level of self-determination as possible on the one hand and to engage in effective politics on the other, a new political approach known

as “nudging” is currently the topic of discussion. This approach uses findings from behavioural economics and psychology to influence consumer behaviour. The aim is to make political strategies and measures more efficient and impactful without restricting unnecessarily the freedom of the individual.

Behaviourally informed regulation

In order to achieve these two objectives, which at first glance appear contradictory, nudging develops measures which influence behaviour and strategically shape what is known as the choice architecture (i.e. the context in which a decision is made). The key characteristic of such measures is that the consumer is free to make any decision whatsoever, that is, no

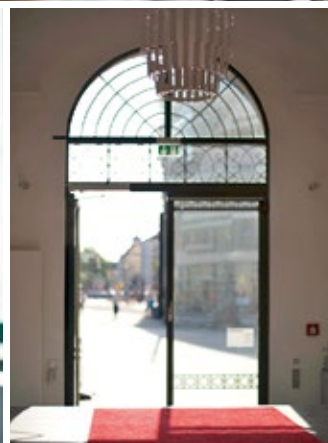
alternatives are either withheld or even forbidden. In addition, this style of politics does without economic incentives or sanctions and in so doing differs greatly from tax or financial policy measures. The scientific principles for this new style of politics, which is also referred to as “behaviourally informed regulation” or occasionally also as “libertarian paternalism”, were essentially developed by the two US-American professors Richard Thaler and Cass Sunstein. Some of the most important instruments and the measures derived from them, which are already being used in many countries, are outlined in the following section.

DEFAULTS AND STANDARDS

This instrument is based on the observation that people fundamentally exhibit what is known as a status-quo bias. It is therefore possible to shape choice architectures in such a



Cashpoints are programmed so that the money can only be drawn once the card has been taken.



University House

University House was donated to Heinrich Heine University by the van Meeteren Foundation. Its purpose is to provide information and advice as well as foster an exchange between science, culture and education.

In the framework of a large spectrum of events, the University offers local citizens the possibility to take part in modern research and its results and shares university life with the city.

Further information, programme, bookings:

University House
Schadowplatz 14
40212 Düsseldorf
Tel. +49 211 81-10345
Email hdu@hhu.de
www.hdu.hhu.de