

2024 — ISSUE 1

MAGAZINE

of Heinrich Heine University Düsseldorf

Take a pinch of...
Unlocking the secrets of taste

LAW

Team spirit and
competition law

ARTS AND HUMANITIES

Maritime routes
of globalisation

MEDICINE

Tumour cells are
masters of disguise

hhu.

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PHOTO: FLICKR.COM/PHOTOS/54591706@N02/7844851684 - NIAID

Art historian Professor Dr Eva-Maria Troelenberg is examining borders, differences and similarities in the region surrounding the Mediterranean Sea in a major research project.

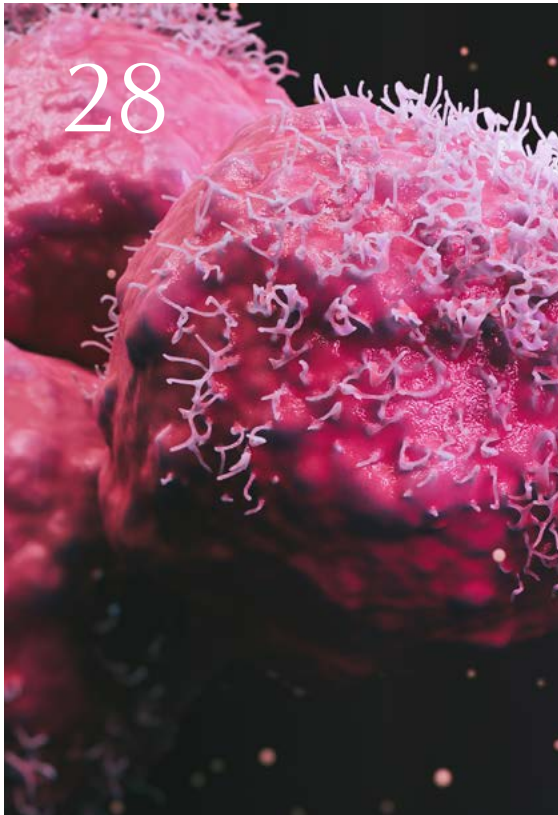


PHOTO: ISTOCKPHOTO.COM - KOTO_FEJA

Malignant tumours often disguise themselves to evade the immune system and grow undisturbed.

Legal notice

PUBLISHER

Communications Office of HHU Düsseldorf in cooperation with the Office of the Vice President for International Relations and the International Office, Universitätsstraße 1, 40225 Düsseldorf

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vista – Digital Brand Content Design
www.studiovista.de

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Editorial



PHOTO IVO MAYR

Dear Reader,

Research is not really a question of taste, but research does address questions of taste – not least from a natural science perspective: How does taste arise, which substances and neurological mechanisms are responsible for it – and how can this knowledge be used? For example, to create taste synthetically and naturally at the same time: Having the taste of oranges produced by microorganisms rather than actual oranges is both fascinating and a little spooky. Intensive research into such questions of taste is being conducted at Heinrich Heine University. And also into other topics relevant to everyday life and society, as the HHU Magazine reports: on women in the “start-up ecosystem”, on the Mediterranean region and its globalisation, on how tumour cells disguise themselves and on major events and competition law. By the way: The latter topic also relates specifically to the upcoming soccer European Championship in Germany.

HHU is a place for such practically oriented, as well as for fundamental research, which is inspired by input from many sources. Academic productivity and a strong University culture depend on openness and tolerance, as well as the diversity that characterises the campus as a whole – true to the spirit of the University’s namesake, Heinrich Heine. Conversely, the following applies: HHU is no place for hate, incitement and violence. The President of HHU reiterated this important message in her address at the 2024 New Year’s Reception. And that is why this issue of the HHU Magazine includes a report on the event and the keynote speech given by the President.

President Professor Anja Steinbeck stated that extremist movements will not be tolerated at the University – in the spirit of militant democracy. In the words of the President: “We will not tolerate those who wish to misuse democracy in order to bring about its abolition.” Accordingly, all members of the University are called upon to continue practising tolerance, diversity and openness – particularly in times when some are calling these values into question.

I wish you an enjoyable read!

Kind regards,

Professor Dr Stefan Marschall

Vice President for International Relations and Science Communication



“HHU is no place for hate, incitement and violence”

BY CAROLIN GRAPE

More than 600 guests from science, politics and civic society accepted the invitation from the President, Professor Dr Anja Steinbeck, to attend the traditional New Year’s Reception at Heinrich Heine University Düsseldorf. In her speech, Professor Steinbeck spoke about the role and duty of universities, and in particular HHU, as well as the need to stand up for the preservation of a fundamental democratic order. She emphasised that HHU is no place “for hate, incitement and violence”.

You do not need to list all the current crisis situations to realise that the world is becoming more heated. In society and in private life, an “aggressive moralism” can be observed in debate that values perception, impressions and feelings more than facts and analysis, and promises simple answers in a complex world: “Perception is sometimes more important than truth, but it takes more than the moral outrage of individuals to change the world for the better,” says the President.

Universities represent a counterpoint to feelings and perceptions. Scientific approaches are characterised by objectivity and facts, “prejudices, ideologies and doctrines have no place here.” With their research, universities help shape the future of society, as the President commented. And they are key players when it comes to finding solutions to social challenges and securing prosperity.

Handling knowledge

As the second key task, teaching imparts fact-based knowledge that adapts dynamically to the achievements of research and social developments: “Its aim is to equip students with an important skill, namely how to handle knowledge, i.e. to scrutinise and contextualise information.”

Universities prepare people for a dynamic and uncertain world full of opportunities and challenges. “In short, people who are capable of playing an active role in a democracy, i.e. those who do not see the state solely as a

“Prejudices, ideologies and doctrines have no place at the University.”

Professor Dr Anja Steinbeck — HHU President

welfare institution, but who are also prepared to assume responsibility for shaping it.”

To what extent should universities get involved in political debates? Outside the specific case of political discourse within the framework of teaching or science communication, Anja Steinbeck believes that restraint is called for when it comes to political topics: “University managements should refrain from taking a stand on political events.”

Defending university values

With one important exception: When events in Germany or around the world strike universities at their core



In his welcoming address, Mayor Dr Stephan Keller appealed to all Düsseldorf residents to demonstrate moral courage and take a stand for democracy.



600 guests from politics, civic society and the University took the opportunity for dialogue at the reception.

or are so far-reaching that the consequences can be felt directly on campus, “then it is definitely the responsibility of university managements to defend the values the university stands for. They must then also take measures to ensure security on campus. How they do that remains up to them.”

Zero tolerance of extremist movements

The HHU university management – alongside many other universities – naturally expressed its deepest sympathies with all those affected by the war in the Ukraine and the terrible events in the Middle East. Language courses for refugees, grants for Ukrainian researchers, visible demonstrations of solidarity with the hostages kidnapped by Hamas and an increase in the number of security staff in order to prevent disputes among students on campus are also part of its response.

