



2021 Sustainability Report

> Rallying for Sustainability

„Social responsibility is one of our most important strategic guiding principles. As a practice-oriented university, we translate these words into action. Thanks to our Sustainability Strategy, we now have a master plan in place for becoming one of the most sustainable universities in the country – thereby living out social responsibility in practice. Our aim here is to serve as a role model for many other organizations in our society“

Prof. Dr. Frank E.P. Dievernich
> President
Frankfurt University of Applied Sciences



„Our mission and challenge is to provide responsibly minded and responsibly acting students with a quality education in preparation for the job markets of tomorrow. This takes place in various strategic areas in which we as a university are genuinely committed to establishing and implementing sustainability.“

Prof. Dr. René Thiele
> Vice President for Academic
and International Affairs



„Time is of the essence. It is incumbent on us as a University to position ourselves at the forefront of the sustainability movement and to develop sustainable solutions through research and education for climate protection and environmental regeneration.“

Prof. Dr. Martina Klärle
> Vice President for Research,
Further Education and Transfer



„Join me in exploring this University with all your senses and seize the opportunities to act sustainably.“

Dr. Bert Albers
> Chancellor



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Sustainability

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> Sustainable as a Matter of Principle

As a University, we have a special responsibility to resolutely live out sustainability in practice across all levels and to harness it for society's gain. The pandemic has made it further abundantly clear: our future will depend on how sustainably we choose to live going forward.

We take our social responsibility very seriously in this point: we actively instill in our students the principles of sustainability so that they can embody it in their professional lives. We carry out sustainable research projects for the betterment and enrichment of society. To succeed in our mission, we as a University are committed to systematically promoting sustainable action: both in our mobility behavior and in our use of resources.

Our main objective is to provide young people with an academic education, and we take this responsibility to heart when, to begin with, we embed social awareness for the importance of sustainability early on in our curricula. This enables us to lay the foundations for young graduates to actively incorporate the principles of sustainability in their future professional lives. Still, that in itself is not enough. **As institutions in their own right, universities and their staff fulfill an important role model function in this regard: sustainability has to become highly visible. And it must be lived out in practice.**

Research is another key area for systemically advancing the concept of sustainability. **Research projects with a clear focus on sustainability serve two key functions: they raise awareness among researchers and students; and they actively contribute to making society more sustainable.** Not only renewable energies and mobility ("cycling professorship") but also planning and construction, as well as computer science, are areas in which Frankfurt UAS conducts extensive research with a particular focus on sustainable aspects – and with high academic reputation.

Our Sustainability Strategy – reproduced in full below – sets the framework and priorities both for our actions and for our goals. Our Sustainability Strategy was developed and completed last year under less-than-favorable conditions and with the broad participation of the members of Frankfurt UAS. It gives me particular pleasure to report that our students provided pivotal impetus here: they not only campaigned for greater sustainability but also demonstrated exemplary commitment in designing the Strategy. **The broad anchoring within our University indicates that a large majority of University members care strongly about sustainability and evoke an active sense of deeply felt individual commitment and responsibility.** It is vital to have a comprehensive strategy not only as a source of self-reminder but also as a form of self-measure while motivating people to change their course of action.

To be sure, sustainability is not a topic that we happened to discover just this year. **Indeed, our commitment to sustainable thought and action at this University goes way back – in a multitude of areas and on many different levels.** All of these activities are summarized here, for the first time, in this report. **Looking ahead, we can – and want to – interlink these multifaceted activities more closely and actively drive them forward; our actions to this end are guided by our Strategy.**

We used the 6th Hessian Sustainability Day in September as an opportunity – in spite of Corona – to feature the topic prominently at Frankfurt UAS. We got the message!

I hope you have an insightful and instructive read. Stay sustainable!

With best regards,



Prof. Dr. Martina Klärle
Vice President for Research,
Further Education and Transfer

> Our 2021 Sustainability Strategy

Preamble and vision

We have only one home: Earth. Our goal is to permanently protect and preserve our planet in a life-sustaining and democratic environment for everyone.

We acknowledge the global climate emergency and declare it as such for Frankfurt University of Applied Sciences.

Honoring our commitment to being a role model for sustainability while inspiring others to join our efforts, we are driven by our guiding principle: “Develop know-how, shape attitude, become an ambassador.” We impart to our graduates the knowledge and skills necessary to become ambassadors of sustainability in both society and business.

We at Frankfurt UAS work towards developing solutions to the major challenges facing humanity today – “climate protection” and “environmental restoration”. To this end, we are guided by the 17 Sustainable Development Goals of the United Nations.

As a university aimed at powering **opportunities through education** and as stakeholder of the Frankfurt/Rhine-Main region, we proudly champion the implementation of sustainability on both an academic and sociopolitical level.

In the core areas of study, teaching, Continuing Education, research and knowledge transfer, we develop solutions for a sustainable world that is future-ready. We make it a point to deploy resources responsibly – without living at the cost of others.

Our strategic goal is to permanently embed sustainability in our thoughts and actions.

I. Sustainability in Studies and Teaching

As a university, we are committed to implementing and promoting the visibility of sustainability as an interdisciplinary issue cutting across all areas of study. In addition to providing students with specialist knowledge and skills, we offer multidisciplinary content oriented towards sustainability. We equip students with the tools needed to analyze and evaluate environmental, social and economic issues, as well as the skills necessary to address these issues in the context of sustainability.

We learn how to weigh the tradeoff between environmental, social and economic interests of sustainability in a fair-minded way while tackling potential incompatibilities between its various aspects. We hone our conflict management skills and critical facilities to become good ambassadors of sustainability. The close link between teaching and research is constitutive of the cross-cutting sustainability theme.

II. Sustainability in research

We work to create an academic environment promoting research into sustainability and in the process qualify a new generation of graduates in this interdisciplinary field of study. Our research findings are deployed to create solutions for the sustainable development of a future-ready world. Frankfurt UAS explicitly supports research projects advancing sustainability in all its dimensions.

In our efforts to expand and enhance knowledge in the spirit of sustainability, we make it a point to share our research findings wherever possible while ensuring their visibility in the public domain.

III. Sustainability in Continuing Education and knowledge transfer

We see our university as a rich source of sustainability and offer the transfer of our knowledge to municipalities, businesses, government agencies and other social institutions. We help them in their transformation towards greater sustainability by providing support for technical, social and institutional innovations. For transfer services to promote greater sustainability, as a university we offer pertinent cooperation and communication formats.

We regularly conduct Continuing Education programs in sustainability for our alumni and university staff members and for the public at large.

IV. Sustainability in university operations and campus development

At Frankfurt UAS, our transformation process towards becoming a sustainable university is something we take to heart and invite the public at large and the urban community to directly experience sustainability on our campus.

The well-being of everyone on campus is a key priority for us. We ensure that study and working conditions

are conducive to good health – for example, by offering a wide range of varsity sports, as well as facilitating flexible work and study conditions.

Our goal is to achieve fully carbon-neutral university operations by 2030 at the latest.

At Frankfurt UAS we see ourselves as a living laboratory and a model project not only for building, campus and greenspace planning that is future-ready but also for sustainable forms of mobility. Construction projects are being planned, bid and implemented with the goal of carbon neutrality in mind. We are mapping out resource and energy consumption to adapt our behavior and infrastructure as needed.

Sustainable university operations should entail more than simply achieving carbon neutrality. Of equal importance is incorporating a holistic approach to harnessing all resources and processes, including time invested and the personal commitment of each and every individual. We foster the responsible utilization of all available resources in the spirit of sustainability. That is why we are undertaking a review of our administrative and operational procedures, making full use of digitization options.

With regard to procurement and commissioning, our decisions are made particularly with a view to sustainability, thereby ensuring that sustainability is not com-

promised for financial feasibility reasons. As a matter of principle, Frankfurt UAS enters into cooperative arrangements solely with businesses and organizations that are already committed to implementing sustainability – subject to verification wherever possible. We are actively working towards Fairtrade University certification.

V. Institutionalized sustainability

We are in the process of setting up a “**Sustainability Office**” at Frankfurt UAS. It is designed to ensure that all activities relating to study, teaching, research, Continuing Education and knowledge transfer are aligned and coordinated from a sustainability perspective. This also applies to our university operations as a whole. Each faculty and department at Frankfurt UAS must delegate a representative to serve as member of the Sustainability Office. They meet at least twice a semester for the joint development and implementation into performance measures of initiatives emerging from the entire university community.



Prof. Dr. Frank E.P. Dievernich
President



Prof. Dr. René Thiele
Vice President for Academic and International Affairs



Prof. Dr. Martina Klärle
Vice President for Research, Further Education and Transfer



Dr. Bert Albers
Chancellor

For purposes of facilitating the corresponding policy and behavioral readjustments, the Sustainability Office must report on current projects and carbon footprint reduction, including resource and energy consumption, on a relevant platform. The Office must submit an annual Sustainability Report, to be accompanied by a status quo survey and monitoring. The monitoring system is based on indicators and milestones identified within the scope of planned measures.

We provide the Sustainability Office with the requisite resources.

We are in the process of establishing a Sustainability Council to convene at least once a year and provide meaningful input into our transformation process. The Sustainability Council consists of

| four administration representatives (one of whom is a member of the University Directorate)
| four faculty representatives
| four students and
| three external representatives from business and society

and shall elect a chairperson from among its members.

In implementing and further developing our sustainability goals, we are wholly committed to fostering a participatory culture in which students, faculty, researchers and staff members have the opportunity to play a viable role. To this end, the sustainability strategy is updated biannually.

This strategy paper was adopted by the senate of Frankfurt UAS on February 17, 2021 and enacted by the presidium on March 1, 2021.

➤ Develop Know-How, Shape Attitude, Become an Ambassador

The Sustainability Task Force



As part of a bottom-up movement, not only students in particular but also teaching and non-teaching staff holding a variety of positions at our University have taken up the baton of sustainable action – and on their own initiative. Following a number of preliminary discussions, the Sustainability Task Force’s first major round-table conference took place on November 28, 2019, with the goal of bundling these initiatives into a single platform. It has since been working intently on the Sustainability Strategy, which you will find on page 8. The Strategy was born out of 10 workshops devoted to the key thematic areas of governance, environment and society. The Task Force

has summed up its motivation in the guiding principle “Develop know-how, shape attitude, become an ambassador.”

Formulating the Sustainability Strategy is but the first step. The objective will be ultimately realized when the substance of the Strategy is systematically lived out in practice – indeed, when the principles of sustainability guide our thoughts and actions.

We extend our warmest thanks to all those who helped in developing the sustainability strategy.

Governance Task Force

Nils Bauer (S); Prof. Dr. Elizaveta Gardó, Fac. 3 (T); Dr. Sabine Geldsetzer, BeSt Dept. (E); Dr. Margit Götttert, equal opportunities officer (E) (group spokesperson); Prof. Dr. Jens Müller-Merbach, Fac. 3 (T); Dr. Christoph Rosenbusch, QEP (E); Ruth Schlögl, Fac. 1 (E); Ulrike Schmittner, Stuport (E); Kilian Wignonek (S); Inke Worgitzki, libr. (E);

Environment Task Force

Esa Böttcher, Campus Sports (E); Prof. Dr.-Ing. Niklas Döring, Fac. 2 (T); Natascha Hempel, (E); Golo Hermann, QEP (E); Sascha Hippert (S); Walther Hirsch, CBT (E); Prof. Dr. Michael Horstmann, Fac. 1 (T); Caroline Löw, Campus Sports (E); Prof. Holger Marschner, Fac. 2 (T); Lea Menn (S); Prof. Dr. Yari Or, Fac. 4 (T); Prof. Dr. Volker Ritter, Fac. 1 (T); Prof. Erik Röhle, Fac. 1 (T); Prof. Dr.-Ing. Ekkehard Schiefer, Fac. 2 (T); Prof. Dr. Hans Jürgen Schmitz, Fac. 1 (T) (group spokesperson);

Society Task Force

Sarah Maria Braun (S); Prof. Dr. Sebastian Bremm, Fac. 2 (T); Prof. Dr. Gerd Döben-Henisch, Fac. 2 (T); Dr. Sabrina Engelmann, BESt (E); Kristina Gaiser (S); Jasmin Grünwald, Diversity (E); Raul Gschrey, Fac. 4 (T); Dr. Vera Jost, Diversity (E) (group spokesperson); Prof. Dr. Tine Köhler, Fac. 1 (T); Prof. Dr. Michaela Köttig, Fac. 4 (T); Angelika Plümmer, Fac. 1 (T, E); Heiko Schorde, libr. (E); Prof. Dr. Ulrich Schrader, Fac. 2 (T); Philipp Senft, BeSt (E); Sarah Sorge, Fac. 3 (E); Prof. Dr. Stefan Timmermanns, Fac. 4 (T); Prof. Dr. Martina Voigt, Fac. 3 (T)

Coordination

Vice President Prof. Dr. Martina Klärte, Dr. Ulrike Reichhardt, Tatiana Friedel

Initiatives and Ideas for Implementing the Sustainability Strategy

The Sustainability Office will decide their prioritization and ensure their effective implementation to the fullest extent possible.

- > M.A. European Green Deal mapped to interdisciplinary areas (incl. social work)
- > "Life Cycle Thinking" is supported by formal and informal teaching and learning processes embedded in the curriculum, as are ancillary qualifications for sustainable cross-disciplinary studies. Additionally, study programs specializing in sustainability are being developed and accredited.
- > Considering developing a practice-based interdisciplinary study program on climate impact adaptation & regenerative transformation.
- > Considering developing a Green Social Work study program (Faculty of Social Work).
- > Considering offering the large variety of courses through a joint study program on sustainability/regen. transformation (Studium Generale ISG).
- > Practice-based projects, combined teaching and research projects.

Environment Task Force

- > Four cross-disciplinary professorships (1/Fac.) for sustainability
- > Wuppertal Institute model: "Target knowledge, system knowledge and transformation knowledge"
- > Participation in real-world laboratories, including in teaching projects

Environment/Sport Task Force

- > Creating outdoor learning locations

Sustainability Talk

- > Developing a criteria checklist to assess the sustainability of study programs
- > Designing and preparing student project databases to enable further treatment of the topics, including for Service Learning, among others.
- > Horstmann and Rucker-Gramm teaching concept: "Components of tomorrow – graduates of tomorrow"
- > Concept design of reusable lectures, including at the inter-university level.
- > Promoting digitization.
- > Less paper in the teaching setting: in the interests of sustainability, advances in digitization are being integrated into teaching and studies with immediate effect.
- > A broad spectrum of definitions for sustainability and implementation options for the various disciplines in accordance with the SDGs is placed at the teaching staff's disposal and further developed on a continuous basis.
- > Enhancement of examination regulation changes: Enacting framework regulations and defining scope for development; simplifying accreditation processes.

Governance Task Force

- > Green Deal: It is necessary to balance compatibility of Green Deal with effective sustainability strategies and initiatives. Is it true that sustainability must "pay off"? Are economic and business administration notions of economic growth still viable in view of the climate emergency?
- > Goal card concept of the 17 SDGs: assigning goal cards to projects devoted to one of the goals; "card collecting" incentive.
- > Integrating sustainability topics into the curricula through University-internal guideline with ECTS.
- > Establishing an experimental faculty in which so inclined teaching staff can experiment with SDG themes. The rest of the world can sit back and watch the outcome: This can act as a magnetizing force for others! Structural support would be important nevertheless. Taking the first step and leading the way! (Paths are forged by striking out on them.)
- > PraxiSDG module: Establishing corporate sustainability and reflecting on its impact on students. Can be implemented in all four faculties.
- > Scaling up the number of service-learning courses, e.g. by means of incentives (reduced teaching load, incentive bonus, as possible goal-setting element).
- > Cross-faculty implementation of Service Learning in examination regulations.
- > Social commitment and willingness to engage in Service Learning as criterion for new appointments, possibility of making compulsory 1 SWS Service Learning per semester/year.
- > Establishing a Social Intelligence Office (concept lying on the shelf), enabling students to work collectively with citizens and pupils on social (micro-) projects with corresponding infrastructure (urban showcase sites for enhanced public visibility).

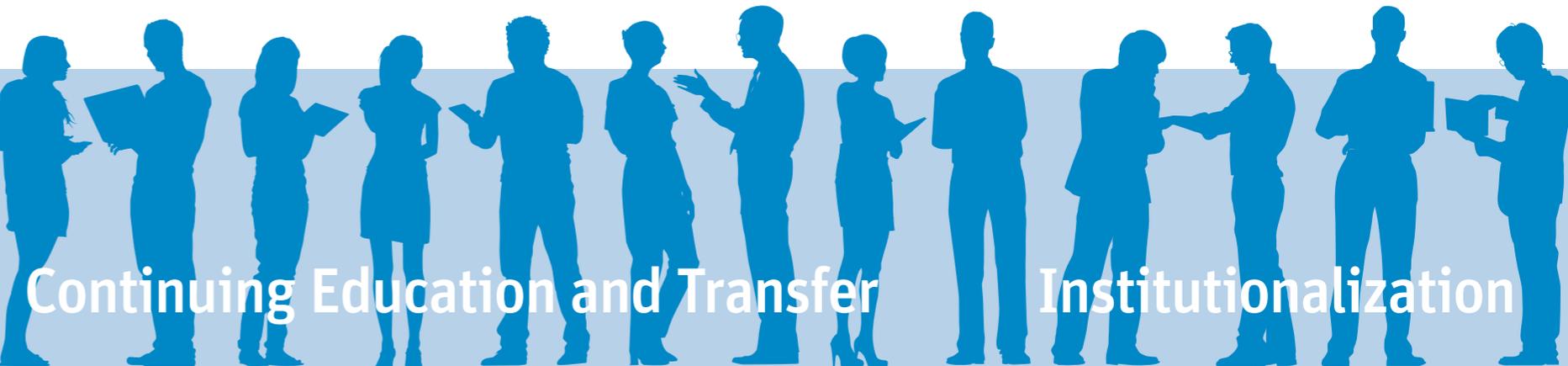
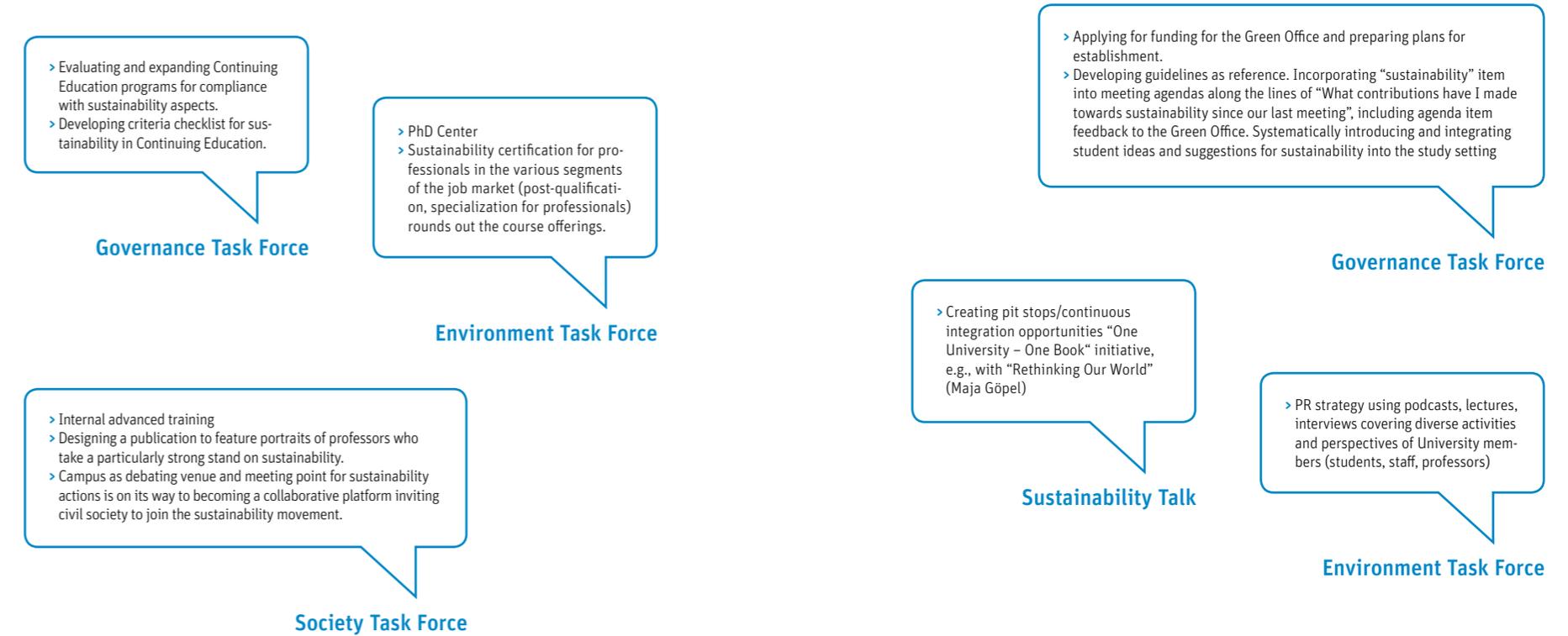
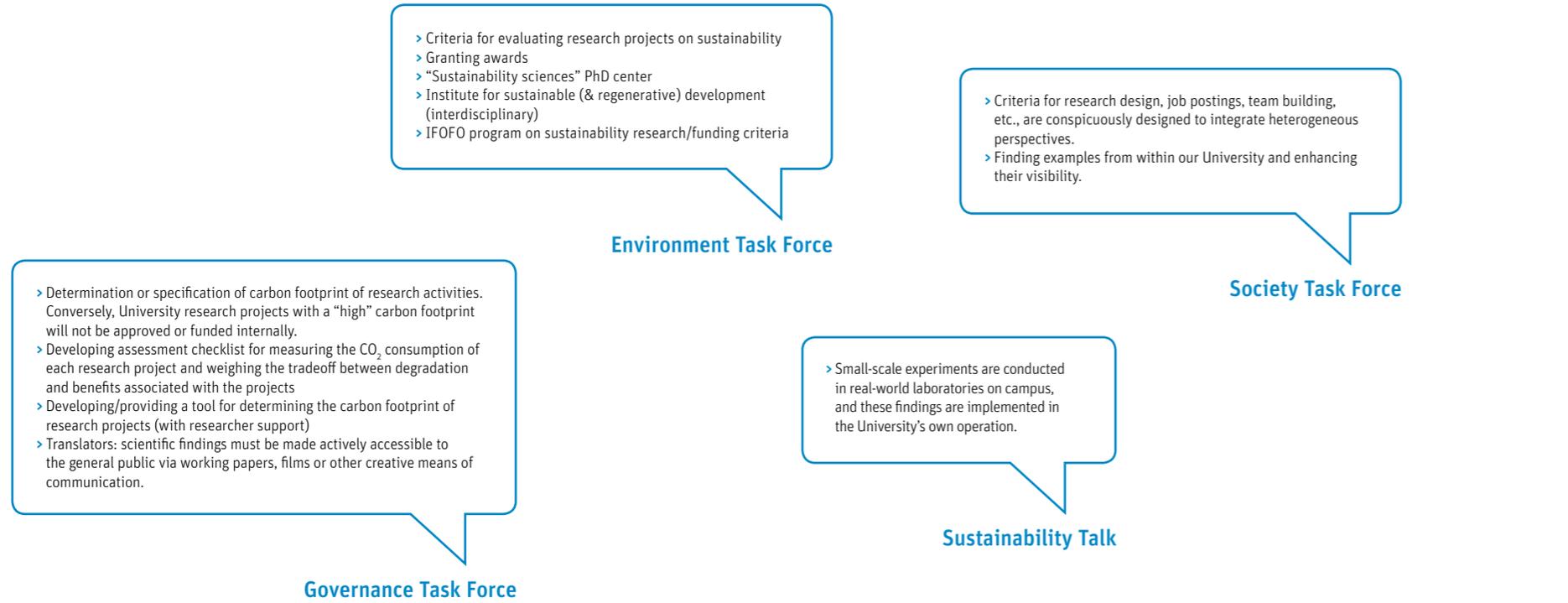
- > Students develop games for communicating real-world problems on a micro-societal level. This is done on an interdisciplinary basis. It is working tremendously, far better than anyone would have thought. Discourse method is firmly embedded within our University and upgraded on a regular basis – across all faculties, including transdisciplinary and interdisciplinary variants. This particularly entails that our teaching staff familiarize themselves with the discourse method so as to pass it on to our students. This would be a key prerequisite for ensuring sustainable social cohesion.
- > Publishing the University's mission statement on our website.
- > Developing UAS didactics that is practice-based and action-oriented and that prepares skills for making an impact at the societal level while building up existing strengths.
- > Embedding SDGs in curricula and teaching methods. This also entails ensuring that all members and affiliated groups receive proper instruction and training, that they are empowered to promote democracy, fairness and equal opportunities as fundamental and necessary preconditions of sustainably sound social institutions and that they are committed to maintaining a sustainable relationship with nature and the environment, as befitting their profession.
- > Prior to accreditation, curricula are assessed for compliance with sustainability aspects. Existing curricula of our current study programs are being realigned towards sustainability with immediate effect (SDGs as theme,

