

Research Report

2018/19

Danube University Krems. The University for Continuing Education.



—

Building Bridges

As a public university for continuing education, Danube University Krems aims at overcoming societal challenges.

We bridge basic and application-oriented research, and build bridges between science and practice in our four main research fields “Cohesive and Innovative Societies”, “Cultural Heritage”, “Regenerative Medicine” and “Lifelong Learning Research”.

This clear research profile as well as an transdisciplinary approach have allowed for significant developments: the first two PhD programs were launched in 2016, and the first PhD students have just been graduating in June 2019. The opening of the Core Facility on Campus Krems provides research with cutting edge infrastructure, and our international research network has pleasingly grown, above all in Europe.

However, the most important foundation of research at Danube University Krems is our staff. Their competences and striving for new insights as well as their commitment to innovation are the cornerstone of our success.

With this in mind, we cordially invite you to take a look at our research and to meet the people behind it.



Viktoria Weber

“We build bridges between basic and application-oriented research, bridge science with practice. This transdisciplinary approach initiates dynamics and innovation and ensures the high social impact our research has on society.”



Answers to Challenges

Digitalization is permeating all areas of social and economic life. Demographic trends challenge us to find solutions against the backdrop of ageing societies and lifestyle-related diseases. Migration streams call for integration concepts, cultural heritage for strategies to preserve it. The economic and technological dynamics necessitate new approaches to lifelong learning. Finding answers to these challenges is crucial.

Seeking dialogue

Promoting dialogue between basic research and practical application, between the scientific disciplines and society initiates dynamics and leads to innovation.

Four research fields

Danube University Krems has a clear research profile within its four research fields "Cohesive and Innovative Societies", "Cultural Heritage", "Regenerative Medicine" and "Lifelong Learning Research".

In the past two years, our researchers were able to broaden their international networks which the significant increase in the number of EU-funded projects proves. The numbers also speak for success: the third-party funds raised for research rose to 7.3 million euros, a clear upward trend.

PhD programs and inter-disciplinary research groups

The PhD programs accredited by AQ Austria, "Regenerative Medicine" and "Migration Studies," are established research priorities and are an elementary component of developing our research and fostering younger generation scientists. Following the successful launch of the first two PhD programs in 2016, the first graduations can be celebrated in 2019. At the beginning of 2019, two new interfaculty research groups were able to take up their work. These groups relate questions on age-sensitive learning and on creating spaces to support learning and innovation.

Science and Society

Danube University Krems regularly participates in events such as the "Long Night of Research" to provide the interested public with an insight into its work. Young people can gain an understanding where the career path in becoming a scientist leads to in the course of excursions or events, such as the "Girls' day".

"Research at the Faculty of Health and Medicine addresses current medical questions and develops innovative therapy approaches. Close collaboration with clinics and partners working in the field ensures strong knowledge and competence transfer. Medical research findings thus quickly enter into everyday clinical practice."

Stefan Nehrer
Dean of the Faculty of Health and Medicine



"The global transitions taking place today have far-reaching impact. The Faculty of Business and Globalization applies a transdisciplinary approach to teaching and research to deal with change sustainably, while at the same time constructively exploiting the potential of innovations. We focus on overcoming the boundaries between science and society as crucial to the goal of creating profound knowledge."

Gerald Steiner
Dean of the Faculty of Business and Globalization



"Ecologically sustainable architecture, lifelong learning concepts and technologies, developing intelligent sensor systems and exploring and protecting cultural heritage are the key topics at the Faculty of Education, Arts and Architecture. To achieve this requires connecting pure and applied research, and a permanent dialogue between practice and science."

Christian Hanus
Dean of the Faculty of Education, Arts and Architecture





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Transdisciplinary Research

Danube University Krems identifies relevant societal challenges and developments. Basic and application-oriented research is combined with the expertise of different scientific disciplines bundled and interlinked with practice-oriented knowledge.

Digitalization, migration flows, demographic transition, economic change processes: Today's complex societal challenges require networked thinking, relating knowledge potentials from different disciplines, and involving society.

Danube University Krems faces these challenges with a transdisciplinary approach in its research by putting basic research, application, scientific disciplines and society into relation. As a university for continuing education, Danube University Krems builds on the profound experience of its students as well as on the individual expertise of its lecturers and teachers to promote the transfer of knowledge and competences among education and research.

Inter-faculty research groups and Transdisciplinary Labs

Apart from all four research fields "Cohesive and Innovative Societies", "Cultural Heritage", "Regenerative Medicine" and "Lifelong Learning Research", Danube University Krems has established inter-faculty research groups in which the focus is on topics such as

age-appropriate learning or creating a learning and innovation environment for continuing education.