The President clearly stated: “We expect people to treat each other with respect and live in peaceful coexistence on our campus. HHU is no place for hate, incitement and violence. Far-right ideas or other extremist movements will not be tolerated at HHU. Such attitudes endanger our fundamental democratic order, as well as the foundation of free science and teaching – and thus

the University itself. In other words: We will not tolerate those who wish to misuse democracy in order to bring about its abolition.”

In this spirit, President Anja Steinbeck called upon all University members to stand up for the rule of law and against right-wing extremism because: “Democracy needs universities and universities need democracy.”

In his earlier, well-received welcoming address, Mayor Dr Stephan Keller also emphasised that: “Research, science and democracy are being threatened in a similar way and from the same quarter. They have the same opponents – fake news, populist views or extremist ideologies.” He called upon everyone present to take a proactive stance and champion internationality, openness and diversity in Düsseldorf.

“Democracy needs universities and universities need democracy.”

Professor Dr Anja Steinbeck — HHU President



No team spirit

How contracts for major events push the boundaries of competition law

BY VICTORIA MEINSCHÄFER

They are meant to be large-scale celebrations involving happy people: The World Cup and European Championship in soccer or the Olympic Games. Everyone competes fairly and enjoys the occasion, the best win and all the fun naturally brings many benefits for the host cities. Right?

Dr Lukas Höfling sees the situation somewhat differently. The legal expert and dedicated soccer fan completed his doctoral thesis on host city contracts, including an anti-trust law review of such contracts, under the supervision of Professor Dr Rupprecht Podszun (Chair for Civil Law, German and European Competition Law). His thesis looks at the complex networks of contracts governing the agreements concluded between cities/countries and sports associations when they host major events such as the European Championship or the Olympic Games. The results are disheartening: Höfling found a large number of problematic competition law issues, establishing for example that authorities have to conclude contracts they cannot comply with.

(Too) extensive rights for sponsors

In the case of the European Championship, the problem starts right at the top: “UEFA, as the top-level governing body in European football, concludes agreements with the government of the hosting country,” explains Höfling. These contain guarantees, relating to e.g. intellectual property, which includes brand, design and copyright law aspects. “In some cases, the government is undertaking obligations that it cannot actually enter into here,” says Höfling. “These obligations relate to the passing of laws, which is something the legislature is responsible for in constitutional states, not the government.” In addition, according to Höfling’s research, the governments and cities are performing services for the sports associations: “For example, so-called ‘clean zones’ are

established in the cities where advertising options are limited and even the activities of local businesses are subject to significant restrictions. And, ultimately, this all only happens because of the sports associations’ desire to achieve the highest possible marketing revenue and profit from the event.”

Furthermore, the strict rules set by UEFA are aimed at preventing all types of commercial usage of certain terms: “No organisation can prevent all possible types of advertising involving terms in general usage,” says the competition law expert, “yet that is exactly what UEFA and the IOC want to do for terms such as ‘Düsseldorf 2024’ or ‘Olympic.’” According to Höfling’s research, the applicable laws are changed specifically in favour of the sports associations for the duration of major sporting events in the majority of countries. “The sports associations are largely able to stipulate the hosting terms on a unilateral basis – i.e. to employ a ‘take it or leave it’ approach,” says Höfling. “This enables them to gain significant tax breaks and even force through special laws to protect certain terms in some cases.” However, the research also showed that the German government succeeded in pushing through legally compliant guarantees.

The city bears the costs for security

Düsseldorf, which is one of the ten host cities for the next European Championship in summer 2024, has also signed such contracts. Like all the cities, Düsseldorf has to bear e.g. the security costs. The city has undertaken not to permit any advertising by non-UEFA advertising partners within an approx. 500 m radius of the stadium and around fan zones. Only UEFA-approved public screenings are to

“No organisation can prevent all possible types of advertising involving terms in general usage.”

Dr Lukas Höfling — legal expert

“The power wielded by the EU should not be underestimated. Sport should not be left to the mercy of the autocrats.”

Dr Lukas Höfling — legal expert

be permitted. “With this, UEFA is stipulating rules for people and companies who are not contractual partners of UEFA,” says Höfling. “And that is not really allowed. UEFA is instrumentalising the sovereignty of the city to protect the business interests of its official sponsors. No other company is in a position to do that.”

Viewing confidential contracts

Many suspect that such legal issues exist, but to date the signed contracts have largely been shielded from the public. “Within the framework of his doctoral thesis, Lukas Höfling has succeeded in viewing the contracts, which are classified as confidential,” says his doctoral supervisor, Professor Podszun. “Höfling has made numerous documents accessible and gained access to information through painstaking research. This is a great achievement within the framework of a doctoral thesis, but a rare one in the field of law. He has therefore done the public an important service.” The contracts that the cities conclude with UEFA are not actually public. Only a few sample contracts have come to light to date. However, within the framework of his thesis, Höfling succeeded in viewing the contracts – thanks to the Freedom

of Information Act (*Informationsfreiheitsgesetz – IFG*). “The city of Düsseldorf was very cooperative,” the legal expert stresses. “It was the confidentiality obligations imposed on the cities by UEFA and the German Football Association (DFB) that made gaining access difficult – only certain parts of these contracts are published, even though they are clearly important not only from a socio-political, but also from an economic point of view.”

Of course, no city has to sign the sample contracts as they are, but what happens to those who do amend them is something that the city of Bremen experienced: It was one of the 18 cities that applied to host matches, but their application was unsuccessful. “Although, obviously, nobody knows exactly why that was,” says Höfling.