- sustainable pedagogics). To this end, discussions are conducted not only by individual teaching staff/study program heads with the Review Board but with teaching staff from other faculties as well (argumentative support).
- > Cross-departmental organization not only of research but also of curriculum development (networking)
- > For example, local eGaming policy, successful model projects are in place, e.g. gamification, simulations for various complex themes without programming
- > Sustainability strategy homepage section, including discussion forum (preferably in plain, accessible language)
- > Advanced course development: embedding diversity in teaching as cross-sectional topic in much the same way as sustainability and conveying diversity through new ideas (methods, examples, etc.)
- > Developing an award scheme for innovative teaching ideas.
- > Extracting detailed knowledge on the social commitment of our teaching staff and students (e.g. through next student survey)
- > Promotion, support and coordination of social and volunteer initiatives from within the student body
- > Social engagement module as potential independent counterpart to ISG so as to make it compulsory for all students.
- > Social engagement as potential enrollment requirement and USP
- > Establishment and broad accreditation of study-related extracurricular commitment (allocating credit points)
- > Debating club: learning to debate respectfully.

Society Task Force

Studies and Teaching





- > Commissioning cleaning contractors for, e.g., waste separation
- > Green Office has to research standards
- > Sustainable workplace fit-out smartly combines working from home with face-to-face courses, covers workplace furnishings and energy consumption, as well as procuring technical equipment and office supplies, etc.
- > Working from home to obviate the need to commute by car; using bicycles and public transport
- > Establishing assessment criteria for university vehicles, as well as for travel options on business trips and Continuing Education programs; eliminating parking subsidization for internal combustion cars (except for those relying on car travel)
- > Examining leasing concepts such as job bikes to incentivize staff to ride their bicycles
- > Reinforced by sustainable workplace design, establishing and maintaining a family-friendly work culture and providing adequate exercise and sport opportunities for study and work
- > Upgrading sheltered and secure bicycle parking facilities
- > Strengthening exchanges of experience, creating a project-related benefits review plan, platform of current projects, centralizing and/or bundling recurring work processes
- > Dashboard
- > Embedding sustainability in HR development
- > Appraisal and funding of opportunities for green power generation on campus Dispensing with CO₂ compensation payments as they are but a "get-out-of-jail-free" card and degradation occurs nevertheless.

Governance Task Force

- > Reducing the total waste volume and increasing the proportion of recyclable waste.
- > Expanding electronic document management and digital administrative processes.
- > Defining sustainability criteria for procurement, which are disseminated through library workshops.

Other universities

- > The Association of Student Affairs [Studentenwerk] offers services geared towards sustainability while using environmentally friendly and fair-trade products and suppliers.
- > Campus as debating venue and meeting point for sustainability actions is on its way to becoming a collaborative platform inviting civil society to join the sustainability movement.
- > Stronger campus greening initiatives for this purpose: creating a culture of well-being. Making use of seating areas beneath existing trees. Wall and roof greening (reviewed by Green Office)
- > Using carbon footprint calculator to universally demonstrate impacts.
- > Introducing test criteria for cooperations geared towards sustainability
- > Activation by generating participation; developing an award scheme for outstanding idea implementation, e.g., replacing PET bottles with sustainable beverage bottles
- > Creating an incentive system, e.g., for bicyclists, pedestrian commuters and members of the University using public transport Why do we have subsidized underground parking spaces but no showers/changing areas for bicyclists?!

Society Task Force

- > Devising exercise and relaxation programs and activities for daily university life
- > Green spaces and vegetation, exercise and health

Environment/Sport Task Force

- > Connecting to district heating grid
- > Fairtrade University
- > Sourcing green energy; also waste separation in the future
- > University pact: making grants available for sustainable measures – may be applied for

Sustainability Talk

- > Trees for graduates. Possibility of sending out a message for the ongoing climate debate, with Frankfurt UAS planting/donating one tree for every successfully completed university degree. Here for instance: <https://www.greenforestfund.de> This enables us to position ourselves sustainably while raising sustainability awareness among our graduates. Funding through donations or cooperation with relevant organisations
- > CO₂ compensation for business trips (modes of transport; compensation payments for flights); budgetable

Organizational suggestion scheme

- > Launch of further campus greening by 2021 at the latest. Vertical and green roofs, unsealing soils, tree planting to support micro-climate
- > Conserving resources, reducing environmental impact, saving energy, recycling
- > Canteen: environmentally friendly meals starting in 2021
- > Guidelines and criteria for University partnerships: sustainability check for all partners, suppliers
- > Enhancing biodiversity on campus (regeneration of micro-climate), e.g., also setting up beehives on campus
- > Sustainability for people on campus: green experience, exercise zones, relaxation areas
- > Outdoor learning spaces and low-threshold exercise programs
- > Relaxation areas and cooling/shady spots for students and staff
- > Concept design for implementing campus greening in planned new buildings
- > Mobility strategy Analyzing and reducing business travel footprint
- > Minimizing number of cars on campus (gamification); creating incentives and raising the parking fee
- > Retrofitting existing buildings with measuring technology to better capture energy consumption and user behavior
- > Studies on summer heat insulation for non-residential buildings (climate impact adaptation)
- > Findings from research projects and experimental laboratories are incorporated into building operation and management.
- > Sustainable replanning for Buildings 7 and 8 in particular (e.g., German Association for Sustainable Building [DGNB]).

Environment Task Force



University Operation and Campus Development

➤ Frankfurt Research and Education Foundation Seeks Sponsors for Sustainability

Foundations are sustainable by nature in that they work to shape social developments more equitably and diversely. That is why we as Frankfurt Research and Education Foundation also are particularly committed to making a critical contribution to the **sustainable** development of our society through education and research. Our mission is to ensure that students in particular engage with sustainability and to apprehend it also as an opportunity for the further betterment their own personal future. Foundations can facilitate sustainability ideation and help to forge a pioneering spirit aimed at practical implementation.

The Sustainability Strategy of Frankfurt UAS, as adopted on March 1, 2021, and particularly the 111 activities simultaneously co-developed by our Sustainability Task Force decisionmakers serve as our roadmap.

As a Foundation, we are keen to mobilize and inspire civil and entrepreneurial involvement in supporting activities for greater sustainability at Frankfurt UAS, thereby helping to ensure that sustainability at the University is not compromised for financial feasibility reasons.

We support the implementation of the Frankfurt UAS Sustainability Strategy.

Located at the heart of the Frankfurt/Rhine-Main metropolitan region, **Frankfurt University of Applied Sciences** continues its longstanding commitment to the region through its four faculties.

- | **Faculty 1: Architecture · Civil Engineering · Geomatics**
- | **Faculty 2: Computer Science and Engineering**
- | **Faculty 3: Business and Law**
- | **Faculty 4: Health and Social Work**

On the strength of its performance profile, the Foundation perceives itself as a catalyst for integration in the region and as its development partner in cooperative research, education and advanced training.

Its broadly diversified spectrum of technical disciplines marks a unique selling point among academic institutions in Frankfurt. As an embodiment of the underlying values it exemplifies, the Foundation aspires, on the one hand, to make young people professionally fit for the job market and, on the other, to help in their development as responsibly acting personalities committed to the principle of sustainability.

Share your new-found inspiration and lend a helping hand by investing in our Foundation! Contact us at stiftung-forschung-bildung@fra-uas.de



Prof. Dr. Martina Klärle

Chairperson

Frankfurt Research and Education Foundation

Vice President

Frankfurt University of Applied Sciences

Karen Hoyndorf

Deputy Chair

Frankfurt Research and Education Foundation

Compass Group Deutschland GmbH Eschborn

Monika Rosenberger

Administrative Office

Frankfurt Research and Education Foundation



We could use the bicycle more on short routes

Mobility is a key factor for sustainability

Professorial Chair of Sustainable Mobility and Cycling
Prof. Dr. Dennis Knese

Prof. Dr. Knese, you have been Professorial Chair of Sustainable Mobility and Cycling at Frankfurt UAS since 2021. Is it an important achievement that the University successfully prevailed in its application for this Foundation Professorship?

It is indeed a success. More than 30 universities applied for the seven professorships that were posted nationally, with three of the professorships awarded to universities in Hessen, including our University. This attests to our University's high-quality profile in the field of sustainable mobility.

In 2016 you became sustainable mobility advisor at the German Society for International Cooperation [Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)], overseeing projects in Asia and Latin America. What makes the transition from the international arena to academia attractive in your eyes?

The transition enticed me because here at the University I have the opportunity to set the relevant topics myself to a much greater extent than I could in my previous line of work, which had its appeal as well. What I also find alluring is the work I do in this highly dynamic region with its multifaceted challenges in mobility and transport, not to mention the opportunity to work with many partners.

Namely?

We have already held our first cycling workshop with representatives of municipalities, associations and the business community. This is the way it ought to be because we are, after all, a University of Applied Sciences, and our focus is on practice-based work. Through the work we do and the practical application of our research and our teaching, we want – in cooperation with our partners – to achieve change for the betterment of our world.

Why is Frankfurt UAS the ideal partner for such analyses in the Rhine-Main region?

Because of the huge demand for evidence-based data before plan-

ners can prepare decisions that policymakers will need to make. The University is ideally positioned to collect and harness all of this data, as well as perform before-and-after analyses, also by also actively involving its students and guiding them through a learning process in and through the practical application of research – for example, together with the City of Frankfurt Cycling Office. In addition, knowledge and competencies from a large number of disciplines are concentrated here at the University – disciplines that are essential for integrated concept development.

You mentioned also the business community as partners in projects for more sustainable modes of transportation. How open is the business community to such a partnership?

Many business enterprises, particularly from logistics, are interested in sustainable concepts. They are looking for sustainable ideas both from a sense of inner conviction and because businesses need efficient processes if they are to survive. Companies specializing in logistics and mobility optimize their route planning, their vehicle utilization and their type of drive system. For example, e-mobility makes sense for short-haul urban delivery trips on plannable routes with high traffic volume. This is where cost savings can be made quickly over the vehicle's total life cycle. At the same time, this reduces air and noise pollution.

Do companies interested in sustainable mobility need partners?

Definitely. To put it in their own words: we're chomping at the bit, but there's too little municipal support. It would be great if municipalities helped to reward the transition – by introducing designated parking and charging zones for electric vehicles, for example.

Is city logistics also an issue for businesses and municipalities?

Yes. Logistics companies operate large warehouses in the city outskirts but also need small logistics facilities – microhubs –

within the cities that they are able to access outside of peak traffic times to deliver outbound goods by e-cargo bike, for example. Particularly courier and delivery services have long understood that bicycles are the ideal delivery vehicle. Logistics providers require space for these microhubs, however, and again this is where municipalities come in.

In the context of your work, what does sustainability mean to you?

Sustainability has accompanied me throughout my career. Not surprisingly, it is also the guiding spirit behind all GIZ projects. The way I see it, the economic, social and environmental dimensions of sustainability are intertwined. Environmental impact is often what first comes to mind when people think about sustainability. But mobility is also essential for enabling access to participation in society, projects and services such as health and educational facilities and, of course, jobs. It has social and economic dimensions that are mutually interwoven.

Are the opportunities for sustainable mobility distributed unequally?

Yes, they are. People in rural areas do not enjoy the same opportunities for mobility, of course, as do people in conurbations. But also in cities there are barriers to mobility, one being price. Not everyone can afford to use public transport – we have no 365 euro annual public transport ticket as they do in Vienna. I see great opportunities here for mobility management in businesses, public agencies and also at universities.

Is it a structural flaw that discussions surrounding mobility are conducted mainly in conurbations?

In political and media discussions it would, naturally, be preferable for greater weight to be given to mobility requirements in rural areas – notably in the context of the social sustainability dimension. What we have to keep in mind at the same time,

however, is that the outcome of the struggle to meet our climate and environmental targets will ultimately be decided in cities and conurbations.

What specific changes do you propose in terms of organizing mobility more sustainably in Frankfurt?

I wish I could give a blanket answer to that. What we really need are integrated concepts using multi-focused strategies for different areas. Strengthening local public transport is one of them. No easy task, to be sure, given the excessively long planning times in Germany. High-speed transit lines such as the Regional Tangente West have been in discussion and planning for decades. By contrast, changes in cycling can be implemented more rapidly. So rapidly, in fact, that it feels as though they take place overnight – like the introduction of pop-up bike lanes in Berlin, the Ruhr region, Munich and Hamburg in Corona year 2020. In China – as well as in many European cities like Paris – reallocation of road space has been implemented for many years now.

So is transport a key segment for enhancing environmental sustainability?

Absolutely. Transport accounts for one-fourth of all energy-related CO₂ emissions. Whereas other emitters in Germany succeeded in significantly reducing emissions during the period 1990-2018 – households by 38 percent, the industrial sector by 33 percent, the energy industry by 30% and agriculture by 16 percent – transport has only managed to reduce its share by a mere 0.8 percent.

Why has road transport barely reduced its CO₂ emissions?

For one, traffic volumes are up because of increased online shopping and number of home deliveries, for example; for another, we are seeing a trend towards larger vehicles like SUVs, which consume more energy. The desired reductions will not be achieved unless and until we introduce more am-

bitious CO₂ pricing schemes or instruments – such as a bonus-malus systems.

In what ways might your cycling professorship help to improve the carbon footprint?

We could use the bicycle more, especially on short routes. For distances of between one and two kilometers, 53 percent of Germans still use private motorized transport; with the figure as high as 65 percent for distances of between two and five kilometers. Yet 80 percent of all households in Germany own a bicycle. What these figures clearly show is the vast energy savings potential that can be reaped from transitioning.

Corona poses a health risk, including risk of death, but will the pandemic at least have a lasting healthful impact on our mobility behavior?

We experienced a real bicycle boom during the 2020 Corona summer. I hope that people switching to bicycles will stick to their new-found mode of transport even after the pandemic is over.

CO₂ emissions reductions: households down 38%, industrial sector down 33%, agriculture down 16%

By contrast: mobility < 1%
We aim to improve that!!





Post-fossil architecture

On sustainability in planning and building

Professorial Chair of
Technical Building Systems
Prof. Dr. Hans Jürgen Schmitz

Prof. Dr. Schmitz, how did you get involved in the topic of sustainability??

I am an architect and teach building technology. My focus is on energy and resources. My interests took me from energy to climate change and from there to sustainability and ultimately to dealing with the issue of social justice inasmuch as we consume resources here that have to be extracted elsewhere under difficult conditions. Our lifestyle choices negatively impact future generations. This requires us to adopt a more far-reaching perspective.

A more far-reaching perspective is a good place to start. Of the many dimensions associated with sustainability, which do we need to focus on most? Solely the environmental dimension?

The focus of our discussion at the moment is on whether the three pillars of sustainability – environmental, social and economic – in fact carry equal weight. In addition to the pillar model, there is also the doughnut model with its 21 domains that situate the environmental, social and economic aspects in a comprehensive context. This model places greater weight on the environmental and social domains than it does on the economic sphere. And then there is the shell model, which treats the environment as the foundation of life. This forms the basis for the social domain, which in turn serves as the basis for the economic dimension. If, for example, the economy is given too much weight and should also fall into disequilibrium, then the shells will tip over. It follows that the economy needs to support the other shells. The environmental comes first, followed by the social – which means we must economize efficiently over the long haul. Embedding this mindset into teaching and construction is what my work is all about.

How will your approach change architecture?

We set a clear goal for ourselves: we have to completely tran-

sition away from fossil energy sources. This can in turn spawn highly engaging modes of architectural expression. What is more, post-fossil architecture ties in with millennia-old technologies. After all, we have always made use of wind, water and the sun as energy sources.

What does post-fossil architecture look like in terms of aesthetics?

It varies in appearance wherever you go. It is different from region to region, is adapted to the climate, conserves resources and makes optimal use of local resources. It is an exciting way to build, quite extreme and also polarizing, to top it off. By way of example, the 2013 International Building Exhibition in Hamburg featured a research building with a microalgae bioreactor façade. The algae bind carbon dioxide and produce biomass to be used as an energy source or raw material in production. The building takes on a new role as producer and is not merely an energy consumer. It effectively becomes a prosumer – producer and consumer in one. Not only does it produce waste gas and wastewater but is also part of a natural recycling economy.

That sounds alluring, but what about the existing cities and structures?

Yes, that is a difficult challenge, to be sure. One thing is certain: the energy standard for new buildings is on the way to becoming the zero-energy standard – or even the Plus-Energy Building, which generates more energy than it consumes. Dealing with the existing structures will prove to be the more formidable challenge. This will require a case-by-case assessment. The general trend, however, is that buildings and housing complexes are no longer being individually supplied with energy but instead are integrated into intelligent networks – smart grids – into which renewable energies such as green power and biogas are fed.

Where is the renewable energy sourced from?

Architects must learn to think beyond the building as such and into the future ...

How will you convey this sweeping change to users and decisionmakers?

Here is where a political component comes into the equation. And it's all taking much too long. Everybody talks about doing what is right, but the necessary decisions are not being made consistently and systematically. I'm thankful for the Fridays for Future movement. Today's generation of university students wants change.

Is this generation with its desire for change building on ideas from the past?

In the early 1980s in the aftermath of the oil crises, a book came out, edited by the Federal Environmental Agency [Umweltbundesamt], under the title Ecological Building [Ökologisches Bauen]. The authors were written off as "greenies," and their work was pejoratively labelled as "muesli architecture." Had we adopted their ideas earlier, we would have had a different architecture today – with fewer problems.

How long will the paradigm shift in architecture that you are working towards take?

There are two avenues of approach to effect such a change: insight and pressure. The insight approach is obviously not working. It seems that putting the pressure on is the only option we have I'm afraid. Our actions have an impact and ramp up the pressure. This will lead to a paradigm shift. We find ourselves at a turning point today. The growth paradigm has steered us into a quagmire of problems, and the way I see it green growth is a contradiction in terms. Climate change will force us to do a rethink. There has never in the history of mankind been a return to customary ways, and people cannot

continue in the future to make the same lifestyle choices they have been making over the past 50 years. If you look back in history, you'll find that lasting change is nothing out of the ordinary but more or less the norm. It is incumbent on us to cultivate change on our own terms – to master the challenges of climate change rather than throw in the towel.

Are your students open to the paradigm shift – no matter how long it takes?

Yes, unquestionably – after all, they are the ones affected by it. They have a personal connection to this issue.

Just how much patience – measured in years – will be needed also on the part of these young people?

The building industry has an immense capacity for inertia – it is extremely sluggish. The service life of a building is 50 to 100 years. However, buildings – once constructed – can be retrofitted or refurbished every 20 to 30 years using automation technologies.

Which technical renovation concepts are forward-looking?

We're talking about more than just insulating here. Buildings must be retrofitted with renewable energy-generating technologies, and the CO₂ price has to rise in order to make the use of certain technologies uneconomical.

As an architect, do you make it a point to seize the opportunity for interdisciplinary studies that a university offers?

Yes, among other things our faculty has hosted a series of conferences on climate change and on residency in conurbations. I worked on the topic of residency together with a computer scientist who also happens to be a Jesuit and philosopher of science specializing in human-machine interfaces, as well as in artificial intelligence. We are taking advantage of computer-based simulation games as a tremendous oppor-

tunity for people to participate in planning processes. What happens when I actively defend my interests in, say, a conurbation? Are they – when I stop to consider the consequences – my interests at all? We discuss topics like these in the "studium generale", which we offer as a compulsory course in the Bachelor's program. Computer-based simulation games offer a singular opportunity in urban planning to identify decision impacts and to enhance the attractiveness of participatory processes. I'm thinking back to Richard Buckminster Fuller, an architect and visionary who originally conceived the World Game. I see myself as continuing the tradition of his way of thinking. He lived from 1895 to 1983 and was a genuine '68er for me – the way he saw humanity treading a critical path and now confronting its final exam.

The building industry has an immense capacity for inertia – it is extremely sluggish. The service life of a building is 50 to 100 years.





Not everything that's supposedly bad is genuinely bad

When it comes to using mobility concepts, you have to weigh the balance

Professorial Chair of Mechanical Engineering/Automotive Engineering
Prof. Dipl.-Ing. Holger Marschner

Professor Marschner, what does sustainability mean for you?

For me, sustainability is the responsibility to leave our planet not in a worse condition than we inherited, but in a better one instead. Fossil fuels take millions of years to form, and we are burning them at breakneck speed – this is simply not acceptable. At issue is the responsible use of resources.

What else is at stake? After all, sustainability has not only an environmental dimension but also an economic and social one as well.

It's also about striking the right balance between economic and social issues, of course. I'm thinking about the tradeoff between economic and ethico-moral interests. Here, we need to answer questions about raw materials for e-mobility, just as we do about fair treatment and decent payment for all players. We're talking about universal problems that can only be solved at the global level. But each person can put their own house in order and make the world a better place to live in.

Where does responsible management begin – in the areas of environment and natural resources, for instance?

It begins with thinking and acting in a holistic and forthright manner. Not everything that's supposedly bad is genuinely as bad as people think, and not everything touted as good is so on a lasting basis. Take, for instance, the hype surrounding e-mobility. No doubt, e-mobility has its rightful place – still, the good old diesel and combustion engines have their good points as well. Our top priority ought to be conserving energy. It makes little sense to drive a heavy SUV into the city, especially since space is tight there. And the electrification of two- to three-ton vehicles makes even less sense. When properly deployed – for freight transport or in a bus – a biodiesel- or biogas-consuming internal combustion en-

gine can also be unbeatable in street traffic. Diesel is not as bad as people make it out to be. And the emissions scandal is not a diesel scandal. That's not on Rudolf Diesel. Rather, the emissions scandal is an emissions fraud scandal.

Does responsible stewardship of the environment also mean that we have to cut back?

We would do well to also rethink our dependence on some cherished habits and items and to discard them depending on the test results. There was a time when we also drove to the city and back in cars like the Fiat 500 and the Beetle that produced 18 to 34 hp. For that you don't need 300 hp or more – and electric-powered to boot. In the case of the internal combustion engine, for example, saving energy is tantamount to downsizing, so you can say goodbye to the six- and eight-cylinder engine. We have succeeded in making all kinds of dreams come true over the years, and we are still doing the same today – only a bit greener. This is not the way to go about it. True, it initially requires cutting back on our part, but whether this gets our spirits down is up to us.

Are we seeing a willingness to rethink and set new priorities in society?

I ask myself the same question. A pertinent example that springs to mind is the acceptance of wind turbines and transmission lines to deliver electricity. I don't know how anybody can object to wind turbines. We're currently researching noise radiation generated by these facilities. But I simply don't know yet. Otherwise, I see some very engaging contributions to a more sustainable way of life: there are more and more bicycle lanes cropping up, and whole families are also riding their bikes to go shopping. Cargo bikes with 250-watt motors are the modern "city SUVs," and they help to maintain individual mobility needs.

Have you transitioned to a more sustainable lifestyle?

Five years ago I bought an e-bike, for instance, and still ride it to the University everyday. I've clocked 15,000 kilometers in these past five years, with a total savings of 20,000 car kilometers – that's because by bike I can take a shortcut that is not suitable for cars. This shows that we don't need even more output to get from A to B – and, what's more, e-biking is lots of fun, most especially when riding over a bridge and passing a traffic jam just below.

As a university professor, do you take it as your challenge to deepen the understanding of sustainability and to promote its idea?

I try to integrate into my own teaching all of the issues I've been addressing here, including the willingness to be thoughtful and forthright. Without a sledgehammer. And it's popular with young people – or I should say, rather, they're already with the program. And I'm involved in research as well. For instance, how to make refuse collection vehicles – which have been a fascination for me since my childhood – more economical and environmentally friendly. A refuse truck powered solely by an internal combustion engine is arguably the most extreme example both from an environmental and from an economic perspective. Garbage trucks are all stop and go, their engines running continuously at full blast while powering all of their hydraulic systems – even an urban bus is a long-distance cruising vehicle by comparison. So it makes particularly good sense to come up with a clean and quiet alternative drive system for refuse collection vehicles. This is where electrification can prove to be most effective.

Do you also conduct research together with your students?

Yes, we do research on refuse collection vehicle improvement and traffic noise reduction, for example. I assign related topics not only for Bachelor's and Master's theses but

also for doctoral dissertations. This is my way of making a positive contribution to research, the environment and human well-being.

How does a university become sustainably sustainable?

By motivating students at the university level to develop improvements for day-to-day life – such as micro-vehicles, alternative drive systems and e-vehicles – and by motivating young minds to carry this motivation with them in addition to the set of tools they have acquired at our University. By applying and exemplifying what we teach in our research labs. Half of the students' time during their Master's program is spent working on individual projects, which can also be in research. Here in Frankfurt, we are fortunate to be able to provide quality education to students from over 100 countries and to lay the relevant foundations for international collaboration.

Do you receive any public recognition for your commitment?

Yes, I received the Frankfurt Research and Education Foundation's publication award in 2017 for a study on the actuation mechanisms of self-excited oscillations. The study was co-authored by three students, and I'm pleased to learn that they were able to include such an honor of distinction in their application files.

A small research project blossomed into a highly esteemed spin-off venture. The electrification of drive systems means that our vehicles are becoming quieter. But when there are no longer any engines around to drown out all of the vehicular noises and vibrations that in fact do not originate from internal combustion engines, then they become conspicuous. So it makes eminent sense to research the topic of noise, vibration and harshness. One of our teams has developed data glasses that are able to visibly display ambient

noise and background sounds, including their source. For this technological achievement the team won the Frankfurt UAS 2018 Ideas Competition and subsequently the Hessen Ideas Scholarship and, most recently, the EXIST Business Start-up Grant from the German Federal Ministry for Economic Affairs and Energy [Bundesministerium für Wirtschaft und Energie] for a one-year funding period.

Which is more important in your view when it comes to implementing sustainability – technical solutions or instruction in technology?

Your question is well placed in that technical solutions abound. It all depends on how solutions are deployed, tested analyzed and selected. Personally, it's uplifting for me when I see my teaching bear fruit and engage young motivated people.

I try to integrate straightforwardness and sustainability into my teaching – without a sledgehammer. It's popular with young people.





Each aspect is important

On supply chains and energy-efficient algorithms

Student in Faculty 3
President of the Student Parliament [StuPa]
Sascha Hippert

Student in Faculty 2
Nils Bauer

Mr. Bauer, you're now in your 5th semester of Computer Science. Mr. Hippert, you are in your 6th semester of Business Administration.

What does sustainability mean to you, Mr. Hippert?

Hippert: It's a huge concept that often gets misinterpreted. To me, it means we leave this world better than we found it. Sustainability is not just about ecology and environment but also about human resource management. The fact is that people are directly impacted when external conditions begin to deteriorate. Poorer countries, for example, have higher unemployment, which affects people's living situation. Businesses are in a position to offer their staff motivating guidance to act sustainably also in their private lives.

Mr. Bauer, what is sustainability for you?

Bauer: It's an exercise in problem-solving to achieve a better result for all areas on a lasting basis. It means not looking for a quick and easy solution but coming up with a permanent one instead – and coming up with a good one at that. Considered from that angle, sustainability will always pay off.

The University has adopted a Sustainability Strategy. Is this fact on its own important to you?

Bauer: The Strategy encompasses many important points, a central one of which I introduced: Our sustainability practices and the changes we initiate are monitored on a dashboard to see where we stand in terms of realizing the Strategy.

How did you become involved in the process of co-developing the Sustainability Strategy?

Bauer: I was one of the founders of the Students for Future group at the University. There are around 20 of us in the group. Someone from the group heard that the Strategy was in the process of being developed, so contact was established.

Hippert: Inspired by Frankfurt's being awarded Fairtrade Town

status, in 2018 I put forward a suggestion to the Student Parliament and to the University Administration to turn us into a Fair Trade University. In fact, our Vice President Prof. Dr. Klärle took up her post pledging her commitment to sustainability, and the idea sounded great to me, so that's how I came to join the Sustainability Strategy group. As former president of the General Student Committee [ASStA], I had already campaigned for waste separation at the University, as well as environmentally friendly photocopy paper and digitalization.

Mr. Hippert, which aspect of the University's Sustainability Strategy is important to you?

Hippert: Each aspect is important. What strikes me as most particularly important is not only that we take sustainability seriously but also that it is embedded in our teaching practice.

How do you study sustainability in Business Administration?

Hippert: Studying value chains and supply chains, for example. In supply chain management, cheapest isn't necessarily best – rather, sustainability is the determining factor for the quality of the chain. Supply chains broke down during the pandemic. They weren't sustainable. What is also important is a good working environment without discrimination and bullying so that fluctuation is kept to a minimum. That, too, is sustainability.

Mr. Bauer, how do you go about studying sustainability in your degree program?

Bauer: There is still room for improvement in Computer Science. But we have been discussing a number of different algorithms already and raising questions pertaining to their sustainability. When I'm writing codes, for example, I can do so in a more or less resource-efficient manner given that computational operations are energy-consuming. An efficient algorithm saves energy because our electricity consumption increases significantly as a result of digitization.

To what extent will electricity consumption increase due to digitization?

Bauer: To cite just one example: plans are underway to build a data center on a former military garrison property in Hanau. The data center will foreseeably require twice as much electricity as the entire city, which, after all, has a population of just under 100,000.

Hippert: I just ran a quick fact-check... The information I'm looking at ... puts digitization's share at 3.7 percent of CO₂ emissions ...

Bauer: Shutting down the servers cannot be the answer. We must generate power from renewable sources and use digitization to optimize energy generation and consumption.

Will you personally include sustainability as a criterion for choosing an employer one day?

Hippert: My personal ambition is to go into social entrepreneurship. It is important to me that a corporate culture be sustainably modelled so that the company or organization leave behind something better than when they began operation. My aim is to build an NGO or to develop social projects.

Bauer: I myself founded a company that not only uses digital signage to combat paper clutter and information overload but also develops standard business processes for organizing events. As an entrepreneur, I am committed to sustainability. Given the recent surge in the number of servers that exploit verifiable green energy resources, I am also keen to use only these servers as soon as feasible.

For young students like yourself who are open to the idea of sustainability and who are entering a profession, will this trigger a push for corporate change?

Hippert: Yes. Customers themselves are becoming increasingly

paying attention to sustainability, so companies for their part will have no choice but to take sustainability seriously. Companies that do not embrace sustainability will get squeezed. Of course, the demographic change is also looming large, with the number of elderly people growing rapidly.

Can it be that the elderly are not interested in sustainability?

Hippert: Sustainability is crucially important, particularly in education, which lays the groundwork for rethinking. Such a rethink is difficult for the elderly since they were not concerned with the topic for years on end.

Mr. Bauer, will we be seeing greater sustainability around the world?

Bauer: It is not just the younger generation that is at the forefront of working for more sustainability. All companies will have to address this issue as well. This is yet another reason why even more potential for change will continue to be tapped. And we at the University are coming up with ideas and concepts of our own.

Who's raising whose awareness here: Is the University raising young people's awareness – or is it the other way around?

Bauer: We students are doing our share to push the envelope. Yet there is still scope for improvement...

Is it a good thing that we now have a Sustainability Strategy at the University?

Hippert: Yes, it is, and yet – as Mr. Bauer just pointed out – there is still room for improvement on the teaching staff side. Thanks to the Sustainability Strategy, it's no longer tenable for someone in a logistics seminar to say that the fastest and cheapest supplier is the best. We can now cite the Sustainability Strategy in seminars and object: That is not the case. As the Sustainability Strategy enjoys the full backing of the Committees, we can raise

an objection whenever someone says something that is just plain wrong. Developing the Strategy is not the main thing – the main thing is to abide by it and to make sure that the results are cross-checked. And to make certain that it is not used for the purpose of greenwashing, which is common practice in not a few businesses.

Bauer: There are a lot of great points included in the Strategy to further the University's mission. It is important that we act on the principle of sustainability. That we put our words into action.

The Committees back the Sustainability Strategy, which students can cite for objections they want to raise. We can refer to the Sustainability Strategy when someone says something that is just plain wrong.





Sustainability can succeed only if everyone is committed to shouldering the responsibility

Reflections on rural youth and why each one of us can make a contribution to sustainability

Women's and Equal Opportunity Officer
Dr. Margit Göttert

Dr. Göttert, how did you come to the topic of sustainability, or did it come to you?

Sustainability is a guiding influence for me – and has been all my life. I come from the rural Middle Rhine region, where my family had been practicing small-scale plot farming for generations. Our great-grandparents, grandparents, parents and children have lived in the same house. There was nothing that wasn't recycled or reused. We didn't even have a trash can.

Goodness, which century did you grow up in?

It's really not all that long ago. We're talking the period from the 1960s through to the '70s – that's the way it was back then. Then we started seeing more money flow into the villages. People bought cars, fitted airtight plastic windows for draft protection in their half-timbered houses, which had not had professionally renovated. Increased consumption was suddenly possible, coming in the wake of a long period of real poverty.

At the risk of sounding like a great-grandparent recounting tales from another era: Were you happier back then?

Glorifying the past is certainly not the issue here. Still, we can shine a light on things that were better in the past if only to better recognize them today. Some of my most cherished memories included the joy we felt in autumn – when the cellar was piled high with potatoes and with the fruit we had canned – or when slaughtering time came around. That was a far cry from buying something on the run for immediate consumption. We looked forward to the feasts with family and friends gathering to enjoy the harvest and the fruits of our labor. Our convivial consumption had a more primary and festive feel to it than is the case today.

What are some of the positive qualities that our present day can claim for itself?

We have more individual freedoms and the possibility of fulfilling our personal life plans. Girls have long enjoyed the opportunities

for acquiring an education. That dates back to my youth.

I graduated from secondary school in 1981. That was around the period that saw the rise of the Greens and their agenda. I was already an active student during my schooldays; I sold recycled paper, for example. I grew up on the Rhine River, which has since been cleaned up. Back then, we stayed clear of the river because of the awful stench it gave off. Every generation of youth has the right to its own time and attitude, a vantage point from which they see their parent's generation as "weirdos." Some things will probably never change. That said, I find that today's youth is genuinely picking up on things that were in fact important to us back then. They're rethinking consumption habits, for example, and negotiating with their parents about what's for dinner because they're savvy about factory farming. We should be dialoguing with each other more and not harping on about how everything was better back then or is better today. No life is utterly free of contradictions. But what I'm seeing is a genuine interest in developing solidarity.

What does social solidarity have to do with sustainability?

For me as Women's and Equality Opportunity Officer, equal opportunity is part and parcel of sustainability. Sustainability and equal rights are interconnected: each person is taken seriously, consideration is given to all life perspectives, power structures and hierarchies are exposed and challenged, violence and discrimination are combatted. Without social justice and decent living conditions, sustainability is neither conceivable nor feasible. In my role at the University, two motives behind my actions in fighting for better education come together. It is a privilege for me as it is to work at an educational institution and to contribute to the discursive transfer of knowledge.

How does Frankfurt UAS translate sustainability into everyday university life?

By way of active example. By genuinely embodying sustainability in practice. Not 100% perfection, but as best as can be. Papercups and soda water from major corporations are still around here though we have many mineral springs in Bad Vilbel. But sustainability is an important issue also at the administrative and organizational levels – or at least ought to be.

How and why should sustainability be a priority for Administration?

Well, we should be asking ourselves, for instance, which transport connections we're setting in motion through the way we organize research and teaching. Or take project management. There are many worthwhile and rewarding projects. But for the most part they have a fixed term of two to four years. Then they're abandoned – and with them great ideas fall along the wayside, concepts and people fade from view and are forgotten. Knowledge, commitment and opportunities for people are tossed into oblivion. For example, we have Project "Opportunity Building" to support children from non-academic families so they can begin a program of study. As a project of this nature requires continuity, the fight for its survival is ongoing.

So sustainability goes well beyond ecology then?

Yes. And to make sustainable knowledge management work you need more time and room for thought and discourse at the University. We often find ourselves running behind the curve at a mind-boggling pace here. Why do we give ourselves only half a year when a whole year would be needed? Speed has become our bugbear. Sustainability for me, especially at a university, means taking more time to reflect and understand – to preserve and transmit valuable knowledge.

Are you satisfied with the process through which the Sustainability Strategy was developed?

Prof. Dr. Klärle, our Vice President, is a key catalyst with a posi-

tive mental attitude. I am most hopeful that the Strategy will be implemented – and also admit to being genuinely surprised by the way the strategy-building process has been coming along. Such a diverse array of people at the University are joining in the discourse and taking sustainability seriously in its full thematic breadth. They are not narrowing it down to saving energy and buying regional products. That is heartening because sustainable knowledge and project management are at risk of becoming forgotten among all the technical issues skimming the surface of the sustainability debate. We have to let out some of the pressure. Only the other day, I was saying to an acquaintance of mine that we need to decelerate. And her response was, If I hear the word "decelerate" one more time... We need to practice doing without. For me this means, to start with: not to pounce on every project and every funding opportunity that comes along but instead to see worthwhile things through to the end or else to further develop and perpetuate projects, for example, where it makes sense to do so.

What things do you practice doing without in your private life?

I make it a point not to fly. Which is no biggie for me considering my fear of flying [laughs]. In our household we have significantly reduced our electricity consumption, and we're driving our economical car proverbially into the ground. We ride our bikes to work, and we combine rail and bicycle travel when we're on vacation. And I have restored a half-timbered house in my home village using all-natural building materials.

Good that you mentioned villages. Are urbanites losing sight of rural areas and their legitimate interests?

Thinking in terms of black and white is a sign of our times. The world is simpler when we paint it with a black-and-white brush. But then we would not be doing justice to reality. It's easy for someone in Frankfurt, who has the complete range the mobility options at their disposal, to preach to others about how they should

do without certain forms of mobility. This morning, the idea came to me to launch a project – for example, working together with faculty and students to develop a sustainability strategy for my home village with its dilapidated houses clustered in the village center. And in point of fact there is another very essential condition for sustainability: social responsibility and public spirit.

Why is sustainability inseparably interlinked with social responsibility and public spirit?

Social responsibility and public spirit are – particularly in a heavily individualized society – closely intertwined. It is incumbent on us to act responsibly, and by the same measure we mustn't lose sight of how we our dependent on others. The so-called contrarians – or "free thinkers" (who are not really thinking at all, as far as I'm concerned) – who are taking to the streets to protest the imposition of rules to contain the Corona pandemic, are confusing personal freedom with thoughtlessness. Freedom means also the freedom to share responsibility. Sustainability will succeed only if we all accept and shoulder responsibility – each for themselves and concurrently for others, as well as for the collective whole.

Sustainability at a university involves, first and foremost, taking more time – taking the time to reflect, appreciate and understand and also to preserve and transmit valuable knowledge.





We have the opportunity to flip the switch

Sustainability as an attitude

Professorial Chair of Land Management
Prof. Dr. Martina Klärle

Prof. Dr. Klärle, as Vice President of Frankfurt UAS sustainability is right at the top of your agenda, and you are often heard to say that you're "fighting tooth and nail" for this cause. How did this fight for sustainability come to be a vital issue in your life?

My personal gateway to sustainability dates back to my studies and was opened by my dissertation supervisor Ortwin Peithmann. In the beginning I only shook my head at his lifestyle. He bought his clothes at thrift shops and walked the last few miles from the train station to the University or else thumbed a lift when no buses were running. But it wasn't long before I understood what he was teaching us through his choice of lifestyle. He was all about conserving resources. I myself ultimately came to realize that this was a positive goal to have in life. And, to tell the truth, my parents had already instilled in me this attitude, this outlook on life, practicing diligence and mindfulness – for example, gleaning fallen fruit and baking it instead of allowing it to rot and buying new fruit all the time. I was reminded of this when I came to understand and appreciate my dissertation supervisor and his way of life. And I thought: this is the way to be and act in life that I also want. Flashing forward, I was by then already a researcher in my mid-forties when I received a second jolt to my consciousness that reinforced my conviction that sustainability was worth fighting for. I'd spent two weeks in Greenland with Mojib Latif, climate researcher and President of the German Club of Rome. We'd been studying the effects of climate change in all its dimensions. And I suddenly realized that each and every one of us has the opportunity to do something and make a difference. And if each one us perseveres in doing something, then we will have the opportunity to flip the switch.

You highlight the environmental dimension of sustainability, but isn't there also a social and economic dimension?

I know, the UN has defined 17 sustainability goals, all of which are important. At the same time, however, I'm equal-

ly aware that I cannot fight for all of these equally. It's the environmental component that is the strongest influencing factor for me. As land surveyor, geodesist and environmental scientist, I have a close affinity to ecology. I think that there are other people who are just as active in their commitment to sustainability as I am – except that they happen to be fighting for social or economic goals.

Where and how are you proactive in the area of sustainability?

At the University, for example, in my capacity as professor, in the transfer of knowledge so that the energy revolution and climate protection can succeed. I am constantly on the lookout for opportunities in my life as to how and where I might implement the practical aspects of my fields of research – such as in my hometown with our personal life's work, our Plus Energy Hof 8 [plus-energy farmyard].

Isn't Hof 8 a prime example of the sustainability triad?