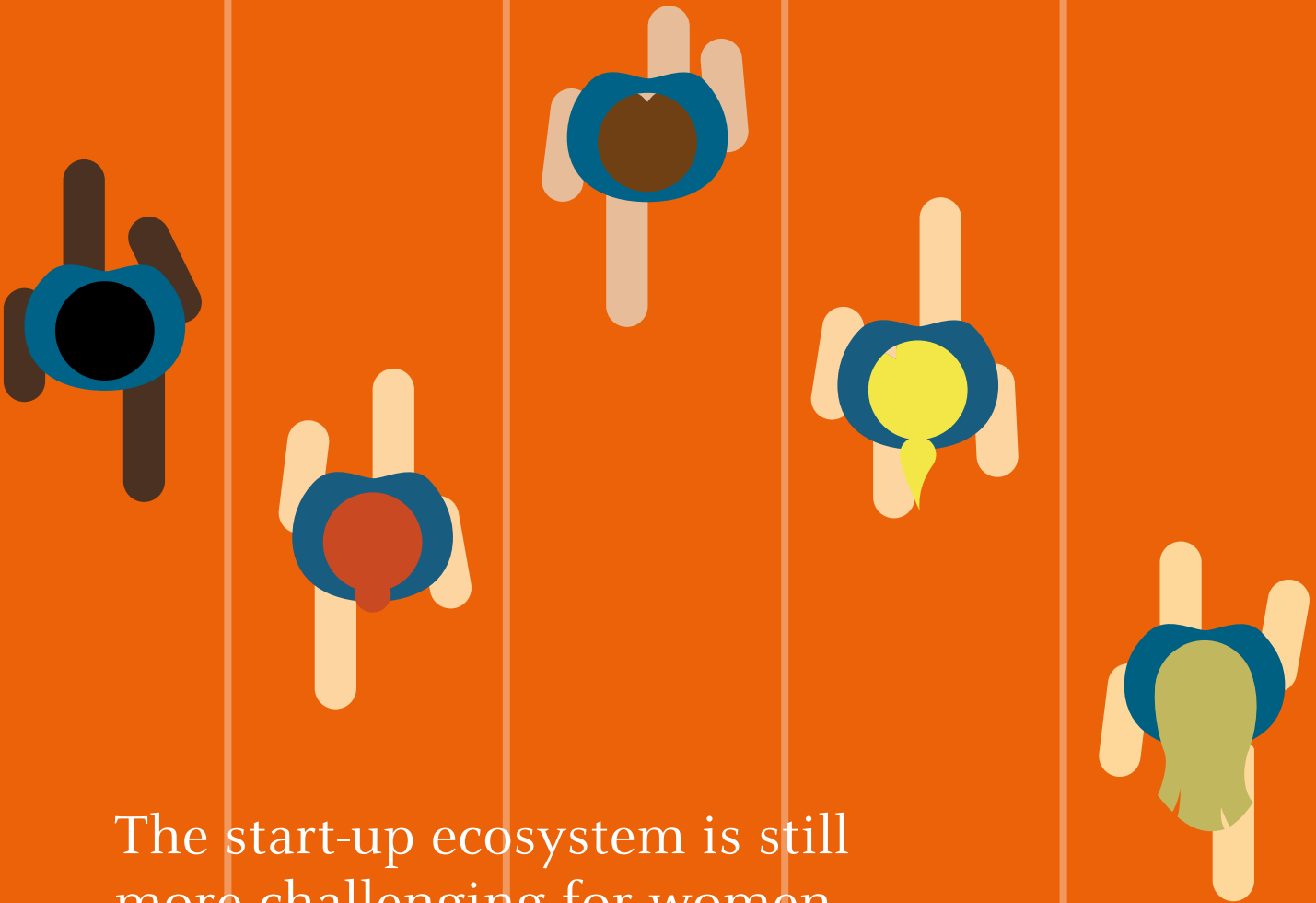
So what should be done? Is there a way to create an appropriate foundation for this legally difficult situation? Höfling clearly sees European antitrust law as a promising starting point. “That applies uniformly throughout Europe, giving the EU Commission opportunities to create long-term, Europe-wide rules, e.g. via non-binding sample guarantees that meet the requirements of antitrust law. The sports associations could also be involved in their development. The power wielded by the EU should not be underestimated. Sport should not be left to the mercy of the autocrats.”



Where will you be watching this time? Fans watched the German national team's first match in the 2014 World Cup against Portugal at a public screening in the fan park between the Brandenburg Gate and the Victory Column in Berlin.

PHOTO PICTURE ALLIANCE – SVENSSON

Ready, steady, start-up?



The start-up ecosystem is still
more challenging for women

BY CAROLIN GRAPE

Although women are almost as keen to found companies as men, only around 20% of start-ups are in fact founded by women. There are a number of reasons for this imbalance, one of which is statistically verifiable discrimination when it comes to funding.

And money is quite simply the deciding factor,” says Professor Eva Lutz, holder of the Chair of Business Administration, esp. Entrepreneurship and Finance. Under the same prerequisites and in the same sector, it is frequently much more difficult for female founders to find investors and obtain the necessary capital than it is for their male counterparts. According to the KfW Entrepreneurship Monitor, a total of almost four billion euros in venture capital funding was paid out in 2021: 91% of this went to male founders, 7% to mixed teams and just 2% to women.

Unconscious gender bias

The expert is researching the reasons for this: “I am interested in the interdependencies and dynamics on the market.” She explains: “Capital providers are more likely to see women as ‘young and inexperienced’. By contrast, men are seen as ‘visionary and promising’.” Where do these gender clichés come from?

Interestingly, start-up ideas are judged neutrally when initially presented on paper: The numbers of men, mixed teams and women invited to pitches are proportional to the number of applications. However, when it comes to funding commitments after the presentation of start-up ideas in person, it is a completely different situation. Men are frequently provided with a much larger volume of capital than women, according to the expert. The question is: What happens in between?

A comprehensive field study with a large dataset has examined exactly this question. Actual pitches made to venture capital investors by technology start-ups at the annual TechCrunch Disrupt in New York between 2010 and 2016 were analysed, along with the subsequent questions and funding commitments. The results make it clear: Capital providers ask female founders

different questions to male founders following their presentations. Male entrepreneurs are more frequently asked to explain their vision and the development potential for their business idea. Women are more likely to be asked how they assess risks and how they intend to deal with difficulties. And they are asked about their personal situation more frequently.

“We can see a gender bias in the questions from investors – irrespective of the gender of the person asking the questions.” However: “When a woman responds to a question typically addressed to a woman with an answer that would be more appropriate to a ‘male’ question, the differences in investment decisions level out,” says the start-up expert.

The analysis is encouraging as female founders can “turn the conversation around and influence it by the way they respond to questions. And that can be learned.” The important thing is to be aware of this unconscious bias and behave accordingly.

In addition to behavioural training, Eva Lutz lists other strategies women can employ as future entrepreneurs in order to assert themselves better in this male-dominated

“Capital providers are more likely to see women as ‘young and inexperienced’. By contrast, men are seen as ‘visionary and promising’.”

Professor Eva Lutz — economist

“We want to support them in their desire to found start-ups and promote their entrepreneurial talents.”

Isabell Nethke – Deputy Head of CEDUS

sector: “Be aware of your own strengths, talk to lots of people about the plans, sound out how much money and time people are willing to invest, do not be afraid of failure. Think big!” This is the tip for women when pitching.

CEDUS as a point of contact

These are all methods that can be learned and which are taught at the Center for Entrepreneurship Düsseldorf (CEDUS) – the point of contact at HHU, which offers intensive advice for students, graduates and researchers planning to start their own business. A special incubator programme for women interested in founding their own

business was launched at CEDUS in January 2024. It is financed via the new “EXIST-Women” funding line provided by the Federal Ministry for Economic Affairs and Climate Action. Isabell Nethke, Deputy Head of CEDUS, is managing the project: “We selected ten women and their start-up ideas, including e.g. digitalisation in pathology, future skills to get children ready for tomorrow and the development of sustainable and personalisable pet urns. We want to support them in their desire to found start-ups and promote their entrepreneurial talents. All projects should be realised in the course of the year.” The funding comprises a three-month grant (of up to €3,000), tailored support in developing the content of their idea, as well as practical workshops and networking opportunities. Over the coming months, the women will also receive support from personal mentors who have already established their own companies.

EXIST-Women: New funding line for women

“The programme is tailored precisely to the challenges faced by female founders and is aimed at strengthening their potential. In addition to the development of a business plan or marketing skills, topics such as resilience and dealing with unconscious bias are also on the agenda, as it is important that all areas of the start-up scene become more diverse,” stresses the start-up advisor.

Kick-off meeting for the EXIST-Women programme at HHU: The founders and their mentors.