Yes, now that you mention it. The buildings are well designed from an environmental perspective, and the Hof is not only a place to work and do business but has also given the village a new economic and social center teeming with life. Most of all, it has a magnetic appeal. Many people come and find inspiration here to make a change with a project of their own. When I experience that, I feel thankful and proud. I am delighted with all that I have achieved. And I can be sustainably mobile using the E-Mobil, for example, which runs on power generated at Hof 8, and I also travel by train. Even if I need to commute up to 10,000 kilometers a month, I can do it in a climate-neutral way.

What can a university do for greater sustainability?

Education is all-important. It is the first step towards change. It's my responsibility to teach students about sustainabi-

lity as an attitude to life and as a belief system. Whether this be in the construction industry, engineering professions, social occupations or in economics: The basic principle is the same wherever you go. Each year, 2,500 students graduate from Frankfurt UAS.

And when they have all learned to think and act sustainably, they will have become full-fledged "sustainability spreaders." And I hope I'm able to convince our students and colleagues both in my attitude to life and by way of active example in just as persuasive a manner as my dissertation supervisor succeeded in doing with me. I hope also that many teaching staff members will plant the seeds of sustainability in young minds. These seeds will then have to be watered by others for the idea to ripen and bear fruit. That is our major lever. And one day we'll have a prominent researcher among our graduates who develops some breakthrough technology that will bring about a permanent change in the world.

In your role as Vice President, what is your specific contribution to making this a sustainable University?

One of the reasons I took up the post of Vice President was to make the University more sustainable and to encourage everyone to join me on this path. I took up the post of Vice President with the aim of enlisting everyone's commitment to ensuring that our University operation, including our teaching and research activities, are aligned with more sustainable practices.

Are you confident of achieving your goal?

Yes, there is a tremendous amount of support for our Sustainability Strategy. It's really amazing to see so many people come up to me now and say they thought they were the only ones who were convinced that the University should also become more sustainable. I'm suddenly surrounded by so many enthusiastic supporters. There are some who are in favor of

declaring a state of climate emergency and others who would like to see small apiaries set up on the rooftops. My job is to support all of these dedicated comrades-in-arms and to empower them to achieve our goal.

What partners does the University need on its path to sustainability?

We have three main partners to begin with. First: the entire University Administration endorses the goal. Second: our faculties, including their curriculum development, must pull together.

And third: we need the support of our government, and this is the most challenging area. The Minister and her State Secretary are on board. But if we want or need to build new facilities, for example, then there are many regulations that stand in the way of sustainable building. For instance, there is one type of insulation material that is made from polystyrene. I'm in favor of slowing down the pace or intensity of building activity if only to ensure that new buildings are future-ready. I always keep this mantra in the back of my mind: we don't have the funds for going cheap.

What tool should you use to ensure the successful conversion to a sustainable University?

We have yet to develop the requisite tool. That's within the purview of our Green Office or our Sustainability Office. Monitoring and systematic reassessments of change will be performed, and reports submitted on our goal achievement level. This is to keep sustainability as a topic from being buried too deep under the shuffle of everyday life.

You drafted the Sustainability Strategy during the Corona pandemic with the help of digital capabilities. Is the simultaneous outbreak of the pandemic and materialization of the Sustainability Strategy a coincidence or mere quirk of fate?

It's just possible that there's a connection – for the simple reason that the pandemic has heightened our awareness of how vulnerable our world is. The crisis has called us to our senses. We may seem to accept it as a matter of course that everything is functioning smoothly, but this is anything but self-evident.

When did Frankfurt UAS and you – as its Vice President – achieve the stated goal with your Strategy?

The way is the goal. With energetic spirit and self-confidence towards greater sustainability and future-readiness – one step at a time: that is our goal.

I hope that many lecturers plant the seeds of sustainability in young people, who can spread sustainability awareness in turn.





People and nature

Reflections on a strained relationship

Professorial Chair of Educational Pathways and Social Participation in the Life Course
Prof. Dr. Yari Or

Prof. Dr. Or, what does your curriculum area — social work — encompass?

Social Work is a human rights profession, particularly also in this time of climate change, marked as it is by the global call for climate justice. But in the Anthropocene era in which we find ourselves today, and in which man has become one of the primary driving factors behind the current environmental crisis, we are being confronted with questions of an altogether different and far more fundamental nature. The call for climate justice, for a reduction in CO₂ emissions and for a change in lifestyle choices is not only necessary but also essential for our survival. Yet it is at least equally important to reflect on the reasons why we ended up in this situation. Not only to describe the phenomenon as such but also to comprehend why we, as one humanity, have allowed the environmental crisis — which we are now experiencing and which was already foreseeable long ago — to reach a critical tipping point.

In view of this, does Social Work mean understanding and describing individuals as part of a broader whole in their multifaceted interrelationships?

Yes, exactly ... and then coming up with answers that can be applied to these analyses. The potential role of Social Work as it relates to the environmental crisis goes beyond the impact of global North-South relations, as well as the erosion of meaning, not to mention the alienation prevalent in modern societies. On a theoretical basis as well, I analyze the relationship between people and nature to derive from this a subject-specific reorientation for understanding human development.

So ultimately it's about a comprehensive, deeper and even new understanding of people, their being and their interaction with nature?

Yes. Humanity has reached a stage of evolution in which it has become so technologically advanced and powerful that everything it does has an impact on all species as a whole on the planet and the planet's entire ecosystem.

Ever since the 1950s, we have been living so far beyond our means as to cause damage to many biosystems. We think of ourselves as beings of near-godlike power, but we're not. We've reached the point where the logic of progress — ever more consumption, ever more production, more and more overexploitation of natural resources, more and more destruction — has arrived its natural endpoint. We must desist from pursuing the path of egocentrism and anthropocentrism that we have taken in the past. The real evolutionary challenge that humanity faces today is to adapt our power and abilities, mindful of our responsibility to protect our planetary system.

Are we capable of bringing about a fundamental change of perspective, to no longer see ourselves as creation's crowning glory but rather as a part of nature?

The way we live and act is predicated on a conception of the world and humanity in which we, as human beings, exist independently of nature, as it were. This conception is the result of the Christian patriarchal worldview, according to which humanity perceives itself as separate from nature. Prior to that time, we viewed ourselves as one with nature, and sure enough we then wanted to elevate ourselves above nature. But this disconnect is no longer functional, assuming it ever was in the first place. Today, at any rate, the biological and social sciences teach us that human beings are part of nature and intertwined with all facets of the system as a whole — from the nano level through to our planetary environment. Once we come to realize this, we will be capable of taking action as never before and adopt a caring and regenerative attitude towards our planet.

From the way you describe your work, I would be tempted rather to place you as a scientist in the company of theologians and philosophers.

I'm an anthropologist and learning scientist with a focus on the developmental processes of adolescents. I always approach human development from a systemic perspective and pursue an interdisciplinary approach, meaning that I look both at social and at cultural belief systems, as well as biophysiological and psychological processes, in order to understand human development in its entirety. I believe that this interdisciplinary and holistic approach is necessary when it comes to a topic as complex as the impact of the environmental crisis on our lives.

My job at the moment is to review the existing literature and baseline studies — especially in psychology, medicine and the neurosciences — at a high, scientifically proven, peer-reviewed level and to further extrapolate the findings for our specific faculty. One question I ask myself, for example, is: Which are the genuinely specific impacts of environmental and climate changes on the development of children and adolescents here in Germany? What negative and what positive influence does nature per se have? And what does this mean for the field of Social Work?

What as yet unimagined negative effects does traffic-related air pollution have on people — apart from respiratory disease, for example?

Traffic-related pollutants in the air we breathe are absorbed into our bodies, where they cause damage not only to our respiratory tract and lungs but also to our central nervous system. They also lead to inflammation in the brain and thus affect both our well-being and our development. We now have ample evidence that exposure to pollutants is associated with major risks to the psychological development of

children and adolescents in addition to the risk of developing dementia. Environmental pollution is also perceptible on a social level as it can lead to ADHD, depression, anxiety disorders and even suicide. This close and multifaceted link between people and nature has not yet filtered through to the applied sciences such as Social Work or, for that matter, psychotherapy. When today's children act out, we tend to search for the cause in the family, in trauma, stress or problematic family constellations.

Is there also positive influence that nature has on humans as its subsystem?

Here as well, numerous studies demonstrate that contact with nature — with what we in science call blue and green spaces, i.e., forests, parks, rivers, lakes — has the potential to regenerate the human system both physically and psychologically. Bare-skinned contact with the earth — such as doing gardening work or romping in the woods — reduces anxiety and indirectly enhances our cognitive potential via a bacterium that we absorb into our body through our skin.

In what ways does Social Work currently contribute to sustainability?

On the one hand, it puts us in the position, on a scientifically founded basis, to call for the conservation of nature as comprehensive protection of human life and as an essential global and basic indivisible human right. Therefore, it can also act directly in the service of climate justice and contribute to the urgently needed socio-ecological transformation of society. Nature-based Social Work as a sustainable field in its own right can help to reconnect people with the “rest of nature” and offer support in regaining their physical and psychological health, on the one hand, and finding meaning and strength, on the other.

What then is sustainability?

A status quo that we need to attain, where we as one humanity can live in balance with the Earth as a system.

What role do science and higher education play in conveying sustainability as a new guiding principle?

We are only in the starting blocks. Within Social Work in Germany and Europe, the first proverbial seeds are now being sown. The first enthusiasts are coming together and consulting with each other on how we as a Faculty of Social Work can address the environmental crisis. On a global scale, social and natural scientists are reexamining outdated assumptions about the relationship between humanity and nature and brainstorming on what a new understanding that regards us as part of nature may entail for their disciplines. Universities, however, are not just places of research but also places of teaching. And there is a prevailing consensus among our students: we've got a problem.

People want to elevate themselves above nature. But that is no longer functional. If it ever was to begin with.





Streets as a green network of public spaces

On the international vitality of urban spaces

Professorial Chair of Sustainable Cities
Prof. Jeff Kenworthy PhD

Prof. Kenworthy, as Professor at Frankfurt UAS, you focus on sustainable cities in your research and teaching. What sparked your interest in this subject area?

It's difficult to say what ultimately sparked my interest in this topic. I think it was being nurtured already during my early childhood. We never owned a car. I lived in the inner suburbs of Perth, pretty much as a "freewheeling" child. I would ride my bike, catch tadpoles and tortoises in the nearby wetlands – and we took buses and trains on longer trips. To mingle with other people and add the spice of variety, my mother and I would take the train on weekends. I had a deep-rooted sense of what a sustainable city should be. My studies ended up being something of a launching pad for shaping and cultivating my interest in sustainable cities.

You spearhead the academic debate with an international perspective. How does the concept of sustainability vary across different countries and cultures?

Sustainability is the interaction of environmental, economic and social factors for the concurrent improvement of each factor. It's not about making a tradeoff or striking a balance between the different factors. Cities in the more affluent corners of the world are aiming to reduce not only their resource consumption but also the waste generated by this consumption while simultaneously improving their quality of life. In less affluent countries, resource consumption is far less wasteful than in the US or Australia and is in fact very low compared to other countries. In poorer countries, there is extensive justification for increasing resource consumption to meet basic human needs such as adequate food supply, shelter, education, healthcare and so forth.

How successfully has sustainability been implemented in Germany to date, and in which areas are even stronger efforts and initiatives called for?

One aspect that really floored me when I first came to Germany

was the stark contrast in terms of the quality with which houses are built in Germany compared to Australia. As a general rule, the bulk of houses in Australia are wafer thin. In hot or cold weather, the inside temperature will rapidly approach the outside temperature. Large amounts of energy are needed to either heat or else cool Australian homes. In Germany, by contrast, residential buildings are pretty much the exact opposite of what you find in Australia.

On the other hand, preferences for passenger cars continue to be a big draw in Germany – led by three of the world's best known manufacturers and with no speed limit on the autobahns. We are incessantly preoccupied with electric mobility in private transport with the notion that we might somehow convert our entire fleet of vehicles from diesel and gasoline to electric and that this would ultimately solve the whole transport sustainability problem. It's a trap – and we must do everything in our power to avoid falling into it. It's simply an illusion. Germany already has more than 500 passenger vehicles per 1,000 inhabitants. The best future is one in which cars take their place alongside all other forms of mobility as opposed to being the transportation option of choice.

All cars, regardless of their drive system, take up space. Roads and parking lots must be constructed. Envision a future in which streets look like a green network of public spaces – where our pedestrian and bike mobility needs in the social space outside our front door were at least on a par with vehicle drivers' entitlement to streets and parking space. Throughout urban history, streets have always had the function of being first and foremost a social space.

Will students graduating from Frankfurt UAS possess the depth of knowledge needed to be good ambassadors of sustainability?

My students most definitely will – as will those of my colleagues!

Let's take a look at the academic subject areas. Why do compact, mixed-use cities tend to be more sustainable than others?

Until 1850, the old compact "walking cities" were a common sight the world over. A compact city has a dense concentration of population, as well as other facilities and amenities, that can service most residents' needs locally – either on foot or by bike – coupled with access to well-functioning public transport services for longer trips. Less land consumption for loose urban sprawl and less extensive transportation infrastructure for cars – such as expressways and parking lots – translates to more protection not only for green spaces such as woods but also for peri-urban and inner-city food production. The irony is that dense European cities provide far more nature-based solutions and green infrastructure than do sprawling metropolises in the US and Australia, which have allowed their green spaces to vanish beneath asphalt and home expansions. And the more greenspace, the fewer heat islands we have and the better it is for cooling a city. Because urban temperatures sometimes soar to alarming levels and the number of heat-related deaths is increasing, it will be vital to provide the most natural cooling possible for cities. As our cities absorb vast amounts of energy, water, food and even people and cars from great distances every day, they produce huge quantities of waste and, environmental pollution.

Is there a chance that cities might be consumers and producers of energy, food and clean water at one and the same time?

Yes, there are abundant opportunities to generate renewable energy in cities by installing photovoltaic and solar thermal systems on roofs or building facades. In a closed-looped recy-

cling system, concomitant waste materials are upcycled into a sustainable source of resources. Wastewater can be easily treated to meet safe drinking water standards – and that using not only traditional wastewater treatment but also biological systems. Under the industrial food production system, today's cities are consumers of foods that have clocked up thousands of "food miles", which means that tremendous quantities of energy are embedded in their production and delivery – the proverbial "three-thousand mile Caesar salad."

What creates a high-quality public space and a vibrant public culture?

Cities are public spaces. With the degeneration of a city's public culture, we find a prevailing tendency towards inward-looking self-segregation among its residents. One of the many US cities that have guarded, gated communities is Los Angeles, which is sometimes referred to as "Fortress LA" and "the Ecology of Fear." These cities have public spaces that are largely unattractive and offer ample opportunity for crime in that there is no critical mass of people or of public activities to provide natural surveillance and a sense of security through social control mechanisms. This is sometimes described as "private splendor, public squalor." Cities that linger in people's memories are typically those that teem with life, color, interaction and multifaceted opportunities to gain a variety of experiences. Barcelona is known for La Rambla; Munich, for its Marienplatz and Karlsplatz pedestrian zones and also for its English Garden; New York, for Central Park and Times Square; London, for Covent Garden and Oxford Street; and Paris, for the Champs-Élysées.

Is democratic decision-making a sine qua non for all-round sustainability?

Sustainability, especially in cities, can really only be achieved where there is a shared vision of the future backed by ge-

neral consensus. This unavoidably includes the challenge of attempting to capture, accommodate and respect the diversity of opinions manifested in each city, and from there to forge ahead step by step, monitoring and assessing the progress made towards achieving these goals, which at least a majority of the population will have adopted as their own. It sometimes happens – when converting streets into pedestrian zones or introducing "traffic calming" – that a number of former detractors come to realize in the end that this change has been good for business, and more often than not the owners of these stores that had not been involved in the street conversion knock on the mayor's door and ask for the changes to be extended up to their store.

Sustainability is the interaction of environmental, economic and social factors for the concurrent improvement of each factor.





Risk Management

On the importance of being a role model

Professorial Chair of Finance and Digitization
Prof. Dr. Jens Müller-Merbach

Prof. Dr. Müller-Merbach, you had a career in bank risk management, worked for a very well-known bank and joined Frankfurt UAS in April 2020. Is sustainability a prominent issue for banks?

Lately, yes. Global climate change and its consequences are perceived as a risk in the financial sector as well. For example, if a loan is secured by a forest tract and the forest is degraded or destroyed, then the collateral will lose value as well. Regulators became aware of this and instructed banks to adequately assess the sustainability risks associated with a given investment. And a penalty capital surcharge is slapped on banks carrying an excessive level of risk on their books. It all sounds very functionalist, but the goal without question is greater sustainability in their books.

As a banker, were you surprised when regulators brought to banks' attention a lack of sustainability as being a collateral/security risk?

At first, yes, absolutely. Yet for the banking industry this was an unexpected albeit salutary wake-up call to integrate sustainability criteria into technical/substantive risk assessment processes. This is has also become an issue for qualification requirements in the recruitment of junior staff.

By when will we have a sustainability risk assessment standard?

For the most part, we – policymakers, regulators and banks – have not succeeded in establishing such standards quickly enough for completion within the timeframe. Although regulators are actually now, in fact, already expecting a well-qualified commitment to the issue of sustainability, a standard with a flexible methodology should be finalized by 2023. To be sure, the ESG Disclosure Regulation as framework recently came into force in March 2021, and the European Banking Authority (EBA) just issued a draft definition for a green asset ratio – so tangible progress is increasingly in the making.

How will such a standard for assessing sustainability risks change the world?

If banks are required to disclose their green asset ratios, then you have a common basis for discussion and comparison purposes. And, after all, people want figures as a basis for factual discussion. So if banks have at their disposal a large data pool on sustainability risks, we can also better justify certain policy measures for enhancing sustainability. A number of banks are already pulling out of financing coal-fired power plants at least.

Is the University working on tools for banks to use in devising and applying sustainability criteria?

There already are a few topics I would like to assign as Bachelor's or Master's theses in Sustainable Finance. For instance, we could study the issue of whether investors are in fact opting for green financial products – or whether it's all just hype. There are of course many funds out there that label themselves sustainable. But are they truly? There are major agencies that perform sustainability ratings. But what exactly are they measuring, and how do they go about it? Given that sustainability measurement is data-intensive, the topic converges on digitization issues.

Has the University set itself the specific task of adopting sustainability as a theme?

Yes, by virtue alone of the University's identity as a role model. Universities have always been beacons of social transformation. We have young people studying here who, on the one hand, benefit from character-building experience while deepening their knowledge and understanding; and, on the other, are still in the Sturm und Drang mindset and want to make a difference. That is yet another reason why we developed our Sustainability Strategy, on which 20 to 30 members of the University worked with disciplined focus.

I was previously employed at a bank. There we also had projects on which up 60 people worked, but I would never have even dreamed of bringing them all together in a video meeting. That would have flopped miserably. That's where a university's culture of discursive discipline is very fruitful.

In what ways does university culture differ from bank culture?

Complex problems are solved at both of these institutions. Intrinsic motivation is more pronounced at a university. Whoever wants to make a difference will join in. Companies tend to focus on problem-solving, yes, but it's also about the whole attention economy as a springboard for careers. Companies' approach to work is highly content- and results-based but staff must also come up with their own ideas and, above all, market themselves as ideators. What also counts alongside professional interest is: What do I get out of it? How does this help to advance my career?

How capable are banks of effecting paradigm changes?

Banks are quite conservative in their outlook and practices. But many of them have been integrating sustainability into their reporting processes for some time now. Still, companies engage in climate protection not for its own sake but because, by their own admission, their clients expect it of them. And it is important to also understand that bank boards have a clear mandate, to wit: managing companies successfully – and it says nothing about reducing carbon emissions. Other success-relevant goals may be introduced but will not be achievable simply by replacing a few people at the top. But if policymakers, the European Union and regulators set a goal, that will get the ball rolling.

Is the EU setting goals and triggering policy improvements?

Yes, the EU is using its Green Deal under Commission President von der Leyen to ratchet up the pressure. The EU is setting the

wheels in motion – and on a significant order of magnitude. The EU is consequently giving numerous impulses for assigning Bachelor's thesis topics though very little can be found on the subject in the media. Also the ECB's push for green quantitative easing (green bond purchase program) under Christine Lagarde harbors big changes. The EU is getting more done than German policymakers are.

How might German policymakers strengthen sustainability with economic regulations?

The German Stability Act, in force since 1967, was designed to promote price stability, employment and external trade balance, as well as steady, adequate economic growth, but numerous attempts to integrate sustainability have failed. And now we're even witnessing German opposition to the ECB's green monetary policy. I find that truly exasperating: the minute you get down to real specifics, it gets rejected. No advantage is being taken of the announcement effect for greater sustainability.

Is the University accepting of you as an economist gunning for sustainable finance?

Environment, economy and social sustainability are not naturally opposed to each other but do call for active regulation to achieve mutual compatibility.

What specifically can Frankfurt UAS do to make itself and its environment more sustainable?

The task force has already developed many targeted measures. As a University, we highlight in our mission statement our close connection with Frankfurt and the Rhine-Main region. Once the Corona crisis is behind us, we might consider adopting a sharing economy concept and, instead of leaving our heated rooms empty during the evenings, for instance, make them available to other users in the region, assembly rooms being a scarce and expensive commodity in Frankfurt.

What long-term impact do you aim to achieve in implementing sustainability as Frankfurt UAS?

Thinking ahead, we don't just want our students to switch to bicycles for transportation; we want them to become interested in, and open to, sustainability issues on a lasting basis. In my advanced lecture, I bring home to them how important sustainability will become in business reporting due to regulatory requirements alone, and this additionally translates to great job opportunities. That applies analogously to engineering, you can be sure. The topics are different, but the underlying idea is the same.

Environment, economy and social sustainability are not naturally opposed to each other but do call for active regulation to achieve mutual compatibility.



Sustainability is firmly anchored > The Deans on the status of sustainability in the faculties

“According to the European Commission, buildings account for 40% of energy consumption and 36% of CO₂ emissions in the EU. The German government’s ambition is to have a climate-neutral building stock by 2050. Climate neutrality and sustainability play key roles also in the areas of mobility and water management. Well-founded specialist knowledge is required for this, which we provide in our degree programs that focus on the sustainable design, construction and operation of buildings and municipal infrastructure. We plan to supplement this with additional study programs in the fields of environmental infrastructure, urban planning and sustainable mobility in order to provide students with an even more comprehensive education to meet the challenges of the coming decades.”