Front (from left): Sarah Maria Volkmann, Isabelle Tebrügge, Lissa Schwarz, Dr Yvonne Thielmann, Larissa Felicitas Flügge, Diane N'Dah, Lena Ehrenpreis, Serena Livia Backschat, Asma Ben Janete

Back (from left): Inga Land, Anna Burger, Kira Kossi, Beatrice Fehling, Anne Porst, Julia Stellmann, Alexandra Holder, Verena Stehl





Tasty? Microalgae are
when it comes



true all-rounders
to taste

BY VICTORIA MEINSCHÄFER

We can differentiate between five different basic tastes with our tongues: sweetness, sourness, saltiness, bitterness and umami, i.e. savouriness. This is because our tongues have corresponding receptors, which identify the molecules in our food and communicate their presence to the brain. It is highly likely that a sixth basic taste also exists – namely fattiness – but research into this is still ongoing. Further taste receptors can be found in the nose and elsewhere in the body, where they influence the immune system and metabolism. But how does the taste actually get into our food – why does an apple taste like an apple and a pear like a pear, while a piece of horseradish tastes completely different? This is due to aroma compounds, so-called plant secondary metabolites.



PHOTO PAUL SCHWADERER

Plant secondary metabolites can be sustainably produced in microalgae – an important raw material for the future.

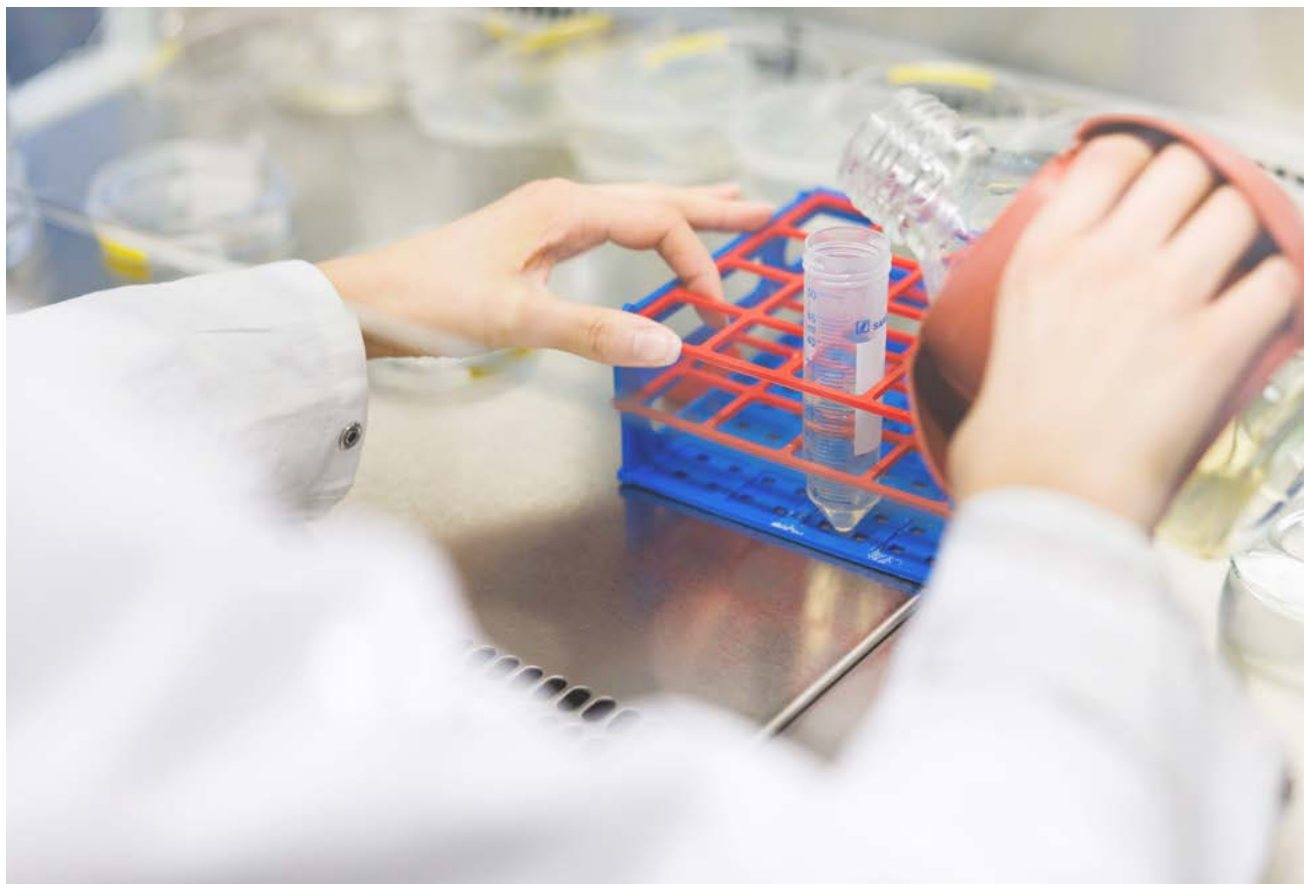


PHOTO CHRISTOPH KAWAN

Terpenes are plant secondary metabolites. The exact composition can be analysed by means of chemical processes.

Professor Dr Ilka Maria Axmann is a biologist and biotechnologist, and head of the Institute for Synthetic Microbiology. Within the framework of the “ValenCell” project (large-scale production of valencene by photoautotrophic microalgae), which has received funding of around €490,000 from the Federal Ministry of Education and Research (BMBF), she is examining plant secondary metabolites, which are responsible for taste and colour, among other things, and also have a wide range of other functions. “The taste of food provides important information about its composition,” explains Axmann. “When we taste something sweet, we know that we are consuming high-calorie food, i.e. easily accessible energy. When we taste something salty, the body knows that necessary electrolytes are being provided.”

Once the food touches the tongue, the receptors there register the flavours and forward the information to the brain via signalling chains. “The receptors are arranged in groups. The papillae are the red dots on our tongues that we can see with the naked eye.” When the

food is chewed, further molecules are released and pass through the throat into the nose, where further receptors are located. “You taste with your nose when chewing,” says Axmann. Important: For each flavour molecule, there is always just one receptor that can perceive it. Taste as a whole comes from the interaction of various flavour ingredients that originate primarily in the plant secondary metabolites in an item of food.

Communication by means of very complex chemistry

“Plants have a highly complex chemical signalling network, which they use to interact among themselves and with the environment. Secondary metabolites play a central role here. Plants can use aromas to attract insects, as a means of defence or to communicate with each other over distances of many kilometres,” says the biologist. There are more than 100,000 of these plant secondary metabolites, including pigments and



“Plants have a highly complex chemical signalling network, which they use to interact among themselves and with the environment.”