Prof. Dr. Monika Horster

> Dean of Faculty 1: Architecture · Civil Engineering · Geomatics

“Today, sustainability is no longer simply a pragmatic principle for optimizing resource use in an economic sense but rather the responsible management of our environment in terms of technical, economic and social implementation. The engineering sciences have always been, and will continue to be, converters of these resources into their application. In teaching and research at the Faculty for Engineering and Computer Science at Frankfurt University of Applied Sciences, we acknowledge and accept our responsibility for sustainable environmental management in our three clusters – mechanical engineering, electrical engineering and computer science. We live and teach this principle in the basic fundamentals, ranging from analyzing efficiency factors and sustainable design through to modern applications, e.g., intelligent systems.”

Prof. Dr. Hektor Hebert

> Dean of Faculty 2: Computer Science and Engineering

„Sustainability encompasses the three dimensions of social equity, environmental viability and economic effectiveness. This triad is integrated into our teaching and also into our research. The realization that we must change the way we interact with the world so that the next generation will also be able to live in it is conveyed in our teaching on an ongoing basis as a matter of principle. Sustainability is also of fundamental importance in research – in the focal areas of mobility and logistics, for example: we conduct research on sustainable changes in urban logistics and air transport. Our focal point of leadership is concerned with providing fresh impetus to (re)thinking and taking action in corporate and organizational management.”

Prof. Dr. Kai-Oliver Schocke

> Dean of Faculty 3: Business and Law

“All sustainability dimensions have to be implemented systematically across the board. The process starts with the individual behavior, addresses all organizations – including our University – and extends to the political decision-making bodies. By the same token, social sustainability is the basis for globally stable societies with decent living and working conditions. Globalization, migration, human rights, social standards, healthcare, inclusion, and diversity make up only a fraction of the topics being worked on, researched, and taught in each of the disciplines represented by the faculty. Our focus in the future will be on implementing sustainability as a mainstream approach in such a way that it is fully integrated into our processes and decision-making.”

Prof. Dr. Gero Lipsmeier, Prof. Dr. Barbara Klein

> Deans of Faculty 4: Social Work and Health



> Off to a Sustainable Start — Now

Status quo

Sustainable thinking and acting is no option but rather the order of the day, a responsibility that extends to everyone here at Frankfurt UAS. Anywhere, any time. Ignorance and carelessness often lead to actions with undesirable consequences. And they frustrate attempts to find better solutions. That is why we address the need for certainty and self-assurance by compiling (in the pages that follow) the wide range of different activities available at this University within the context of sustainability. This truly impressive inventory provides guidance as to where our strengths lie and where we can still improve.

We are embarking on a new era. This has been conclusively demonstrated by the Corona crisis. **Sustainability is the central theme.** For society as a whole, and in particular for us as a University.

- | We aim to become a carbon-neutral university by 2030.
- | Professorships in sustainability are to be established in each faculty to strengthen research in this area, promote interdisciplinarity and contribute to advancing dialogue and exchange both with policymakers and with society as a whole.
- | An office for sustainability is set up as a Green Office to systematically integrate sustainability into teaching, research, transfer and internal operations, in addition to bundling existing approaches and projects, in order to achieve greater dynamic capabilities for sustainability.

Achieving what we set out to do!

Each and every one of us – both as members of the University and individually – is called upon and has a responsibility to contribute towards greater sustainability for a better world. We are measured by how we ourselves live and work. With a view to the needs of our fellow human beings: **environmental, economic and social.**

> There's Still More that Can Be Done ...

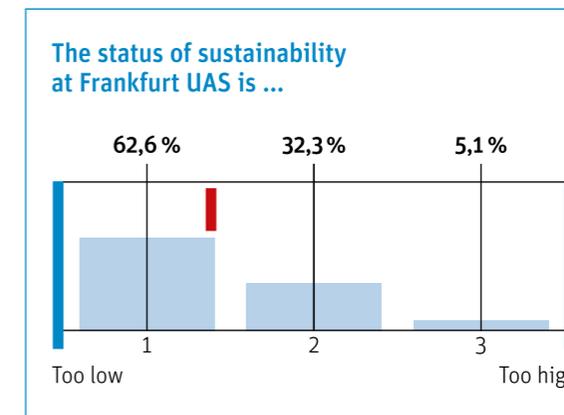
In order to ascertain the extent to which the principles of sustainability have already been integrated into teaching and learning, research, Continuing Education, transfer and University operations in accordance with the 17 Sustainable Development Goals of the United Nations – and also where University staff members see potential for development – surveys were conducted in the 2020/2021 winter semester in the areas of

- | Studies and Teaching
- | Research and Development
- | Continuing Education and Transfer
- | University Operations, incl. Mobility Patterns

An online survey was conducted over the period October 1-30, 2020, inviting 15,626 students (with a response rate of 2.0%), 468 administrative/technical staff (response rate: 22.4%) and 948 teaching staff (including 258 professors, 46 teachers for special responsibilities, 690 adjunct lecturers and 114 scientific staff members: response rate: 10.6%).

In addition, data recorded in the Research Information System (RIS) on publications, research and development projects was evaluated, as were the comparative carbon footprints of Hessen's universities culled from the project report of the HIS Institute for Higher Education Development e.V. [HIS-Institut für Hochschulentwicklung e.V.] (2020).

Our report on the mobility patterns of University members is based on surveys conducted by the Research Lab for Urban Transport (ReLUT: survey sample periods 03/2017 and 03/2018).



As part of a survey conducted during the 2020/2021 winter semester on the development of a Sustainability Strategy, nearly 63% of University members belonging to all status groups responded that University's sustainability status was too low, while 5.1% stated it was too high and 32.2% felt it was adequate. A total of 522 University staff members were surveyed, of whom the student body accounted for 60%; teaching staff, 19.3%; researchers, 7.9%; and administrative staff, 20.1% (multiple responses by teaching staff/researchers were possible).

Of those surveyed, 36.6% responded that they would be available as ambassadors of sustainability; 13.3%

responded similarly, provided that the time commitment be within reasonable limits and/or commensurate with studies/professional activities. Remuneration is proposed for students; course releases and/or reduced workload is proposed for tenured/civil servant University staff.

A resource-efficient method of managing working time is planned as a prerequisite for the collaborative process, safeguarded by means of good preparation, specific tasks/projects. An additional prerequisite for the collaborative process is shared fundamental values. In this way, concrete measures are to be implemented in practice – and not just in words. The acceleration of University processes is crucial in this connection.

“Our students bring with them a natural aptitude for sustainability.”

Prof. Dr. René Thiele

> Vice President for Studies and Teaching

> Teaching and Studying Sustainability

A Status Report

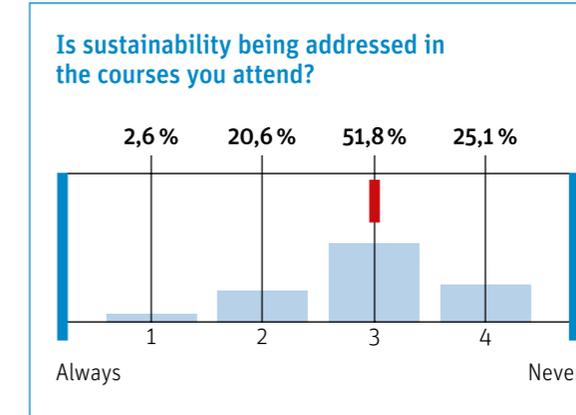
A total of 313 students took part in our online survey:

- | 16.9% from Faculty 1:
Architecture · Civil Engineering · Geomatics (*18.6%)
- | 22% from Faculty 2:
Computer Science and Engineering (*38.1%):
- | 12.2 % from Faculty 3:
Business and Law (*21.5%)
- | 33.9% from Faculty 4:
Social Work & Health (*21.9%)
- | 5 % in an interdisciplinary study program.

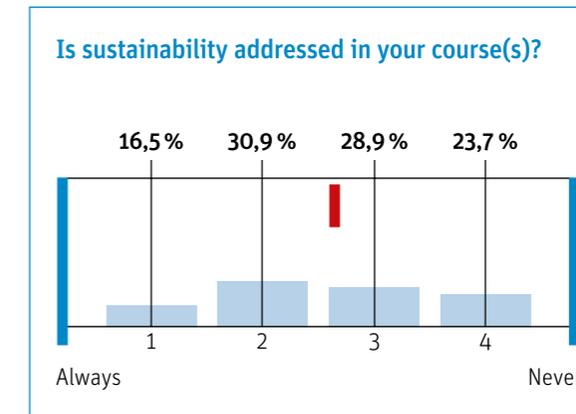
(participation rate of students in 2019. Source: QEP and StuPort departments)

On the teaching staff side (professional staff, teachers for special responsibilities, adjunct lecturers and scientific staff), 101 persons participated in the survey; the largest group being from Faculty 2, at 39.6% (*22.5%); and Faculty 4 having the lowest participation rate, at 15.8% (*35.2%). The participation rate among respondents from Faculty 1 was 17.8% (*18.3%), compared to 22.8% (*24 %) from Faculty 3. (*participation rate of teaching staff in the faculties, source: QEP Dept., survey date: 12/31/2019).

When asked if – on a scale of 1 (“always”) to 4 (“never”) – the topic of sustainability was addressed in courses attended, 51.8% of students responded with a rating of 3; 25.1%, with “never”; and 20.6%, with a rating of 2. A total of 2.6% responded that the topic of sustainability formed an integral part of their course at all times.



By comparison, the fluctuation of the teaching staff’s response rates was less substantial, with the most frequent rating being 2, at 30.9%, followed by a rating of 3, at 28.9%, and the least frequent rating of 4 (“never”), at 23.7%.



A total of 16.5% of teaching staff responded that sustainability was always addressed in their courses.

Sustainability certificates

To the survey question of whether it was currently possible for a sustainability certificate to be acquired, 99% of the teaching staff responded in the negative. This is offered only in the Master’s degree program Sustainable Structures with the exam for a “Young Professional of the DGNB.”

Courses

A total of 68% of the students were in favor of offering more courses on topics relating to sustainability.

Based on the open responses, general and specialized thematic categories were established for the purpose of properly assigning the topics listed.

General knowledge

- | sustainable nutrition,
- | benefits of fairly traded food products, responsible consumption
- | sustainability in (everyday) work situations,
- | impact of factory farming,
- | environmental
- | climate protection
- | interdisciplinary topic digitization with a view to contributing to environmental protection

Specialist knowledge

Faculty 1: Architecture · Civil Engineering · Geomatics: environmentally friendly and/or sustainable materials, critical management of concrete, building materials and their energy consumption/life cycle, sustainable construction, environmentally sound construction processes, renovation, restoration, rehabilitation, upcycling, sites and locations, design, recycling in demolition vs. recyclable raw materials in new building and practical applications of theory.

Faculty 2: Computer Science and Engineering: effective use of (collected) data for process optimization, green IT, resource-efficient programming, EE, energy revolution, power generation, efficient production, e-waste disposal, etc., recycling, sustainable materials for vehicle construction, where and how are materials sustainably sourced?, what chemicals have what kind of impact on environment/nature?, social responsibility of engineers.

Faculty 3: Business and Law: sustainability in economic and corporate activities, sustainable corporate governance/management, sustainable investment, sustainable economics, social entrepreneurship “short-term returns/long-term costs due to clear-cutting/carbon emissions,” sustainable resource use, sustainable controlling, business law (also at EU level), linkage of computer science with business through sustainability.

Faculty 4: Social Work & Health: sustainable business ideas, sustainability in Social Work, sustainability in working life, sustainability in social institutions, education for children and adolescents towards sustainable development, effects of sustainable housing and sustainable nutrition on clients’ quality of life, diseases of civilization, waste avoidance in clinical contexts, resource-efficient use of teaching materials, long-term and short-term impact evaluation, evaluating meaningfulness of interventions/impacts of measures in terms of environmental and economic consequences, B.A.: economy and implications for the climate crisis, methods of feasible sustainability concepts, environmental management, exploitation of people in developing countries/major corporations that disregard environmental standards in developing countries, major corporations that disregard human rights, healthful nutrition and lobbying, financial viability of sustainability also for welfare recipients, is sustainability a question of affordability and/or what other possibilities for taking action are there?, social justice, ethical and political sustainability, resource justice.

Teaching forms

Of the teaching staff surveyed, 22.7% indicated that they were aware of didactic teaching forms they considered particularly suitable for exploring the topic of sustainability, whereas 77.3% responded in the negative.

The general question put to teaching staff was whether teaching forms suitable for exploring the to-

pic of sustainability differed from those typically employed at a UAS.

Once awareness of sustainability is raised, respondents felt it was important to become familiar with, and learn to differentiate, the various definitions of the topic. Respondents also noted that environmentally, socially and economically balanced developments for the preservation of a viable and sustainable future should be outlined. Intergenerational and global justice, as well as an understanding of general principles, round out the curriculum. The interdisciplinary approach in the transfer and development of curricula was regarded as essential.

For the further development of didactics in teaching sustainability, reference was made to, inter alia, “Didactic principles for education for sustainable development in teacher education, ESD Consortium COHEP, 2013 [Didaktische Grundlagen zur Bildung für Nachhaltige Entwicklung in der Lehrerinnen- und Lehrerbildung, BNE-Konsortium COHEP, 2013].” In general, a variety of teaching methods are encouraged in our courses; ranging in detail from scientific analyses and general principles through to “thinking in processes with explicit criteria for success.” In this context, the particular focus is on clarity and descriptiveness to bridge theoretical knowledge with the practical implementation of sustainability topics. Respondents noted that the relevance of a critical examination of

sustainability for professional and personal future goals should be demonstrated using personalized reports, case studies and/or specific examples (projects, simulation games and the like).

In addition, by integrating sociopolitical developments into personal lifestyles (including consumer habits, personal life design), it is possible not only to render visible the full impact of our own actions but also to foster and discuss an understanding of personal responsibility.

Digital teaching

As a consequence of the Corona pandemic, the 2020 summer semester took place predominantly online under extraordinary circumstances. Based on this experience, the following advantages and disadvantages were called out with regard to sustainability: respondents noted that they were able to conserve perso-

nal resources such as health and time thanks to digital courses and to manage their time more flexibly.

In addition to reducing commuting-related CO₂ emissions, working from home and online courses helped to cut down on traffic congestion and mobility costs. Speed of information gathering was perceived as positive.

With respect to the courses themselves, positive reference was made to the fact that intensive digital media involvement had improved digital working and its management. Conserving courses meant that they could be taught multiple times by teaching staff and offered to students.

By contrast, private financial resources were strained as a result of increased energy and paper consumption or also upgrading the technical infrastructure and emissions in private consumption such as waste and CO₂ emissions.

Based on the feedback received, teaching quality suffered from a lack of – most particularly – nonverbal communication, social networking and interaction. But also limited technical support made the transition to digitization difficult. Respondents noted that they were more easily distracted than during in-classroom teaching. They also indicated that teaching methods based on haptics and immersive experience were possible only with some difficulty. The connection to the University as a place of teaching and learning was also lacking and generally missed.

Teaching modules

In order to allocate teaching modules to the topic of sustainability using a) “mostly” or b) “taught marginally” as differentiation criterion, the faculties listed and classified the corresponding teaching modules in the 2020/2021 winter semester, assigning key terms as appropriate:

Faculty 1: Architecture · Civil Engineering · Geomatics

With some 2,900 students, the Faculty is one of the largest in its areas of expertise in the Rhine-Main region. Its salient features are close networking with the regional planning and construction industry and high practical relevance. In research, the focus is on planning and construction, mobility, renewable energies and digitization.

To round out the portfolio, new study programs are being introduced in urban planning, infrastructure

and the environment (all Bachelor's programs) in addition to facility and real estate management, as well as sustainable mobility (all Master's programs).

Sustainability, in conjunction with energy efficiency, for example, is given a high priority in teaching and research on "Resource-efficient planning, construction and operation" and "Sustainable urban, rural, infrastructure and mobility planning"; instructional aspects addressed in many modules range from was-

terwater treatment through to sustainable urban development.

The Faculty currently offers 7 undergraduate Bachelor's and 9 Master's degree programs, with a total of 89 Bachelor's and 38 Master's modules in the subject area of planning-building-operating, in which the topic of sustainability is addressed either peripherally (66 Bachelor's and 2 Master's modules) or as a core topic (19 Bachelor's and 21 Master's modules).

Resource-efficient planning, building and operation

Building materials and material testing

- > Resource conservation
- > Materials and their environmental impact
- > Material selection under recycling economy aspects/life cycle assessment (LCA)
- > Energy input for material production/gray energy
- > Energy-efficient construction
- > Life cycle costing
- > Sustainable waste management

Sustainable planning, building and operation of buildings

- > Energy-efficient building
- > Thermal insulation and demand reduction
- > Resource optimization
- > Examples of zero- and low-energy buildings
- > Night ventilation, natural ventilation
- > Sustainable energy supply
- > Energy supply grids
- > Energy management
- > Energy management concepts in buildings, industrial plants and municipal facilities
- > Optimization of pipe and duct systems for reducing pump and fan power requirements
- > Optimization of control technology to reduce energy consumption
- > User comfort and guarantee of energy savings via control

- > Management of buildings throughout life cycle
- > Performance data of buildings
- > Calculation and simulation methods
- > Learning the basics of sustainability certificates
- > Benchmarking

Renewable energies

- > Analyses of renewable energy potentials
- > Carbon footprints
- > Use of regenerative energy systems in technical building infrastructure [Technische Gebäudeausrüstung (TGA)]

Sustainable urban, rural, infrastructure and mobility planning

Urban planning and land management

- > Sustainability as basic principle of planning
- > Sustainable urban development
- > Best practices of sustainable urban development worldwide
- > Mixed-use urban quarters
- > Compact city
- > Urban green spaces for climate protection and climate adaptation: water, climate, plants, animals and their role in urban ecology
- > Inclusive public spaces
- > Sustainability in land redevelopment
- > Wasteland recycling (use of brownfield sites and vacant lots)
- > Technical environmental impact assessment/environmental law/EIA

- > Environmental assessment
- > Competing sustainability goals
- > Socially equitable land use and building land models

Mobility

- > Designing sustainable transport systems (environmental, social, economic)
- > Sustainable urban mobility
- > New forms of mobility
- > Vehicle-free and low-traffic cities
- > Pedestrian and bicycle traffic
- > Local mobility
- > Traffic avoidance and traffic guidance systems
- > Strengthening the environmental network

Waste and resource management, urban water management

- > Sustainable water supply and disposal, climate change impacts
- > Sustainability in water management
- > Water as resource
- > Long-term water supply security
- > Water reuse
- > Hot water production using renewable energy systems
- > Water-efficient fittings

Interdisciplinary approaches to design, planning and utilization

- > St. Gallen Management Model
- > Social and cultural aspects in planning, building and operation



Sustainability Focal Points

Faculty 2: Computer Science and Engineering

With more than 5,000 students, the Computer Science and Engineering Faculty is the largest technical faculty in Frankfurt and the Rhine-Main region. The primary focus is on instructional quality. Projects with a high level of practical relevance serve to map out future occupational fields in conjunction hands-on practice and to integrate social skills such as teamwork and intercultural competencies into the transfer of technical knowledge. An additional aspect is the generally close proximity to students, who work in small groups and with easily approachable teaching staff.

The lab learning center is a key facility for learning subject-specific and interdisciplinary skills and is a quality feature of the Faculty.

Sustainability is addressed in research and teaching in the fields of sustainable product development (EcoDesign), life cycle assessment (LCA), renewable energies and energy efficiency. In light of the existential importance of global environmental changes for present and future generations, as well as the growing relevance for professional activities, these topics are

being expanded and anchored in our study program curricula.

In Faculty 2: Computer Science and Engineering – we offer 17 Bachelor's and 9 Master's degree programs, with modules in which the topic of sustainability is addressed either peripherally (11 Bachelor's and 3 Master's modules) or as a core topic (11 Bachelor's modules and 1 Master's module).

Product development and technical design

- > Environmentally compatible and recycling-friendly product and design development
- > Assessment of environmental damage caused by technical products
- > Technology impact assessment methodology in product development
- > Energy and resource efficiency awareness
- > Sustainability in design
- > Linkages between sustainability and innovation
- > Analysis and evaluation of technical product life cycles with their energy and material flows
- > Potentials and challenges of sustainable product development
- > Development of sustainable product systems and product service systems
- > Reflection on the effects of technical product obsolescence
- > Modelling, simulation and evaluation of environmental characteristics
- > Life cycle assessment
- > Application of life cycle assessment software systems and databases
- > Abbreviated assessment methods
- > Product carbon footprint
- > Screening LCA
- > Sustainable service life design of technical products

- > Designing technically feasible, economically viable and environmentally friendly products and value chains
- > Reflection on ethical, social, societal and environmentally relevant aspects of products and knowledge transfer to future work settings as engineers

Electrical engineering and information technology

- > Renewable energies
- > Emissions reductions in the energy market
- > Energy-efficient electric drives
- > Energy generation and distribution: structural change in the energy sector
- > Decentralized energy generation and distribution for greater social acceptance

Mechatronics

- > Electromobility

Bioprocess engineering

- > Renewable raw materials

Mechanical engineering

- > Alternative drives and vehicle management systems

Sustainability Focal Points



Faculty 3: Business and Law

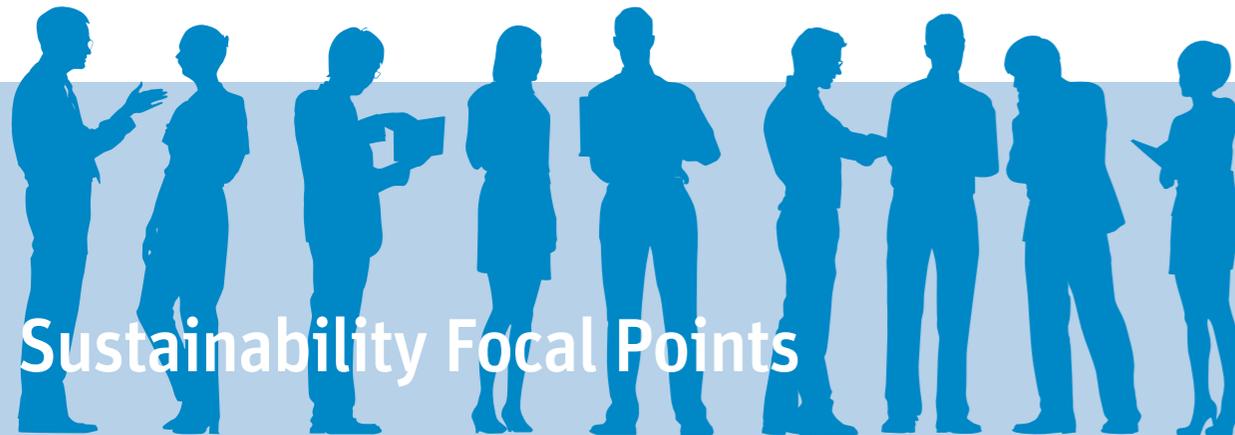
With some 3,700 students, more than 55 teaching staff, approximately 180 adjunct lecturers and over 40 scientific and technical/administrative staff, Faculty 3 is one of the well-established faculties of economics and law in the German university landscape. Upwards of 800 students begin their studies in 19 admission-restricted degree programs each year. The faculty offers excellent general, specialized and dual Bachelor's and specific Master's degree programs.

The faculty profile will continue to be scaled up in the coming years, established beyond the Rhine-Main region, and contribute to a positive image of the University as a whole. Our program development is based on transparent and uniform criteria.

It incorporates social developments such as demographic change in addition to economic trends. The faculty

has attained an outstanding level of technical sophistication in its dual-degree programs.

Sustainability in its three dimensions – environmental, social and economic – is embedded in many modules and integrated into faculty self-governance. In addition, professorships are being established that approach the topic of sustainability from the perspective of the three focal areas “Logistics and Mobility,” “Management and Leadership” and “Compliance and Conflict Resolution.” The faculty currently offers 11 undergraduate Bachelor's and 8 Master's degree programs, with a total of 42 Bachelor's and 18 Master's modules, in which the topic of sustainability is addressed either peripherally (29 Bachelor's and 17 Master's modules) or as a core topic (14 Bachelor's modules and 1 Master's module).



Sustainability Focal Points

Aviation Management

- > Role of air transport in the tradeoff between society, policy, economy and environment.
- > Environmental policy aspects of flight production, aircraft approach procedure, landing, taxiing, positioning and handling processes.
- > Development of visionary airspace structures; sustainable airline business models.
- > Elaboration of airline development prospects, as well as the importance of strategic partnerships for sustainable mobility; comprehending strategic connections for corporate sustainability decisions.

Tourism Management

- > Relevance of sustainability in destination management.
- > Importance of digitization and sustainability for the mobility industry, sustainability strategies/concepts for mobility services with particular focus on the tourism market.
- > Operator forms, strategies, organizational structure and workflows
- > Students are able to develop, market and gain an operative understanding of tour operator offerings – from product idea to market readiness. They are able to evaluate product potential based on customer and market analyses and to select profitable products.
- > Expanded development of grammatical language functions for situations in daily work-related life with regard to the ethical focal point from the areas of environment, sustainability and social responsibility.
- > Students learn to analyze current trends and developments in the business travel market and to apply their knowledge to companies and processes.

Aviation and Tourism Management

- > Apply spatial economics and regional structures in the context of aviation and tourism. Realize impact of the industry on the environment. Comprehend sustainability management. Plan infrastructure sustainably.

Public Administration

- > Economical and environmentally sound use of work/organizational resources

Public and Non-Profit Management

- > Understanding the impacts of environmental policy measures; analysis of developmental economic questions and problems.
- > Gauging sustainability and the need for reforming the German social security system against the backdrop of theories of market failure, changing values, social transformation and demographic challenges.
- > Importance of economic, environmental and social sustainability, as well as sustainability criteria/strategies. / Environment and development

International Business Administration

- > Market failure and the role of government (efficiency of competitive markets; externalities and public goods)
- > Students are able to apply the core concepts of marketing and marketing management. They also are able to apply the core concepts of logistics and production, especially within the service and manufacturing industries.
- > Trade and the environment
- > In-depth understanding of global marketing and its opportunities and problems, of the implications of global environmental factors for business.
- > Instruments of business ethics management, CSR, Business Ethics Standards
- > Sustainability of investment strategies/sustainability in investment management/importance of capital for sustainable development/sustainability aspects: environmental, social, corporate governance
- > Procurement, distribution and disposal logistics
- > Controlling-based management action recommendations

Business Administration

- > Market failure and the role of government (efficiency of competitive markets; externalities and public goods)
- > Sustainability of investment strategies/sustainability in investment management/importance of capital for

sustainable development/sustainability aspects: environmental, social, corporate governance

- > Procurement, distribution and disposal logistics
- > Controlling-based management action recommendations
- > Ethics management tools, CSR, ethics
- > Sustainability of investment strategies/sustainability in investment management/importance of capital for sustainable development/sustainability aspects: environmental, social, corporate governance

Business Law

- > Sustainability and ethics in corporate activities in the HR area
- > Drafting legally binding contracts in various areas of business law
- > Current developments in corporate governance in Germany, Europe and abroad, with focus on the US; requirement profiles, conflicts of interest and remuneration; monitoring tasks grouped horizontally and vertically and in the corporation; transparency through accounting and other instruments; role of auditors
- > Contemporary human resources management with a view to sustainable and ethical conduct
- > Liability risks for the corporation, its managers and supervisory board members; consulting and insurance; setting up and maintaining a compliance organization

Tax Theory

- > Income tax regulations for promoting sustainable action.

Accounting and Finance

- > Underlying principles and techniques of different approaches to financial decisionmaking of corporations and individuals in a social environment with regard to business ethics.
- > Students are able to combine their skills from different modules and subjects in order to apply them to a complex case study or research project. In particular, they are able to analyze and understand the social implications of their findings.

- > Integration of social and ethical objectives into key performance indicator systems
- > Future-ready enterprise

Global Logistics

- > Based on the mathematical solution, they are able to draw practical conclusions that take economics and social aspects into account.

Leadership

- > “At the end of the module, students should be able to explain how today's businesses use strategic management to establish a sustained competitive advantage in an international environment and to understand the key topics of formation and implementation of strategies in the global environment, the building of strategic alliances, negotiation and cross-cultural communication, international marketing, and corporate social responsibility.”
- > Students are able to identify leadership challenges in a complex and dynamic environment, analyze how they promote a holistic understanding of leadership, describe how they develop relationship in virtual, agile and non-hierarchical settings, explain how they encounter dissolving boundaries of organizations, hierarchies, working structures and cultures and discuss the importance of resilience and prerequisites to develop resilience.
- > Work and performance evaluation as basis for incentive design / personal development as incentive / increasing the flexibility of working time, place and structure / leadership under incentive aspects, incentive design in teams, emotional leadership, value-oriented leadership.
- > Students are able to analyze scenarios of possible developments in society, the economy, ecology, geopolitics, politics and families in order to develop new hypotheses and to outline and explain the balance between stability and flexibility in social systems.
- > Current topics in leadership, state-of-the-art models in current leadership, latest leadership theories, in particular leadership styles; leadership behavior; strate-

gic human resources management; performance-based compensation systems; modern working time management; current forms of personnel assessment; concepts of change management; international aspects of leadership behavior; virtual leadership; relationship between leadership, organization and human resources management.

Strategic Information Management

- > “At the end of the module, students should be able to explain how today's businesses use strategic management to establish a sustained competitive advantage in an international environment and to understand the key topics of formation and implementation of strategies in the global environment, the building of strategic alliances, negotiation and cross-cultural communication, international marketing, and corporate social responsibility.”
- > Students are able to analyze scenarios of possible developments in society, the economy, ecology, geopolitics, politics and families in order to develop new hypotheses and to outline and explain the balance between stability and flexibility in social systems.

Negotiating and Designing Contracts

- > Students explore economic implications of legal rules in situations involving competition for scarce resources for cooperation, communication and conflict resolution.
- > Environmental due diligence within the scope of company valuation

Industrial Engineering

- > Understanding team processes as managerial function with the aim of sustainably enhancing corporate strategic goals.
- > “Students are able to conceptualize in technical, economic, environmental and social categories./ They are able to include social and environmental aspects in their decisionmaking processes.”
- > Analysis of forms of delegation, corporate organizational trends, CSR and diversity

Faculty 4: Health and Social Work

With more than 3,500 students, Faculty 4 is one of the largest Social Work faculties in Germany. It covers the entire spectrum of Social Work issues ranging from Bachelor's and Master's degree programs through to doctoral studies, jointly with the cross-university Doctoral Center Social Work. The study portfolio includes diversity, inclusion, migration, addiction, poverty, sustainability as well as culture and media in social work. This is what makes the Health and Social Work degree program in Frankfurt unique.

The faculty stands out for its high research intensity, with 10 research institutes, a large number of researchers and its embeddedness within research-oriented teaching practices. The faculty profile will be further expanded over the next few years: new degree programs such as clinical nursing and science-based midwifery

are being established with new learning facilities such as high-tech skills labs.

Vocational pedagogy for health professions is being further established.

Social sustainability has always played a key role among teaching staff and students. This is reflected in numerous modules of our study programs.

In the coming years, we will expand our focus to include other aspects of sustainability. To serve that purpose, a task force has been set up and a dedicated professorship is being established.

Restructuring plans are underway for the Health Faculty. For example, the faculty is currently developing a clinical

care study program in accordance with the new regulatory framework. Furthermore, the faculty is establishing professional pedagogy for health professions and midwifery education as a new subject area.

The faculty welcomes and supports the introduced measures and discourses to embed sustainability aspects in the University operation and teaching. A task force is dedicated to promoting this important topic internally.

Currently, the faculty offers 5 undergraduate Bachelor's degree programs and 8 Master's degree programs, as well as two continuing education Master's degree programs. In total, the faculty has 23 Bachelor's modules and 8 Master's modules in which the topic of sustainability is addressed either peripherally or as a core topic.

Social Work

Nature-Based Social Work

> Elementary pedagogy, out-of-school education for children and juveniles, leisure time education, experiential education, social policy developments, models and core values with a view to politically defined framework conditions for Social Work; significance of social policy standards for general framework/working conditions in Social Work

Methods and Concepts in Social Work

> Sense of acknowledgment and belonging; learning to express oneself freely, experience of limitation with xenophobic attitudes and group-focused enmity in real and virtual space, tailor-made and sustainable solution patterns in crisis situations through pertinent decision-making procedures, consequences of trauma as social and not (only) psychological/individual phenomenon

Society and personality – exclusion and integration focal points

> Prevention-oriented education/upbringing services, intervention in challenging life situations of children, adolescents and families, diagnostics and intervention in response to illnesses, disabilities and/or life crisis situations
> Global issues and vulnerable populations in postmodern, post-colonial contexts such as children, women, older persons, persons with disabilities, migrants,

persons identifying as homosexuals, in political contexts, our own positionalities and decolonial methods of practice

Education and upbringing from a sociotheoretical, socioeconomic and sociopolitical perspective

> Sociotheoretical, socioeconomic and sociopolitical proficiency (field of education and upbringing), current social and educational policy discourses, dimensions of social inequality and exclusion risks, organization of social work and of technological and media impacts on society and the individual

Migration, flight, asylum

> The field of addiction care, Social Work in the healthcare sector, social counseling and justice-related social services

Addiction care

> The field of exclusion and integration as focal points: Addiction help, Social Work in healthcare, social counseling and justice-related social services

Living environment and management

> Life-changing connections with the world around, us coping with crisis situations, requirements for processes and structures involving prevention, networking, regionalization, democratization

Diversity, discrimination and inclusion

> Social disparities and discrimination, biographical-analytical and ethnographic research approaches, psychosocial situations and care systems, equality and antidiscrimination law, methodological and personal/professional reflection on communication experience/interview situation, justice, intersectionality, inclusion and exclusion, allocation of resources, recognition and participation opportunities

Applied Nursing Sciences

Health and disease concepts

> Health promotion and prevention in and through healthcare, expanding the (traditional healthcare) focus from disease (risks) to health (resources), health advocate

Current developments and innovations in nursing and healthcare

> New technologies for the design of care processes, care process management, forms of intra- and inter-professional cooperation, nursing and health-related care (including innovative health promotion and prevention services, regional and integrated care concepts, digitization, ambient assisted living, robotics), national and international structures and qualifications in nursing and healthcare (including e-health concepts, telenursing, public health nursing, advanced nursing practice)

Case Management

> Concepts of case/system management and of health impairment or health hazards case/system management, individual cross-system care processes, inter-professional care case management, alignment of empowerment and living environment orientation in the care process; introduction of decision-making/problem-solving processes, cross-sector, cross-organizational and cross-professional problems of healthcare, managed care, disease management programs

Advanced Practice Nursing

> Lifeworld, empowerment and recovery, hermeneutic case comprehension, care process guidance, professional one-on-one assistance with care needs, care plans, healthcare process management.

Diversity and Inclusion

> Critical examination of diversity, diversity-sensitive awareness, inclusive structures in fields of social work practice, tapping the potential of a heterogeneous society, counteracting exclusion, embedding diversity sensitivity as a cross-cutting issue in institutions and organizations, inclusion-promoting organizational development tools; participation, resource orientation; organizational development; inclusive design – digital health and case management, relationships between people, ambient spaces and technical systems, dismantling barriers, conception and production of user friendliness, usability in the development of new technologies



Sustainability Focal Points

➤ Lightweight Construction for Sustainable Solutions in the Building Industry

Faculty 1:

Architecture · Civil Engineering · Geomatics

Sustainability is more than saving energy. It is relevant from the level of cities and buildings down to the level of materials. We care about the sensible and responsible use of resources and space, as well as minimizing cubic volume, thereby controlling material and energy flows. Last but not least, we coordinate spatial (living) interrelationships.

The “Lightweight Construction” teaching project with its focus on “Foamed Textile Constructions” explored new technologies for sustainable material, construction and design concepts. Students in the “Sustainable Structures” and “Architecture” Master’s programs learned to combine architectural design with development of materials. They examined how a composite of fibrous materials (textiles) and pore-based materials (foams) can be used in the building industry for implementing technically viable lightweight construction applications of compelling design. Specific fields of application are wall, ceiling and opening units. What came out of the project were designs for lightweight, well-insulated, strong and textile-based, foamed wall and hull constructions as prime examples of construction applications of the future.

This has formed the basis of, and resulted in, a further **teaching and research project – “G3Tex”** – in which recyclable 3D textiles for walls and roofs are being developed. In addition, the interdisciplinary **educational project “Components of the Future”** was launched in collaboration with other professors:



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Within the scope of project-related modules, solutions to questions generated from research are developed in the teaching context. The focus is on practical implementation in combination with the critical examination of the substantive content from a theoretical perspective. For hands-on testing and optimization of design and material properties, 1:1 scale architectural designs are used in addition to small-scale laboratory experiments and computer-aided simulations. This enables a wide spectrum of realizations, ranging from various single- and multi-shell, planar and folded demonstrators through to experimental buildings for the prototypical verification of the – initially merely hypothetical – application, utilization and design options. Thanks to the synergies created from combining teaching and research, the courses can benefit from the innovation of the research approach and proximity to practice partners.

Through practice-oriented, scientifically informed projects, students are challenged, encouraged and motivated to make responsible and sustainable contributions to society.

Prof. Dipl.-Ing. Claudia Lüling

Professorial Chair of Concept and Design
Head of Laboratory for Textile Lightweight Construction

Prof. Dr.-Ing. Petra Rucker-Gramm

Professorial Chair of Building Materials, Building Physics and Building Maintenance and Resource-Optimized Construction
Head of Laboratory for Building Materials, Building Physics and Building Maintenance

Prof. Dr.-Ing. Agnes Weilandt

Professorial Chair of Structural Engineering, Building Mechanics and Constructive Engineering
Head of Sustainable Structures study program



> Sustainable Building Optimization

Faculty 1:

Architecture · Civil Engineering · Geomatics

Building Service Engineering Module 2 addresses the subject areas of building heating, cooling, ventilation and air conditioning, with the integration of regenerative energy systems elucidated for each area. For example, heating technology explores the reduction of greenhouse gas (GHG) emissions through the integration of solar thermal energy, heat pump technology and combined heat and power plants. In ventilation technology, the topics of GHG reduction are discussed with reference to building airtightness and heat recovery in ventilation systems. Night ventilation is presented as a useful method in cooling and air conditioning technology to reduce power demand. Technical and conceptual knowledge of electricity generation with photovoltaics and storage technologies for zero and plus energy buildings is developed.

There are also a number of laboratory exercises with three regenerative energy system experiments: in addition to a solar thermal experiment, students also complete exercises on a heat pump system experiment and a photovoltaic storage experiment as part of their curriculum.

In the **Technical Building Services and Energy Consulting Module** students work in groups to develop concepts for a self-sufficient micro-building (Tiny Studios). The building's interaction with storage systems and hull structures must be optimal in all technical building service areas (from plumbing to

heating) to enable the mathematical modelling of a zero-energy building. In addition, social sustainability aspects are addressed in building design (topics: type of use, preferred temperatures (rebound effects) and living in smallest square footage (sufficiency). In the "Focus on Technical Building Equipment" core elective, students create a building information model (BIM) applied to buildings with renewable energy systems. These are imaged and analyzed primarily in the area of technical building services [TGA].

The objective is to use the findings of "Technical Building Services and Energy Consulting" module for the realization of two Tiny Studios to be built on campus. This will enable students to enhance the theoretical knowledge outlined above in planning, construction and operation by combining it with hands-on experience. Various experts from Faculties 1 and 2 are involved in the project to lend support.

Prof. Dr. Volker Ritter

Professorial Chair of Technical Building Equipment



➤ Energy Efficiency in the Process industry as Key to a Sustainable Society

Faculty 2: Computer Science and Engineering

A significant reduction in primary energy consumption across all consumer sectors is a key approach to developing a sustainable carbon-neutral society. This is also the stated aim of the German government in reaching its target of a 20% reduction in primary energy consumption by 2020, and a 50% reduction by 2050 (base year 2008) (Energy Efficiency Strategy, 2014). The underlying rationale is not only climate protection but also Germany's international competitiveness as a production hub. Energy efficiency – that is, the rational use of energy – plays a crucial role here.



In this context – and integrated as a task for the whole of society – particular focus must be placed on the industrial sector inasmuch as its contribution to final energy demand is substantial, at roughly 30% (on a par with the transport and private household sectors) (“Environmental Use and Economy” [„Umweltnutzung und Wirtschaft“], 2016). In the industrial sector, the

process industry (chemical products, petroleum refining, food and plastics manufacturing) accounts for approximately 50% (“Energy use by the manufacturing industry” [„Energieverwendung der Betriebe im Verarbeitenden Gewerbe“], 2015).

Accordingly, scaling up energy efficiency, particularly in the process industry, plays a prominent part in achieving the realization of a sustainable society.

The Bioprocess Engineering study program at Frankfurt UAS addresses the topic of energy efficiency as a focal point. As an integral component of all specialist modules, students explore methods for optimizing the energy efficiency of process plants already in the development phase, as well as in subsequent operation. In this way, the study program is able to raise the awareness of future managers for one of the greatest challenges facing society as a whole in this century while also equipping students with the requisite problem-solving skills.

Teaching projects and research cooperations with industry partners facilitate the detailed specific development and implementation of energy-optimized solutions. Examples include:

| Solvent recovery from printing processes.

In addition to the energy efficiency of this procedure, the focus was also on the efficient use of resources (solvents) through recovery. (LOEWE 3 with SME in

Hesse, 2016-2018, project volume of approx. € 900,000, Prof. Dr.-Ing. Niklas Döring)

| Harvesting algae from open-pond cultivation

In a first step, algae is marketed as a high-end food supplement. There are many additional interesting prospects for the material and energy use of algae as renewable raw material. (Proposal with SME in Hesse in preparation, Prof. Dr.-Ing. Niklas Döring)

| Development and implementation of innovative technologies for energy-optimized biodiesel production from renewable raw materials.

(Multi-semester teaching project aimed at the demonstration of well-functioning laboratory-scale process plant, Prof. Dr.-Ing. Claus Fleischer)

Prof. Dr.-Ing. Niklas Döring

Professorial Chair of Mechanical Process Engineering, Pipeline Systems and Apparatus Engineering



> EcoDesign

Faculty 2: Computer Science and Engineering

Manufacturing companies bear a special responsibility towards environmental protection since it is primarily industrially manufactured products that can have a massive impact on the environment during their service life.

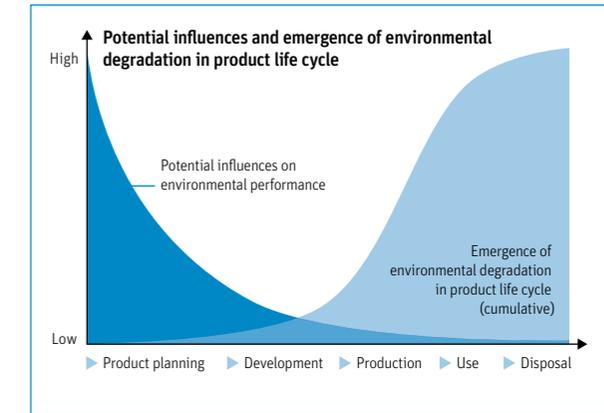
Particularly in the early stages of product planning and development, the choice of materials, for instance, can substantially influence parameters such as energy consumption and emissions. In this context, defining the expected process characteristics during the stages of a product's service life can have the most effective impact over its entire life cycle.

The EcoDesign and Sustainable Product Development modules introduces students in the General Mechanical Engineering (MA), Mechanical Engineering (BA) and Product Development and Technical Design (BA) study programs to the methodologies used for the environmental optimization of technical products.

EcoDesign is the proactive, holistic ecological, economic and technical optimization of products, taking into account their entire life cycle. "Eco" stands for ecological and economic, underscoring the demand for environmentally friendly and commercially sustainable products in view of the truism that nothing is as futile in terms of environmental sustainability as a product that is useless to the customer.