Professor Ilka Maria Axmann — biotechnologist

aroma compounds, as well as phytohormones or vitamins. Research has only been conducted into a fraction of these metabolites, such as terpenes, which Professor Axmann and her research group are working with. The greatest variety of terpenes can be found in plants. They include volatile organic compounds, which often have a strong odour, as well as pigments (such as carotene) or phytohormones. “Terpenes are isoprene compounds, i.e. they have a framework that consists of five carbon atoms,” explains Axmann. “It is like a Lego brick that is produced by the cells. De-

pending on how many of these isoprene ‘bricks’ they comprise, they are referred to as monoterpenes (such as the substance responsible for the fragrance of geraniums, geraniol), sesquiterpenes (e.g. valencene, the aroma of oranges) or even polyterpenes (such as in tree sap).” The name “terpene” comes from the tree sap, turpentine. Research into this class of substances has been honoured with multiple Nobel Prizes.

Many terpenes occur naturally in the chloroplasts of plants. However, they can also be produced on a biotechnological basis in microalgae, which include cyanobacteria. Axmann is particularly interested in these microorganisms. “Cyanobacteria are closely related to the chloroplasts of plants in evolutionary terms. They are becoming increasingly important in biotechnological applications and for the generation of sustainable energy. Cyanobacteria are also known as blue-green algae and can photosynthesise in the same way as plants, using light as a source of energy. However, they do not have a cell nucleus and are thus classed as bacteria.”

Living on carbon dioxide and light

Cyanobacteria can be found everywhere – in the desert and in the Arctic, in the oceans and bodies of standing water, and on the campus of Heinrich Heine University. “They can live on carbon dioxide and sunlight, meaning that they are found at the start of many food chains. They have been adding oxygen – the air we breathe – to the atmosphere for more than three billion years.”

Axmann is producing terpenes, i.e. flavour and aroma compounds, using genetically modified cyanobacteria. “It is very simple,” the biologist says. “Increasing amounts

Synthetic biology tools make it possible to utilise cyanobacteria for the sustainable production of plant terpenes.



PHOTO PAUL SCHWAEDERER

of plant DNA have been precisely analysed, meaning that we have blueprints for the terpenes. So, we can copy the parts of the DNA responsible for the production of aromas from plants and insert them into the bacteria. To achieve this, we are utilising the virtually unlimited possibilities offered by synthetic biology that allow us to replicate, modify and recreate, i.e. synthesise, DNA. Cyanobacteria naturally assimilate external DNA and – thus reprogrammed – start to produce the desired substance.”

Sun worshipper

Microalgae like warmth and around 30 degrees Celsius is the ideal temperature for them to flourish. They then multiply by cell division and produce the programmed substance, e.g. the terpene valencene, an aroma component of citrus plants. The valencene can be separated from the microalgae using an organic

solvent such as oil. The oil absorbs the valencene and floats on the water, where it can be skimmed off.

A successful major research instrumentation proposal resulted in a 4-laser cell sorter

This can be seen on a small scale in the laboratory of Professor Axmann. In small vessels, the microalgae multiply and produce various substances. “In southern Europe and above all in Asia, there are large-scale plantations where algae are cultivated in huge saltwater pools using only sunlight and carbon dioxide from the air or connected power stations,” says Axmann.

A new piece of equipment at HHU, which was procured last year via a successful major research instrumentation proposal, is helping the research. The so-called 4-laser cell sorter enables different living cells to be

Ilka Axmann explains: “We can optimise the valencene production of the microalgae in photobioreactors.”



PHOTO PAUL SCHWABERER

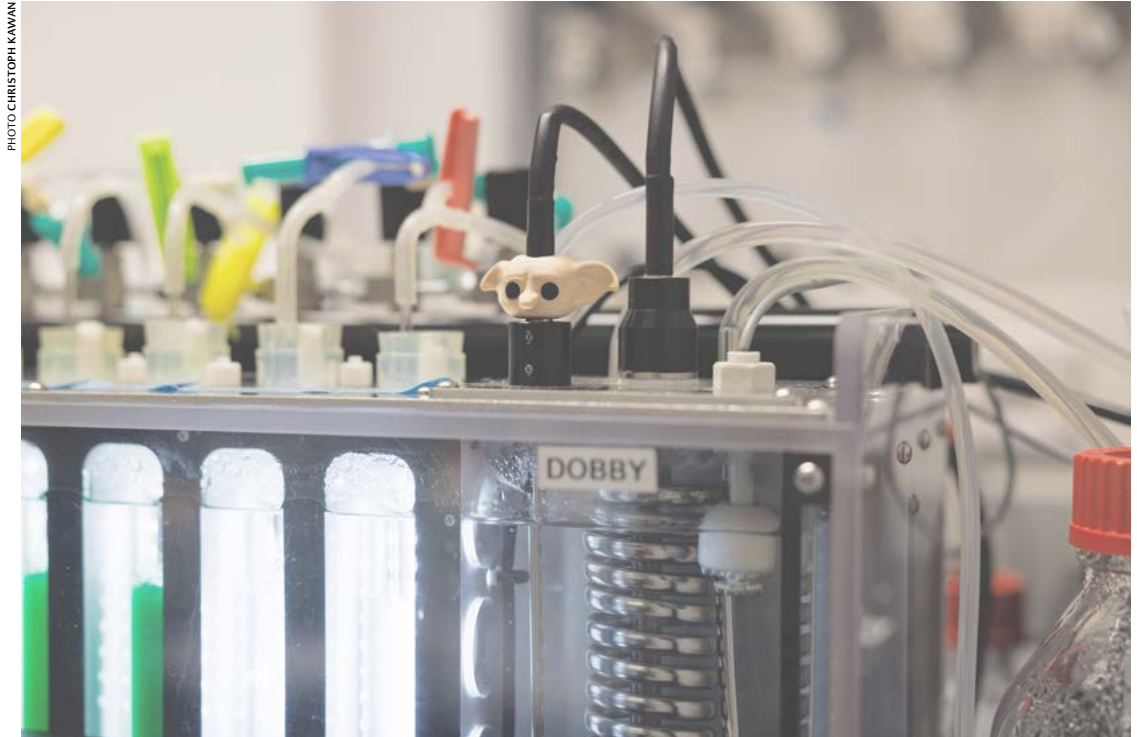


PHOTO CHRISTOPH KAWAN

The targeted variation of light and CO₂ quantities increases the valencene production rate.

“The microalgae can be cultivated in saltwater or waste water, meaning that they are not competing with agricultural land and food production.”

Professor Ilka Maria Axmann — biotechnologist

individually analysed, sorted and separated at high speed. This is achieved by guiding the cells through a thin glass tube past an optical measuring system, which contains four lasers. “This enables us to determine form, structure and fluorescence, and the resultant properties

of the cell. The cells, which are then individually packaged in droplets, are separated in an electrical field and subsequently sorted into different containers,” explains Axmann.

The device can for example be used to monitor co-cultures of fluorescent cyanobacteria and fungi in order to understand signalling and nutrient networks within symbiotic communities of different species. Axmann: “However, we

also want to use it to characterise our cyanobacteria that we are using for the production of plant secondary metabolites.”

Axmann believes that the production of aroma compounds using microalgae opens up many new

opportunities for biotechnological production: “The microalgae can be cultivated in saltwater or waste water, meaning that they are not competing with agricultural land and food production.

New opportunities for biotechnological production

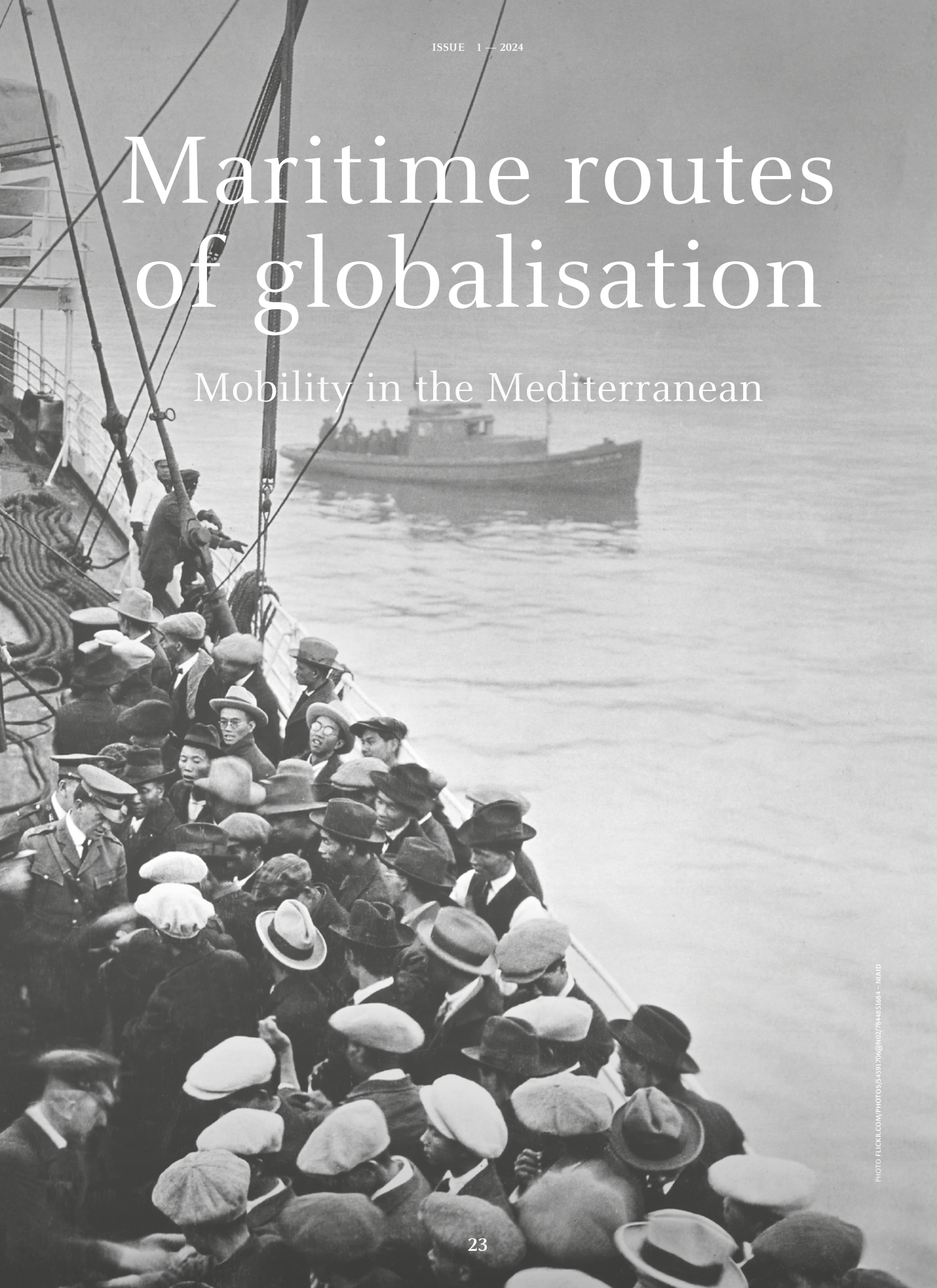
The new research field of synthetic microbiology is thus enabling the innovative use of this important group of organisms as cell factories for the production of important chemical compounds, among other things.”

Professor Dr Ilka Maria Axmann, head of the Institute for Synthetic Microbiology, studied biotechnology at TU Berlin. She gained her doctorate in molecular biology at Humboldt University Berlin in 2006. She has had her own research group since 2009. In 2013, she was appointed CEPLAS Junior Professor at HHU Düsseldorf, where she has been a W2 professor since 2019. Her research focuses on cyanobacteria and their control by means of synthetic tools for sustainable, phototrophic production.



Maritime routes of globalisation

Mobility in the Mediterranean



BY VICTORIA MEINSCHÄFER

Steamships and boats, transporter and other bridges, the Suez Canal or minor rivers – they are all in focus in the MEDMACH research project (*Machinery Rooms of the Mediterranean, 1800 – present: Images and Visual Archives of Movement and Acceleration*). In this project, which has received an ERC Grant of two million euros, the art historian Professor Dr Eva-Maria Troelenberg examines borders, differences and similarities in the region surrounding the Mediterranean Sea. Over a period of five years, Professor Troelenberg and her team will focus on previously overlooked and neglected places, perspectives and narratives, and analyse images of infrastructures and machineries of acceleration.

One key question in this consideration of the region is: “Do we perceive the Mediterranean as a homogeneous, connecting or dividing region?” says Professor Troelenberg. “When industrialisation began, this question became particularly pressing – namely precisely when acceleration at a technical level made it possible to cross borders more quickly”. Yet, despite quicker means of transport such as rail and steamship, and despite the Suez Canal, which opened up new routes, the perception of the region as a single entity became less common. “This is due to nation building and colonialisation,” explains Eva-Maria Troelenberg. “The emerging concept of nations had a fragmenting effect on the Mediterranean

region.” Despite – or because of – this, the researcher has taken the Mediterranean region as a frame of reference for a range of questions. Images showing infrastructures and machineries of acceleration from there are being examined.

Not just postcard motifs

“Images” in this case largely constitute photographs, both black-and-white and later colour, but other things such as oil paintings or films are naturally also included, as are postcards, which became popular during the period of industrialisation. “The railway bridge, which connects the

With the Orient Express, you could cross Europe from Paris to Constantinople, while the Taurus Express connected Turkey with Syria and Iraq.