The basis for understanding the root causes of environmental degradation is life cycle thinking: Product developers must give early consideration to possible processes and their impacts on all stages of the life cycle, including selection, design and optimization from an environmental compatibility standpoint. Here the fundamental tenet of EcoDesign applies of always taking into account all stages of a product's life cycle (material production, fabrication, utilization, recycling/disposal). Failure to do so can deliver distorted – if not patently erroneous – results, thereby increasing the risk of setting the wrong development goals and in the process jeopardizing the product's environmental performance and even its commercial success.

Every constructive measure ultimately influences the environmental degradation in a product's life cycle and interacts with other environmental impacts in the same or other stages of its life cycle. Accordingly, every measure must be evaluated not only from a technical and economical perspective but also from an environmental standpoint, e.g., through life cycle assessment. Negative interactions in particular, whereby an environmentally beneficial measure per se results in undesirable environmental effects somewhere else, must be flagged in good time because in the worst case scenario they may lead to an increase in the overall environmental burden.



Prof. Dr. Ekkehard Schiefer
Professorial Chair of Product Development,
Technical Design and EcoDesign



> Ethics and Sustainability in the Investment Industry

Faculty 3: Business and Law

Denmark – the EU’s largest oil producer – decided in early December 2020 to end its oil production. The example of Denmark can be added to a growing list of countries with specific climate targets, highlighting the mounting importance of climate change. But other sustainability aspects such as decent working conditions are also garnering greater public attention.

The issue of sustainability is rapidly taking hold in the capital markets, where many investors are incorporating it as a criterion in their investment decisions. The EU Sustainable Finance Action Plan likewise aims to promote sustainable capital markets. The underlying rationale is to mobilize private funds to make the transition towards a sustainable economy.

We have introduced courses on sustainability within various study programs in order to raise our students’ awareness of these issues. The courses entail three points that are essential to social sustainability management:

- 1) Constructing a shared language for sustainability. This point evolves from the concept’s complexity and ambiguity: Which criteria are relevant, and how can they be tested?
- 2) Investing in projects promoting sustainability. This requires an understanding of market participants such

as rating agencies, for example, and an assessment of impacts on risk/return profiles.

3) Reflection on own behavior patterns, necessitating contemplation of ethical obligations.

To that end, our courses initially offer an introduction to ethical reasoning, addressing ethical issues based on philosophical theories of ethics. Student discussions figure prominently in these courses. For example, concerning the question: What responsibility do investors bear towards companies they finance? The concept is working extremely well and has spawned intensive discussions. A highly encouraging aspect was seeing the many differentiated analyses of ethical issues and development of logical arguments on the part of students.

Next, the courses turn to the topic of sustainability, with students investigating complex issues related to sustainable investments within the scope of project work. The results were compelling: one paper, for example, compared recent EU regulation requirements with currently established sustainability ratings. It was evidenced that the ratings provided only limited sustainability guidance within the meaning of the EU guidelines.

In embarking on its Green Deal, the EU has assumed a political leadership role and, through an array of re-

gulations, is doing its part to ensure that Europe stays ahead of the curve relative to other regions in strengthening its commitment to sustainable capital markets.

Prof. Dr. Christian Thier, CFA
Professor of Capital Markets and Asset Management



> Key Competencies for Greater Sustainability

Faculty 3: Business and Law

Of the 17 UN Sustainable Development Goals, the two that should be integrated into the curriculum are SDG 8 (“Decent work and economic growth”) and SDG 12 (“Responsible consumption and production”).

For teaching specialist skills in the logistics and production management areas of focus in conjunction with key competencies such as teamwork, we have been running so-called practical case projects for many years now at Faculty 3: Business and Law. To achieve this objective, students work on a specific complex task assignment of a practice partner. These projects are frequently carried out in socioeconomic institutions and give students the opportunity to “think outside the box.”

For example, one project was realized together with the Flörsheim social department store. Social department stores offer used and donated products that are recycled in the name of sustainability; customers can acquire furniture and consumer goods at attractive prices. Social department stores provide employment opportunities and employee training programs, mostly for the long-term unemployed or people who have overcome addiction. In a student collaborative effort, the receiving and storage areas were redesigned and a concept was developed for the introduction of a merchandise management system to standardize processes.

Support was provided for several projects in collaboration with Behindertenhilfe Bergstraße in planning a

new workshop, among other things, together with students. They checked the flow of materials in the laundry facilities (washing machine and dryer capacities, labelling laundry items) and the kitchen (turnaround times for prepared meals, process flow for preparing fresh produce) and developed proposals for optimizing process flows. This was followed a years later by carpentry and assembly projects for the new workshop, which is up and running. As an offshoot of this course, a research project was developed in which students likewise participated. The goal was to develop a feasibility study on the disassembly of spare parts from old appliances in workshops for people with disabilities. Besides the aim of conserving resources, the projects are additionally designed to help workshops for people with disabilities to become stronger while opening up new spheres of activities to them.

The project results are incorporated into logistics courses where, for instance, resource-efficient and disassembly-friendly manufacturing is discussed in the “Production Logistics” module.

Prof. Dr. Susanne Koch
Professor of General Business Administration and Logistics



> Socioecological Transformation

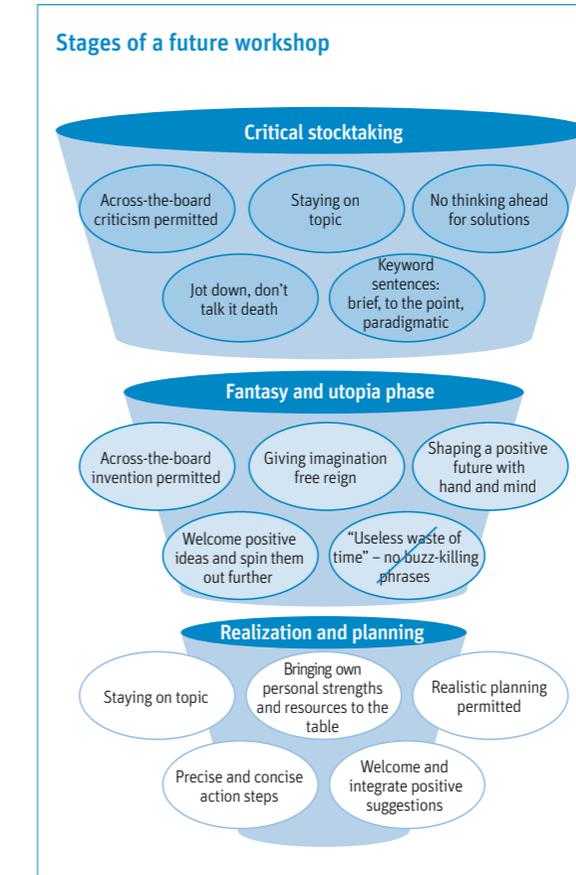
Faculty 4: Health and Social Work

All the talk about climate change and environmental destruction is nothing new. Scientific studies and findings such as those of the Club of Rome on the overexploitation of natural resources and its attendant disastrous consequences have been around since the 1970s.

For decades, however, they have been mostly ignored or downplayed. But the urgency of environmental problems is accelerating across the board. An attitude shift can be observed today among economic, political and civil society actors. Will this be followed by appropriate action and, if so, what sort of action? Last but not least, on Fridays – and on other days as well – young people are demanding that we change course in terms of our current economic and lifestyle choices. In addition to concepts and scenarios, this large-scale sociopolitical project also calls for public discourse and agreement on how we choose to live and work going forward.

The business-as-usual inertia is a big and powerful force, as is the self-deception – and deception of others – regarding the openness to change in affluent societies such as Germany, for example. The mantra of economic growth has grown problematical. Paying lip service both to the inflationary use of sustainability as a concept and to extensive greenwashing practices will not get the job done.

Technocratic answers and solutions are also ultimately bound to the logic of economic growth and to a reified



notion of man and nature. Bringing about the much-needed sociocultural transformation towards a genuinely sustainable, resilient and healthy society, however, takes time. It is still within our power to decide – for the most part democratically – the kind of lifestyle we

want going forward. This decision may well be forced upon us in just a few years' time.

Social science research and education are innovative catalysts of socioecological transformation to the extent that they are capable of profiling socially integrative and reflexive opportunities: creating opportunities by educating students on facts and linkages, as well as transmitting knowledge of common points of reference and practice-oriented skills. University courses can be grassroots, democratically structured workshops of the future. As an Enlightenment philosopher, Kant in 1784 called for "mankind's exit from its self-incurred immaturity," which is as relevant today as it was then, as is the insight that freedom and responsibility need not be opposed to one another but always require education and communication.

Prof. Dr. Andreas Treichler
Social Science



➤ Environment and Social Work

Faculty 4: Health and Social Work

The conference we organized at the end of January 2020 on “Environment, Climate Crisis and Ecosocial Work” marked the starting point for a discussion on environmental issues in social work. One of the acknowledged findings was that, while environmental issues were addressed in several modules, there was no clear module that explicitly thematized these issues. This evolved into an array of teaching programs: the “Green Social Work” module of Prof. Dr. Yari Or and Prof. Dr. Ute Straub examined the professional approaches of international Social Work to the field of ecology and nature.

The “Contemporary Environmental Movements” module of Prof. Dr. Chaitali and Youssef Abid (coordination) was aimed at investigating contemporary environmental issues and their relationship to Social Work practice. Students developed four projects during the summer semester that probed the various aspects of environmental movements, namely

- | Environmental movements of the right-wing/ extreme right-wing groups
- | Impact of fast fashion on the environment
- | Pork production and its impact on the environment
- | A critical analysis of the Extinction Rebellion movement

During the winter semester, students took part in an online exchange program with social work students from the University of Strasbourg to explore and discuss the impact of the environmental crisis on migration.

The course offered students an opportunity to critically examine current ideas on the environment and to engage in discussions on the ways in which Social Work addresses these issues, as well as on the boundaries of Social Work’s remit. Students learned in project-based groups and shared their findings in group presentations.

In this way, students were able to broaden their ideas and knowledge on selected topics, develop skills in research group work and group presentations and study cross-national aspects of these issues.

Prof. Dr. Chaitali Das
Professorial Chair of Transnational and International Social Work

Prof. Dr. Ute Straub
Professorial Chair of International/Transnational Social Work

Prof. Dr. Yari Or
Professorial Chair of Educational Pathways and Social Participation in the Life Course



➤ Sustainability in the Interdisciplinary “Studium Generale”

Responsible action is multifaceted (as of 2017 summer semester)

The Interdisciplinary Studium Generale (ISG) is a compulsory module for all Bachelor's students who spend a semester studying a topic outside their curriculum together with students from other programs and faculties. Many of the topics offered are situated in Service Learning, where students work on a specific issue area from external partners that often come from the NGO sector.

Not surprisingly, they adopt the UN's Sustainable Development Goals as frame of reference (with rising trend). This is clearly the case with the “Environmental Sustainability” module. The focus of the “Sustainable Investments” and “praxiSDG” module topics is on the full array of sustainability goals. The former focuses on private sector investments to promote the SDGs, while praxiSDG is conceived as a Service Learning module in which students support civil society organizations or business in their sustainability efforts.

In the “Development Education” module, topics such as international poverty, globalization, development and co-development form the framework of the study program. The “Nature and Technology” module is dedicated to sustainability issues raised by technical interventions into nature – such as traffic routes, hydraulic structures and waste material disposal. Intended and unintended environmental and social impacts are analyzed and evaluated in this context. The “Smart Cities” and “Mobility” study programs deal

with sustainable cities and suitable mobility models, as well as goal achievement options afforded by digitization.

Responsible consumption and production patterns are one of the many topics covered in “Globalization”. “Future Aspects of the Automotive Industry” and the “FRA 5000 Rally Team”, where students have the opportunity to design a rally car without internal combustion engine. “Waste Prevention at Frankfurt UAS” draws on opportunities from the students' perspective.

The issue of affordable and clean energy is addressed in the “Renewable Energies” module, which examines the use of renewable energies under natural scientific/ technological, economic, legal and social aspects. The “Who Does Our Water Belong to?” study program takes the “Clean Water” sustainability goal as reference point and focuses on the technical, environmental and socio-economic constraints of constructing a drinking water pipeline in Tanzania.

“A Critical Look at Inclusion” is aimed at reducing inequalities; the module invites students to identify and critically examine exclusionary structures and dynamics in society.

List of Modules (as of 2017 summer semester)

- | Waste Prevention at Frankfurt UAS
- | A Critical Look at Inclusion
- | Development Education
- | Renewable Energies
- | “FRA 5000” Rally Team
- | Globalization
- | Mobility
- | Sustainable Investments
- | Nature and Technology
- | Environmental Sustainability
- | praxiSDG
- | Smart Cities
- | Who Does Our Water Belong to?
- | Future Aspects of the Automotive Industry



> Sustainability Is Taking Off

Over the past few years, scientists at Frankfurt UAS have produced 770 publications that take the 17 Sustainable Development Goals as their reference point.

We regard the communication of scientific issues and findings as a primary task, both internally and externally. This also includes organizing conferences and congresses.

Our online survey from the 2020/2021 winter semester found that 62.4% of respondents were interested in Continuing Education courses in sustainability. The list of topics on which there is a need for Continuing Education are geared towards the definition of the sustainability concept, resource conservation and/or waste avoidance, awareness-raising and tips for individual behavior in sundry areas (mobility behavior, workplace and/or when studying, personal everyday life).

“Frankfurt UAS regards itself as a catalyst for our society. Companies are often desperately looking for opportunities to get their staff fit for sustainability. Our KompetenzCampus makes the difference.”

Prof. Dr. Martina Klärle
> Vice President for Research, Further Education and Transfer

Sustainability counts

MBA Aviation and Tourism Management

Prof. Dr. Karl-Rudolf Rupprecht

Sustainability plays a central role in logistics and mobility. The global growth industry is indispensable in business-to-business transactions, in the networking of producers and companies and in the growing business-to-consumer sector (e-commerce). Relevant knowledge is imparted to our MBA participants.

The topic has been barely addressed in purchasing. To date, sustainability has not been included among the selection criteria of financial key performance indicators (KPIs), which are used for measuring the performance of corporate activities. On the contrary, sustainability is a non-financial KPI of secondary importance. As desirable as it may be, it must not cost anything. In keeping with this, it is worthwhile addressing the issue of how environmental KPIs in purchasing can be mapped to financial KPIs. Another question worth addressing is: How can we bridge the gap between wanting and doing in terms of economic psychology?

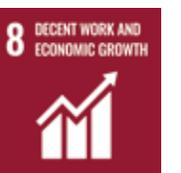


Educational Processes: Instrumentality Me

M.A. Consulting in the Working World – Coaching, Mediation, Supervision and Organizational Consulting

Prof. Dr. Ingmar Maurer

Sustainability inherently plays a major part in the “Consulting in the Working World – Coaching, Mediation, Supervision and Organizational Consulting” (MAXO) Master’s degree program. As we go about our teaching and daily lives, also beyond mediation, process consulting as accompanying support service for persons, groups and organizations, our common shared goal – without focussing on it explicitly – is indeed social development and peaceful coexistence. Along the path of studies, it is all about the educational processes of each individual with a view to forming their own “Instrumentality Me”, which sets the trend as process consultant. And where does all this take us? It takes us on the road to contributing to our society through an array of initiated educational processes. And to social development and peace. Sustainability is our business.



> City and People – with Continuing Education towards Greater Sustainability

Building cities of tomorrow

M.A. Urban Agglomerations

Prof. Dr.-Ing. Michael Peterek

Rapidly advancing urbanization, worldwide migration movements and the impacts of global climate change are just three of the challenges that clearly testify to the need for more sustainable urban development. Since its inception in 2008, the “Urban Agglomerations” English-language postgraduate Master’s degree program has been designed to provide students with an understanding of concepts and strategies for resource-efficient and climate-oriented urban planning, green forms of mobility, inclusive urban neighborhoods, public spaces and open landscapes, as well as a more resilient technical infrastructure. From the perspective of international comparison, the program most directly pursues United Nations Sustainable Development Goal (SDG) 11 “Sustainable cities and communities”.



Sustainability needs entrepreneurship

MBA Entrepreneurship & Business Development

Prof. Dr. Johannes Ohmer

Europe has reached an agreement on a roadmap for a sustainable EU economy. Is this a mortgage on the Continent’s competitiveness, or is it the dawning of a period of growth driven by innovation? One thing is certain: the latter can be achieved only with the implementation of entrepreneurial initiatives and the support of forward-looking entrepreneurs.

The “Entrepreneurship & Business Development” part-time MBA degree program provides students with general management skills, practical knowledge and expertise. The implementation of sustainable management in particular requires the proficiency to identify new growth options and to facilitate and responsibly advance their implementation in the context of company start-ups and market-oriented business development in both small and large enterprises. Sustainability as a concept can be structured only with entrepreneurial courage, skill and farsightedness.



Sustainable behavioral change

Addiction Therapy and Social Management in Addiction Care (M.A.)

Prof. Dr. Heino Stöver

In the tertiary education sector (SDG 4), the “Addiction Therapy and Social Management in Addiction Care (M.A.)” part-time Master’s program provides an application-oriented, forward-looking learning and studying opportunity in a family-friendly and gender-equitable setting. The holistic education program is aimed at current topics of addiction research, competencies and methods in therapeutic care and treatment, including in the area of social facilities management. In addition to the Master’s degree, you will earn a certificate as addiction therapist recognized by the German Pensions Insurance Association [Deutscher Rentenversicherung Bund] and entitling you to work in medical addiction rehabilitation. Consequently, our graduates are excellently prepared to bring about sustainable behavioral changes in their relevant target groups, alleviating the societal burden in the long run.



> Research and Development for More Future Viability

In the period 2016-2020 no fewer than 100 research and development projects (R&D projects) were conducted at the University, with a total volume of EUR 16.7 million, of which EUR 10.9 million was in the thematic area of climate protection (source: FIT Department/own survey in FIS, as of: November 2020)

From the four faculties at Frankfurt UAS

| Faculty 1: Architecture · Civil Engineering · Geomatics

| Faculty 2: Computer Science and Engineering

| Faculty 3: Business and Law

| Faculty 4: Health and Social Work

we present below 10 exemplary projects that use the 17 Sustainable Development Goals of the United Nations as reference framework.

Emplement! – Empowering urban regions in Vietnam for practical implementation of sustainability and resilience strategies considering the urban-rural nexus

Prof. Dr.-Ing. Michael Peterek

Rapid urbanization poses major challenges for cities and their surrounding regions, not only due to increased resource consumption and its impacts but also in terms of vulnerability to sudden changes/threats. It is of the utmost importance to ensure the practical implementation of strategies and plans that address these challenges – such as pertaining to adequate supply and disposal infrastructure (water, energy, food supply, waste, wastewater).

The objective of emplement! is to develop transferable tools and the needed capacities that enable administrations and relevant stakeholders in the city of Da Nang and the adjoining province of Quang Nam (Central Vietnam) to ensure the planning and practical implementation of relevant strategies into efficient, sustainable and resilient measures that interact synergistically.

The development of tools takes place at three different levels: system level (analysis of strategies, plans, general framework; data generation methods); technology level (identification of appropriate technologies, decision-making support); implementation level (identification of obstacles, implementation of showcases, research on implementation).

Given the economic importance for Da Nang and Quang Nam, emplement! focuses on four fields of action: tourism, agriculture, industry, and built environment. Based on this, a comprehensive, transferable methodology is being developed to be applied in other Asian cities and regions as well. Implementation activities are initially defined in the four fields of action; next, first practical showcase projects are implemented and provided with scientific support, taking into account the conceptual and technical synergies both between the four action fields and in the urban-regional context.



Integrated concept for recycling mineral waste in the context of urban-rural land use relationships

Prof. Dr. Tine Köhler

The project, which is funded by the German Federal Ministry of Education and Research [Bundesministerium für Bildung und Forschung (BMBF)], aims to develop a platform-independent, decision-making support tool for selecting mineral waste treatment sites that can be mobilized. The project is designed to enable urban-rural relations to be established and permanently consolidated in the Dresden-Meißen model district. The tool supports the implementation and sustainability process in addition to broad-based participation. Selection is based on the applicable laws and planning-relevant aspects. In this way, protective goods are analyzed and evaluated in compliance with the Environmental Impact Assessment Act [Umweltverträglichkeitsprüfungsgesetz (UVPG)] and the Regional Planning Act [Raumordnungsgesetz (ROG)] and competing uses are determined.

To this end, input data is generated from reports and/or forecasts and mapped using a clear and scientific method to an evaluation matrix calibrated with key metrics. The most significant databases in this context include in-

put flows, masses of material to be landfilled, emission and immission forecasts, traffic forecasts, identification of areas and landscapes that merit protection (e.g. nature conservation areas, cold air production areas, etc.), a critical-load substance input concept, ownership structures, etc. For completion of the planning basis, a regional building cadaster is used to assist in making strategic decisions for a study-area-specific recycling economy.

By developing evaluation options for various key parameters, it is possible to demonstrate unequivocally positive effects of urban-rural partnerships.

The project is carried out in cooperation with the Leibniz Institute for Ecological Spatial Development, the Federal Institute of Materials Research and Testing [Bundesanstalt für Materialforschung- und Prüfung], the State Capital City of Dresden, AGS Anlagen + Verfahren GmbH and TU Dresden.



Infrastructure – Design – Society Mobility systems and multimodal green mobility in the Rhine-Main conurbation

Prof. Dr.-Ing. Petra Schäfer

The economy and society in the Rhine-Main conurbation are essentially defined by mobility processes and systems. Climate change and resource scarcity intensify the urgency to generate new solutions for mobility in urban centers. In the area of design, this includes the development of specific tools and strategies for the positive promotion of green mobility projects and visibility enhancement for greater public acceptance.

Traditional scientific fields such as transportation planning, urban development, information and communication technology and social sciences are combined with design research for this purpose. The project focuses on the mobility of individuals in relation to the transportation system and its infrastructure (mobility structures) and the development of concepts to incentivize multimodal green mobility behavior.