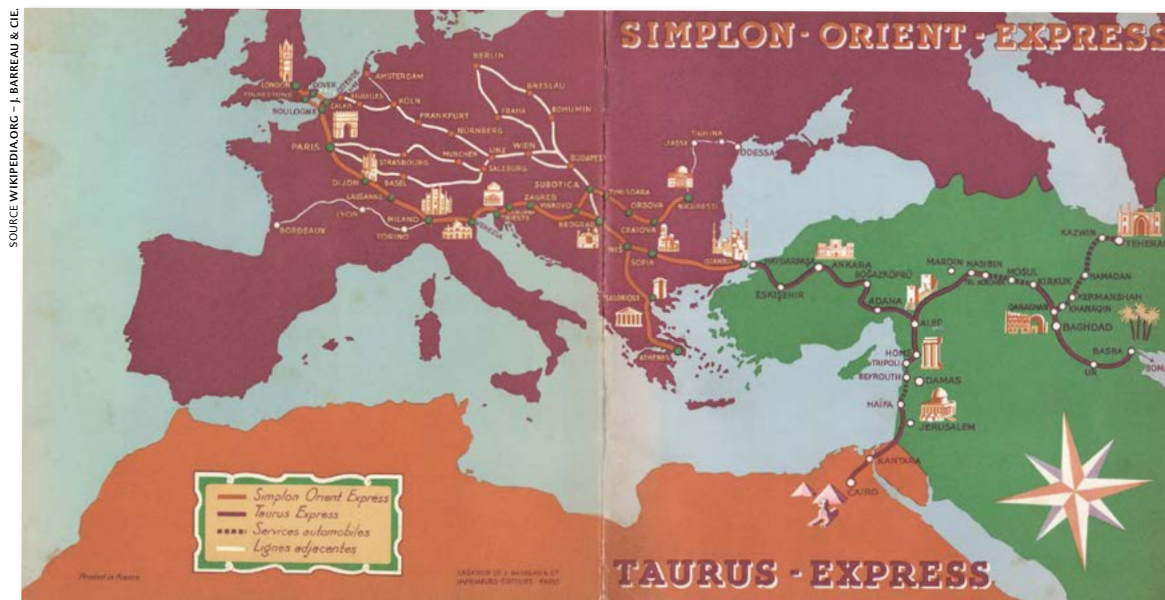




Image of a postcard showing the channel out of the Old Port and the transporter bridge in Marseille, ca. 1920.

Venetian lagoon with the *terra ferma*, was only very briefly considered worthy of picture postcard fame after its completion in 1846,” says Troelenberg. However, it is the perfect symbol for what is being researched here: The postcard comes from a particular place, is intended for somewhere else and in this case shows motifs focusing on acceleration.

Marseille – gateway to America and starting point for deportations

However, before images of acceleration can be analysed, Eva-Maria Troelenberg, Anna Messner, Argyrios Sakorafas and Shraddha Bhatawadekar, supported by research assistant Pardis Nosratpourian, have to actually find them. “We search for corresponding archives, whereby the term ‘archive’ is used very broadly here,” says Troelenberg. “It can constitute anything from national archives to a box of photos under the bed.” This is something that Anna Messner has also found during her work on a sub-project covering the Jewish history of Marseille. “The port city of Marseille is the gateway to the transatlantic route, but also to Morocco, Tunisia and the Middle East,” the art historian says. A city with many transit points, Messner is examining mobility and immobility in the major port of Marseille.

“On the one hand, during the Second World War, ships departed from here heading for freedom, yet on the other hand, the Old Port was also the site of deportations. The Jewish population was rounded up here and sent to the concentration camps in the east.” Images of this can be found in the Federal Archives, as the Nazis documented the deportations photographically in meticulous detail. And they chose a location for this, which was highly symbolic in France in the early 20th century. “There used to be a transporter bridge for people and goods in Marseille, the ‘Pont Transbordeur’, and it was as much of an icon at the time as the Eiffel Tower,” says Messner. In 1943, German troops blew it up and the destruction of this monument was also deliberately documented in images.” In addition

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Anna Sophia Messner — art historian

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Professor Dr Eva-Maria Troelenberg — art historian

to these photos that can be found in the Federal Archives, there should also be photos in Marseille itself, but these are not so easy to locate. “The city has a small archive on Jewish history, but gaining access is difficult,” says Messner. “Here, it is important to get to know people and establish trust in order to gain access to small, private archives.”

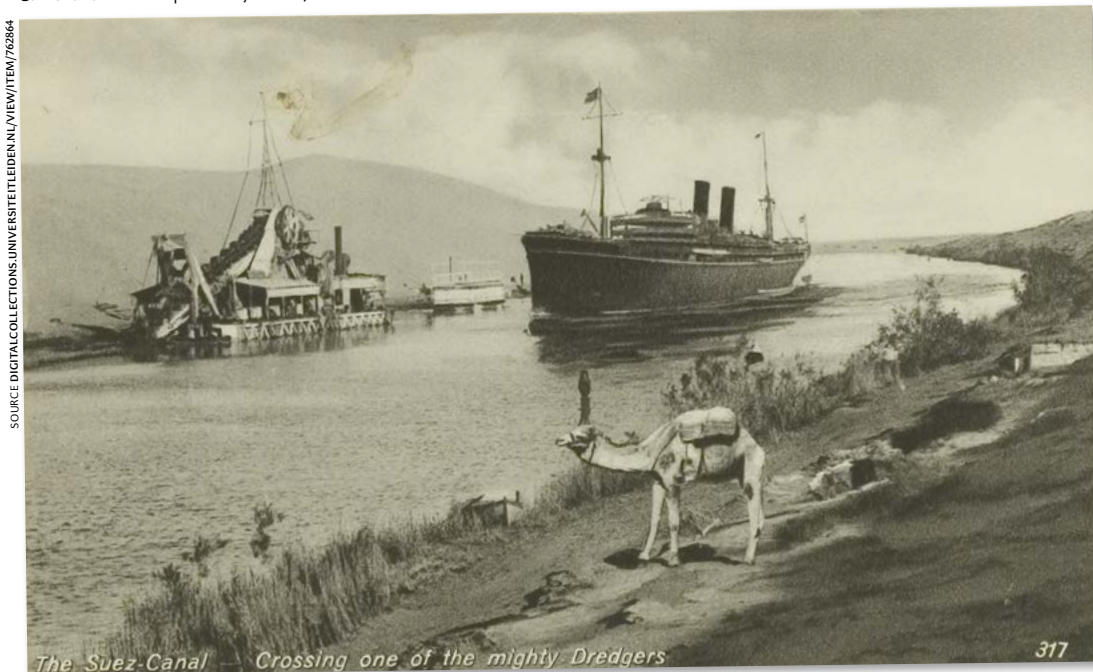
The meta-topic of “handling archives” is an important sub-project of MEDMACH. “We want to examine and document what it means to work with archives in the Mediterranean region,” says Troelenberg, who would also like to organise a conference on the topic later on in the project. Alongside other publications, the aim is to bring out a handbook on researching and using visual archives in the Mediterranean region at the end of the project.

Steamships made travel by sea much easier from the early 19th century onwards. Argyrios Sakorafas focuses on this topic. The PhD researcher is working with images taken of and on steamships. “Two very different topic areas are covered in the photographs: the magnificent ships and the life of workers on these ships.” Sakorafas is also exploring archives in a wide range of countries as, on the one hand, they were linked by the ships while, on the other hand, the workers came from diverse countries and also distributed photos far and wide.

From Iran to Ingolstadt

The three-part film “*La via del petrolio*” (“The Oil Route”), directed by Bernardo Bertolucci, which was commissioned in 1967 by the Italian industrial group ENI (known as AGIP in Germany), also focuses on the workers. “The film shows the route taken by the crude oil from its discovery and transportation to its refining,” says Troelenberg. It is fascinating because on the one hand, it offers a very different perspective on this fossil fuel, which we view critically today of course – here, the extraction, refining and processing of crude oil is celebrated as a masterpiece of civilisation. On the other hand, the film links faraway Iran, where the oil is extracted, to the refinery in snowy Ingolstadt. “Workers – from those involved in oil extraction

Camel and steamship virtually side by side – the Suez Canal was a frequently photographed motif.



SOURCE: DIGITAL COLLECTIONS: UNIVERSITEIT LEIDEN, NL/VIEW/ITEM/702864



A postcard showing the ocean liner “Viceroy of India”, which went into operation in 1928. The luxurious ship offered an indoor swimming pool.

in Iran and those responsible for unloading the ships in the port of Genoa, to those in Bavaria – are portrayed in a highly stylised way. The film presents a global community of workers.”

Enthusiasm for technology

Troelenberg herself is working on another sub-project on the Suez Canal, which has connected the Mediterranean with the Red Sea since 1869. “You can see the enthusiasm for technology and interest in large-scale travel right from the outset,” she explains. “Following its opening, the Suez Canal became part of every Grand Tour.” Consequently, it is very well-documented photographically, with many pictures in the photo albums made of the tours undertaken. And it was an extremely rewarding photographic motif. “Many of these photos show a large ship on the Canal in a central perspective. With camel trains going past on the left- and right-hand sides, it seems like the ship is moving through the desert.” For its part, Egyptian artistic modernism responded with its own take on this motif of the Suez Canal and contributed the perspective of local workers.

The Mediterranean can also be seen as a transit region, which opened up further links to India via the Red Sea.

This corridor is important for the examination of migration and exchange processes, as a region of colonial encounters and negotiations. And this is what Shraddha Bhatawadekar is concentrating on in her sub-project. She is considering the Indian postal route from London to Bombay via the Suez Canal and the visual stories and portrayals connected with this dynamic route.

Interconnections up to the present day

The continuing relevance of the Mediterranean today, with its regional mobilities and global interconnections, was demonstrated in 2012 when the Costa Concordia cruise ship ran aground in the Tyrrhenian Sea. “For over two years, the surreal image of the ship embodied the excess of fossil fuel driven mass tourism and decadence,” says Troelenberg. “It very quickly became an icon of cultural decline, as it even featured symbolically in Paolo Sorrentino’s film *‘La Grande Bellezza’* (‘The Great Beauty’). At the same time, the modest shipwrecks left behind by migrants in the ship graveyard of Lampedusa are a monument to the dire reality of Mediterranean migration today.”

Well hidden

Tumour cells are often masters of disguise

BY JÖRN GRABERT

Malignant tumours often disguise themselves to evade the immune system and grow undisturbed. New cancer therapies – so-called immunotherapies – make it possible to overcome these disguise mechanisms and make tumour cells visible to the immune system again. Oncologist Professor Dr Sascha Dietrich, head of the Department of Haematology, Oncology and Clinical Immunology at University Hospital Düsseldorf, presents promising immunotherapy processes.

There are many ways in which a tumour can make itself invisible,” says Professor Dietrich. “We are learning more about how this disguise mechanism functions and we are working to make the tumour cells visible again,” i.e. visible to the person’s own immune system. This is because “visibility” is a key prerequisite for the body’s own immune cells to be able to act against cancer cells.

Currently, the standard cancer therapy is chemotherapy. It is targeted at very active tumour cells and – in the best-case scenario – destroys these cells throughout the body. However, it is not possible to tailor chemotherapy to attack only tumour cells. Healthy cells are also always affected, resulting in side and knock-on effects.

“However, the immune system is a strong partner when it comes to fighting cancer in a highly targeted way,” says Dietrich. Researchers all over the world – including Düsseldorf – are therefore working to find starting points for cancer treatments and develop therapies based on the body’s natural defences. They are seeking special properties of tumour cells as identification features, which can be used to ensure that treatment will only have an effect where it is supposed to.

Immune checkpoints are one of these starting points. Immune cells, more accurately: T cells, use receptors on their surface to determine whether another cell should be classified as one of the body’s own healthy cells or a dangerous, diseased cell according to the key-lock principle. Under normal circumstances, this mechanism ensures that natural defence measures – such as inflammation – do not have an uncontrolled effect on the body’s own tissue. Cancer cells exploit this principle and have in many cases developed the ability to disguise themselves as harmless cells, enabling them to avoid attack by the immune system. So-called immune checkpoint inhibitors reduce the ability of immune cells to receive “all-clear” signals from the cancer cells. As a consequence, the immune cells attack the tumour cells.

CAR T cell therapy

CAR T cell therapy also boosts the immune system, but takes a broader approach. Blood is taken from the patients. The T cells are isolated and genetically engineered to create so-called CAR T cells. The surface of these cells is modified to improve the receptors, enabling the cells to identify and fight tumour cells better. The modified CAR T cells are produced specifically for the patient and administered

via infusion. The two aforementioned therapies are only approved for use against certain types of cancers. In the case of CAR T cell therapy, the tumour cells must also possess further specific properties to ensure effectiveness.

Significantly better identification of cancer cells

The greatest advances are currently being made in the area of so-called bispecific antibodies, which are produced synthetically in the laboratory. As soon as they have been administered to the patient, they start to bind with both immune cells and tumour cells, thus bringing the two “adversaries” close together. This is enough to activate the immune system as a whole and significantly improves identification of the cancer cells. This targeted therapy utilising bispecific antibodies cannot be used for all types of cancer yet either. “It can however be expected that the many research activities addressing this topic will lead to an increase in the areas of application,” believes Professor Dietrich.

Research on immunotherapies to date has concentrated on the properties of tumour cells and their ability to avoid attack by the immune system. “The fact that the immune system does not work in the tumour may however also be due to the immune cells found there,” says Professor Dietrich. This is the focus of a current research project at University Hospital Düsseldorf, which is examining malignant lymphomas (lymph node cancer). Using state-of-the-art techniques that enable many thousands of properties of individual immune cells to be determined – so-called single-cell sequencing – Professor Dietrich and his team of researchers have been able to demonstrate how a tumour changes immune cells. This research work will enable the development of new immunotherapies and models to forecast which patients will respond best to which immunotherapies.

A preprint on this topic entitled “Multimodal and spatially resolved profiling identifies distinct patterns of T-cell infiltration in nodal B-cell lymphoma entities” has already been published.



PHOTO UNIVERSITY HOSPITAL DÜSSELDORF

Professor Sascha Dietrich is working on making tumour cells visible.

→ <https://www.biorxiv.org/content/10.1101/2022.11.04.514366v3>



Haus der Universität

The *Haus der Universität* is a place of dialogue and exchange between science and society – in the heart of Düsseldorf. After extensive renovations, the van Meeteren Foundation kindly allowed Heinrich Heine University to use the building at Schadowplatz 14 as an event centre and, since 2013, as a venue for scientific conferences and for presenting university research and teaching

as well as academic culture. The *Haus der Universität* takes on a central function for Heinrich Heine University at the interface between science and public. It is part of the higher-level public engagement strategy being pursued by the university, which actively furthers the exchange between the city of Düsseldorf, its citizens as well as society as a whole.

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