In addition to establishing a research network, the project conducts fundamental research on the role of design in shaping emotional and contextual qualities of mobility spaces to promote multimodal green mobility behavior. A system-oriented design concept is additionally developed in the form of design guidelines focussing on the overall structure in preference to individual projects: user-oriented development of planning and design concepts (user experience design) of mobility spaces. The Association also acts as an information, cooperation and innovation network and consistently seeks to enhance dialogue with research and educational institutions, as well as stakeholders from business, civil society and policymakers in the region.



LastMileTram – LastMileTram Rhine-Main

Prof. Dr. Kai-Oliver Schocke

The past few years have witnessed an above-average increase in the volume of shipments in Germany. The German Federal Ministry of Transport and Digital Infrastructure [Bundesministerium für Verkehr und digitale Infrastruktur] expects a 38% increase in road freight transport by 2030. The consequences of this are higher levels of environmental pollution due to emissions, as well as increased spatial coverage. This is accompanied by declining amenity quality, as well as conflict situations with other road users, particularly in urban areas. Limit values for nitrogen oxide emissions are being exceeded in a number of German cities, and as a result the EU Commission has already filed suit against them.

The growth of the CEP service provider industry, with its associated increase in traffic volumes, calls for innovative concepts that address urban conditions and the needs of all concerned. In response to this, plans are

underway to use the existing infrastructure in Frankfurt, in particular the railway network of subways and streetcars. It is currently being investigated whether it is possible to deliver parcels in this way, and a pilot test is being carried out. In addition, delivery concepts on the “last mile” will be tested and evaluated to see whether they can be integrated into the delivery process via railway network. The objective is to reduce the number of delivery vehicles and hence emissions in inner-city areas.

The findings will be used for developing a delivery concept for (inner) cities via an existing (subway/streetcar) railway network.



Silent Green – the refuse collection vehicle of tomorrow

Prof. Dipl.-Ing. Holger Marschner

With its Green City concept, the City of Frankfurt is pursuing a detailed and ambitious action plan for resource, climate and environmental protection. Waste management is a key element of the action plan. In its waste collection/separation system for residual waste, bio-waste and paper, FES [disposal service provider contracted by the city] is already making a significant contribution to the goal achievement. However, FES regards it as part of its mission to also rethink its collection process and search for alternative concepts.

Conventional garbage trucks run on diesel fuel and, should they be rejected by the city as a result of growing concern over air pollution problems, alternatives will then be needed. This renders the garbage truck an object of research for engineers at Frankfurt UAS.

In a pilot project to run just under three years, they are testing the potential of an innovative natural gas/electric hybrid vehicle [HA-Projekt 523/17-05] with the support of the Hessian Ministry of Economics, Energy, Transport and Housing [Hessischen Ministeriums für Wirtschaft, Energie, Verkehr und Wohnen]. In the first phase of the

project, the Automotive Engineering Research Laboratory [Forschungslabor für Kraftfahrzeugtechnik] accompanied a conventional Euro VI diesel vehicle for several weeks on its tour through downtown Frankfurt. Both the pollutant emissions and fuel consumption were recorded using mobile exhaust gas measuring technology. This made it possible to determine the contribution of waste collection to inner-city pollution levels and to estimate the reduction potential. And the potential reduction is quite considerable since FES uses several million liters of diesel every year to keep the City of Frankfurt clean.

It is currently planned that the project's findings will be applied to the entire FES fleet. In fact, the garbage truck being studied here is just one of 65 vehicles that collect household waste each day. Added to this are vehicles for other types of waste, with a total of up to 500,000 metric tons of waste disposed of annually in Frankfurt's waste incineration plant.



ELRA 16 – Pressed for solvents

Prof. Dr. Niklas Döring

The aim of the project is to develop a process for the cost-effective recovery of solvents in the printing industry. To date, this has been accomplished on a small scale for specific applications for special solvents or very large airflows; these processes are generally not economically viable.

The project is designed to improve the process, coupled with a broad-based reduction in associated costs for enhancing competitiveness in the new market. In addition to cost-effectiveness, significant savings in carbon dioxide emissions result both from the typically used thermal post-combustion process and from solvent production. By establishing a raw material cycle, it is possible to directly incentivize a cost-effective environmental benefit for the industry.

The first step involves the enrichment of the solvent-containing exhaust air in an adsorption stage. Next, the exhaust air is cleaned and the solvents are added to a considerably smaller airflow, from which they are taken up by an absorbent. Possible absorbent carryover is returned to the original exhaust airflow and undergoes a cleaning process as a result. The solvents recovered from the absorbents can be reused in the production process.

The project was funded by the State of Hesse within the framework of LOEW Funding Line 3 for a total amount of € 900,000. Project partners: Rafflenbeul Anlagenbau GmbH in Langen and Anton Debatin GmbH in Bruchsal.



Optimized laboratory test method for retaining fine solids in decentralized rainfall treatment facilities when discharged into surface waters

Prof. Dr.-Ing. Antje Welker

It is planned that the assessment of precipitation runoff for discharge into surface waters in Germany will be carried out in the future using the parameter PM63 [AFS63] (fine solids with a grain size of > 0.45 µm and < 63 µm). While centralized treatment structures have already proved their effectiveness and can be dimensioned according to existing codes and regulations, there is no evaluation procedure for decentralized treatment plants.

In principle, a reproducible laboratory test method that is based on the existing test method of the German Institute for Building Technology [Deutsches Institut für Bautechnik (DIBt)] is suitable for discharging rainfall runoff from traffic areas into groundwater. It must be adapted to the hydraulic feed and the choice of suitable test materials, for example, to be able to classify the efficiencies, as published in the new guideline DWA 102 in relation to PM63 [AFS63] for decentralized rainfall water treatment plants, and to be able to implement the provisions of the new Annex of the Wastewater Ordinance pertaining to rainwater.



“Sustainability is embedded in a set of values that are part of our University’s self-understanding and that we wish to impart to our students.”

Prof. Dr. René Thiele
> Vice President for Academic and International Affairs

Brief assessment of manufacturing and waste treatment in EcoDesign (EcoScreen)

Prof. Dr. Ekkehard Schiefer

Product development greatly influences a product's environmental impact. To enable the early detection of ecological weak points and promptly take suitable design measures, thereby minimizing environmental degradation over the whole product life cycle, it is essential to use effective and efficient environmental impact estimation methods already at this early stage. It is often the case that it is not always possible or else too costly at this stage to perform comprehensive life cycle assessments; therefore, abbreviated assessment methods play a particularly crucial role.

Abbreviated assessment methods frequently only consider individual environmental aspects of production processes while considering processes for treating waste and/or residual materials to very limited extent only. Accordingly, they are assessed in EcoDesign as uncritical to a greater degree than they actually are. In addition, the selection of available processes in abbreviated assessment methods is very small so that unavailable production and waste treatment processes are often substituted by non-representative processes and therefore

ecologically evaluated in realistic terms to a limited extent only. Both lead to uncertainties – in some cases significant – in the application of such methods, leaving optimization potential unrecognized.

The research project is designed to contribute to reducing the uncertainties in the abbreviated assessment and, to this end, to provide a sufficient number of abbreviated assessment metrics for selected production and waste treatment processes that take into account all relevant forms of environmental degradation. Existing assessment approaches are assigned to reference processes whose environmental impacts are assessed and aggregated to the easy-to-use abbreviated assessment metrics Eco-Indicator and carbon footprint.



Participatory-oriented intervision for workplace health promotion in diverse care teams (POINTED)

Prof. Dr. Ulrike Schulze, Sabrina Khamo, Andre Terjung

The effects of demographic change and of the mounting shortage of skilled workers are placing an ever greater burden on nursing care professionals and will again increase significantly in the near future, not least because of a pandemic-related deterioration of working conditions. To counter this effectively, Project POINTED at the Hessian Institute of Nursing Research [Hessisches Institut für Pflegeforschung (HessIP)] develops and evaluates interdisciplinary media-assisted intervision concepts in the form of group-dynamic instructions. It is designed to empower care teams to solve problems independently using mutual team coaching programs that can run autonomously. POINTED relies on the demonstrably more effective approach of conflict prevention.

Teams that meet without an external professional supervisor to reflect on their professional work do so in the form of “intervision” – in contradistinction to supervision. The goal is to provide sustainable relief and support to heterogeneous care teams in all areas by empowering them to manage psychosocial and interpersonal stress independently. Permanent overstrain can cause physical and psychological stress and lead to burnout syndrome, as well as to increasing absenteeism and ultimately even early departure from a career. Only if effective support is provided to nursing professionals in workplace settings that pose a health risk is it possible to guarantee adequate nursing care in Germany over the long term.



Gender differentiation in daycare centers. An ethnographic study in a multicategorical context

Prof. Dr. Ute Schaich

Despite the socially enhanced importance of institutional care for young children, gender studies in the context of daycare centers expose significant gaps with regard to the systematic consideration of children under three years of age. The research project provides a contribution to addressing this shortcoming: basic research is conducted in a subject area that has been only rudimentarily investigated, focussing on the social category of gender in connection with additional interdependent differentiations observed in daycare centers. Accordingly, based on the current state of knowledge in gender research, according to which the dimension of gender is linked to various differentiation categories, empirical findings and gender-critical perspectives are being introduced into daycare research and into an expanding field of action where such development has been largely absent to date.

The study looks at all actors, as well as the material environment, enabling extensive, pertinent findings to be gleaned, while offering insights not only into conscious and verbal but also into pre-reflexive and pre-verbal forms of gender relations at the child-child level, adult-child level and adult level in socioculturally heterogeneous contexts. This facilitates the development of extensive empirical jumping-off points for a gender-sensitive improvement of process quality in daycare centers.



“For me personally, climate protection is the most important factor in the sustainability discussion, in particular CO₂ reduction in the building sector. We have halved our CO₂ emissions over the last 10 years and, by purchasing green electricity, are on track to becoming the best university in Hesse in terms of CO₂ emissions.”

Dr. Bert Albers
> Chancellor

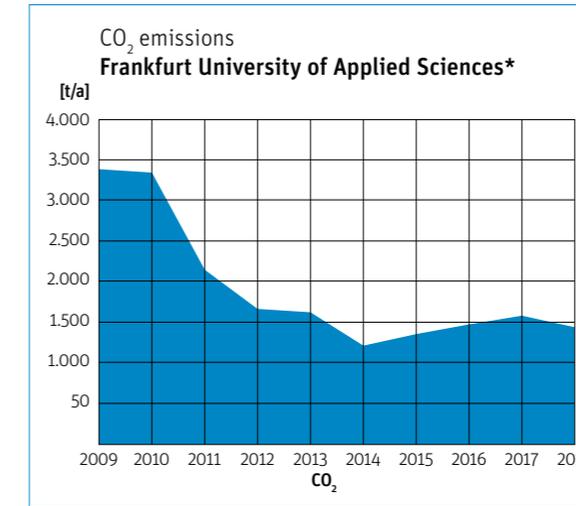
> CO₂ per Floor Area and per University Member

The target is to make our University carbon-neutral by 2030 – a key aspect to the authentic practice of sustainability in everyday life.

Frankfurt UAS has halved its carbon emissions in the past 10 years; our purchase of green power has propelled us to become the most exemplary University in Hesse in terms of CO₂ emissions.

Within a span of five years (2009-2014), Frankfurt UAS reduced its carbon emissions from roughly 2,500 metric tons/year to approximately 1,000 metric tons/year, corresponding to a 66% reduction. Following a slight increase to 1,500 metric tons, our target over the next 10 years is to reduce this level to reach carbon neutrality.

To date, CO₂ savings have been achieved primarily through external effects – particularly our transition to green power in 2010 and our purchase of district heating in 2019. To meet our ambitious target, we must ensure consistent energy savings and a positive change in mobility behavior going forward. The use of smart thermostats is envisaged with motion sensors that regulate energy consumption depending on room use. A complete reduction in energy consumption will, however, not be possible; accordingly, CO₂ emissions must be compensated for – by planting trees, for example, at our Vietnamese partner university (see page 14 for an overview of measures).



Looking at CO₂ emissions per square meter of floor area Frankfurt UAS, with just under 90,000 m², stands out among the 13 state universities in Hesse, at an impressive 16.1kg/m². This is surely also attributable to the fact that Frankfurt UAS has to manage with a comparatively small floor area per University member.

“Our target is to become a carbon-neutral University by 2030 in order to authentically exemplify and genuinely put sustainability into practice as stakeholder and actor in the FrankfurtRheinMain metropolitan region.”

Prof. Dr. Frank E.P. Dievernich
 > President Frankfurt University of Applied Sciences

In 2019 we had 15,045 students and 749 staff. Relative to the total number of University members, our University has the lowest carbon emissions, with a specific CO₂ emission rate of 91.3 kg per member of the University.

2018	Change		2018	Change
22,0	3,5 %	HS Darmstadt	199,3	4,1 %
16,1	-8,9 %	UAS Frankfurt	91,3	-12,0 %
18,3	-5,0 %	HS Fulda	108,6	-10,8 %
41,9	6,5 %	HS Geisenheim	1.030,3	5,5 %
19,6	-0,4 %	THM Gießen	106,1	-3,7 %
23,2	-4,1 %	HS RheinMain	148,7	-6,8 %
22,7	24,3 %	HfMDK Frankfurt	353,9	35,8 %
17,1	-5,1 %	HfG Offenbach	275,1	-7,8 %
52,3	2,1 %	TU Darmstadt	929,4	2,2 %
34,8	-1,6 %	GU Frankfurt	352,6	0,1 %
44,0	-3,4 %	JLU Gießen	619,8	-2,1 %
20,9	-9,6 %	U Kassel	254,7	-9,1 %
42,4	-9,9 %	PU Marburg	721,6	0,8 %

Specific CO₂ emissions per floor area (kg/m²)*

Specific CO₂ emissions per University member (kg/Person)*

* Source: Person, Ralf-Dieter: Wöhning, Cord (2020): 2018 carbon footprint of Hessian universities – use of energy and key indicators. Project activity report of the HIS Institute for Higher Education Development [HIS-Institut für Hochschulentwicklung e. V.]

> Sustainable Mobility Management at Frankfurt UAS

Due to the large number of people who commute to campus on a daily basis, be it to work or attend classes, Frankfurt UAS is a major traffic generator in Frankfurt's North End district. The aim of the project was to evaluate the mobility patterns of staff and students at Frankfurt UAS and to sustainably change their mobility behavior in the long term by establishing a mobility management program and to positively influence the transport choices of staff and students in our progress towards becoming a carbon-free University. The focus here was on electromobility, public transport, cycling, parking management and pedestrian traffic.

A residence analysis, a location analysis and a survey of students and staff were conducted with the aid of various questionnaires. Questions about mobility behavior were likewise included. The surveys were conducted in March 2017 (t(0)) and March 2018 (t(1)).

The 2018 survey showed an 18% increase in public transport usage over the 2017 survey. The modal split of passenger vehicles declined by 15%. This also shows that the absolute number of public transport users rose by 50% over the same period. By contrast, the absolute number of passenger vehicle users was down 40%. Assuming an average 200 working days per year, the transition (from private to public transport) results in annual CO₂ savings of roughly 64,000 kg. With a general average per capita consumption of 8,990 kg CO₂ in Germany (IEA 2015), the savings achieved merely as a result of a

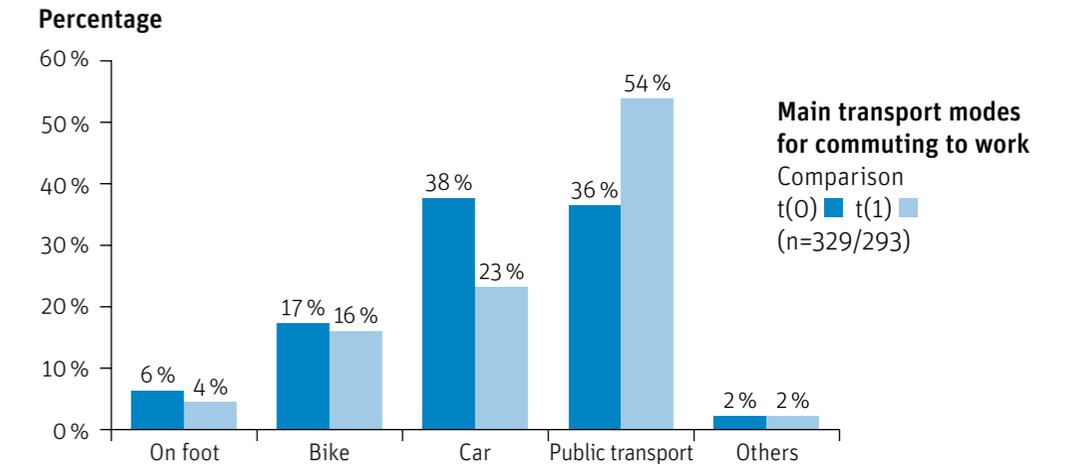
change in transport mode for commuting to work correspond to the total annual CO₂ emissions of seven persons.

The "Sustainable Mobility Management at Frankfurt UAS" project has above all strengthened the awareness of students and staff at the University. The greater presence of "mobility" and "sustainability" as thematic areas has enhanced their importance.

The proposed measures, some of which have already been implemented, were primarily deployed in the "Bicycle-friendly employer" certification. The certification also strengthens the profile of Frankfurt UAS as an attractive employer, giving the University a major image boost. Additionally, the project has strengthened the University's

internal research focus on "mobility and logistics." The measures are also contributing to an increase in energy efficiency and a reduction in emissions levels. This likewise strengthens our vision of a carbon-neutral University, which is the goal of the sustainability strategy of the State of Hesse.

It is fundamentally important that future measures raise awareness and gain a high level of visibility – visible not only to students, staff and University administration but also to external partners. Accordingly, the visible measures implemented in the area of "mobility" offer the potential to enhance the attractiveness of universities both internally and externally in the social, economic and political arenas.





Our Minister of State Dorn with Closing Remarks

Hessian Minister of State for Science and the Arts
Angela Dorn

“Who, how, what – why, why and why? “Those who don’t ask stay dumb.” This motto, loosely adapted from a catchphrase repeated on Sesame Street, is one that we are all familiar with from our childhood and that we too pass down to our children. We take it as our springboard for discussion here and welcome this opportunity to speak with you, Minister of State Dorn.

Questions were put by Martina Klärle, Vice President of Frankfurt University of Applied Sciences.

In the first Black-Green legislative period in the Hessian State Parliament, you were the spokesperson for the Greens on climate protection, the environment and energy. Today, you are Minister of Science. And it is precisely the * Sustainability – University * interface that we would like to adopt as our focal point for this discussion.

WHO, then, among the 14 universities in Hesse, can lay claim to having the lowest CO₂ emissions in the three categories – per student, per staff and per square meter of floor area?

Now you’re fishing for compliments: I warmly congratulate Frankfurt UAS on its highly successful efforts in, among other things, transitioning to a renewable energy-based power supply and in significantly reducing its carbon emissions, where it earned first place. That said, the universities have altogether different starting conditions in terms of buildings, floor space use and mobility, not to mention different energy supply needs. Still, I’m very pleased to observe that all of Hesse’s universities are committed to working intensely and diligently to improve their carbon footprint.

If the sustainability genie were to grant you one last wish, HOW could we as Frankfurt UAS make your wish come true?

One of my heartfelt desires is assuredly to see a genuine turnaround in transport towards sustainable mobility. This wish can-

not come true without many more new insights and innovative ideas, like those being developed at Frankfurt UAS. The recently founded PhD Center for Mobility and Logistics is impressive evidence of this.

WHAT is more important in the tradeoff in day-to-day business: sustainability or short-term cost savings?

Sustainability should be at the forefront of all decisions, of course – not only for reasons of climate and environmental protection but also because this is the only way to ensure that funds are well invested for the long term. For example, the federal state government decided many years ago to implement higher energy efficiency standards for buildings than required by law. This generates real money savings over the long haul. Accordingly, investment decisions are also based on life cycle cost considerations over a 30-year period. And the sustainable and fair procurement of products and services similarly plays an important role within the scope of Hesse’s sustainability strategy.

WHY do universities in particular play such a decisive part in their commitment to sustainability?

Universities frequently count among the largest institutions, and consequently also among the largest energy consumers in a particular region. By the mere act of putting their house in order and improving their energy efficiency, for example, they can make a substantial contribution to greater environmental sustainability. They also fulfill an important role model function as vital social institutions with a high degree of visibility. And, of course, they are particularly distinguished by the fact that they educate the decisionmakers of tomorrow, who will support and help to shape the social transformation process towards greater sustainability – and also researchers who develop the technical, economic, social and cultural innovations that we absolutely need in order to build a sustainable society.



Minister Dorn, Vice President of Frankfurt UAS Martina Klärle and and President of TU Darmstadt Tanja Brühl, 2019 at the March for Science in Frankfurt.

WHY does the federal state government not require that sustainability in its social, economic and environmental dimensions be a compulsory component of all study programs?

Generally speaking, the design of academic instruction falls within the purview of university autonomy. And that’s just

as it should be: It would be a major conceptual challenge indeed to meaningfully integrate a prescribed standard teaching module on sustainability into the entire spectrum of subject areas. Nor is this necessary because I’m pleased to note that the topic of sustainability in all its manifold and discipline-specific facets has already found its way into the

curriculum of many study programs at Hesse’s universities. Particularly at universities of applied sciences, there is a wide range of study programs in diversified subject areas that also focus specifically on sustainability issues. Nevertheless, since we regard it as incumbent on universities to shoulder their social responsibility as well, we have stipulated in the Hessian Higher Education Pact 2021-2025 that all Hessian universities develop an individual sustainable strategy and thus anchor sustainability as a cross-cutting task in research, academic teaching and transfer of knowledge.

WHY are you so pleased that Frankfurt UAS in particular is the first of the 14 universities in Hesse to adopt a sustainability strategy in its senate?

The fact that Frankfurt UAS has already developed a comprehensive sustainability strategy is, of course, sensational. And what I find especially positive is that the strategy was developed in a broad participatory process involving many dedicated staff members at Frankfurt UAS – and that in spite of Corona. Such a strategy works only if everyone pulls together. I extend my heartfelt thanks to all those involved for their exceptional commitment!

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Interviews: Claus Peter Müller von der Grün, Kassel.

Contributing authors: Sabrina Engelmann, p. 74-75, Lola Freyer, p. 90-91

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