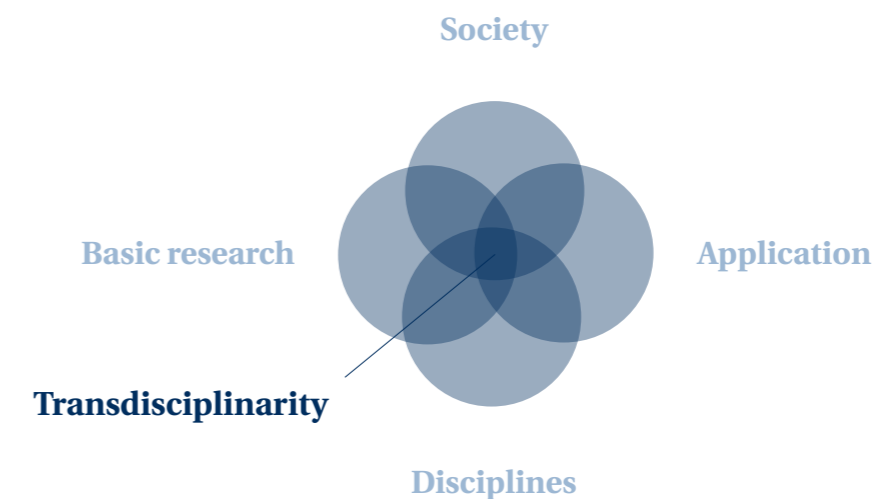
The transdisciplinary laboratories at Danube University Krems on the other hand provide room for exploring complex questions and for systematically working out solutions. They particularly focus on the impact of digitalization on work and society, as well as questions related to sustainability.

Inter-Faculty research groups

- Learning and Innovation Spaces for Lifelong Learning
- Age-appropriate Learning

Transdisciplinary Labs

- GovLabAustria: Experimental room for modern administration solutions
- Transdisciplinary Lab sustainable digital environments (SDE TdLab)
- Transdisciplinary Laboratory sustainable mineral resources (SMR TdLab)
- Biodiversity Hub

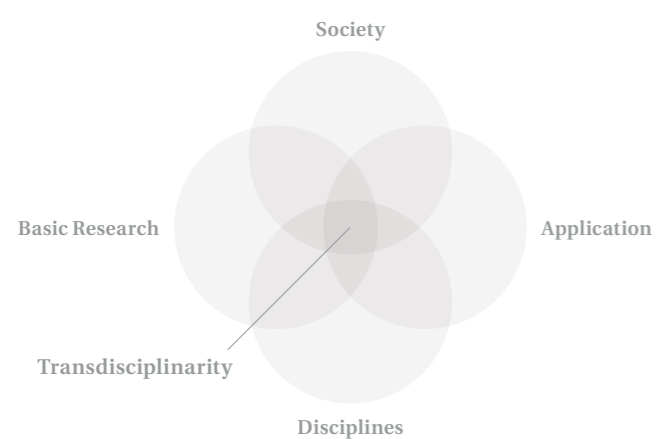




Institution-wide research field

Regenerative Medicine

- **Regenerative Medicine**
- **PhD Program Regenerative Medicine**
- **Sepsis and Pathogen Diagnostics**
- **Neurosciences and Prevention**
- **Psychotherapy and Biopsychosocial Health**





Bone, tissue and organ replacement is a major research focus at Danube University Krems. Research centers on new methods of tissue engineering for cartilage and bone regeneration, as well as on osteoarthritis and its treatment with the aid of regenerative medicine. New biotechnological therapies for diseases of the musculoskeletal system are developed in cooperation with partners from universities, clinics and industry.

Pictured (f. l. t. r.)

front row:

Daniela Kern
Olga Kuten-Pella
Eugenia Niculescu-Morzsa
Irene Hackl
Andrea De Luna

back row:

Alexander Otahal
Markus Neubauer
Vivek Jeyakumar
Christoph Bauer
Christoph Stotter
Karina Kramer
Alfred Mann
Andrea Pichler
Stefan Nehrer

Joint Regeneration

At present therapies for osteoarthritis can largely only treat the symptoms, but not reverse the disease progress. One approach investigates the effect of endogenous blood products on cartilage regeneration.

About 15 % of the total population is affected by osteoarthritis, a chronic degenerative disease. It leads to a progressive degradation of the cartilage, so that patients suffer from pain to the point of disability and are severely restricted in everyday life. The disease is currently treated with painkillers and dietary supplements, conservatively with physiotherapy or surgically by joint replacement.

Testing the efficiency of blood products

Endogenous blood products such as platelet-rich plasma or hyperacute serum are already used in practice to support the healing of cartilage defects. However, there are variances in the effectiveness of these blood products. This depends on the number of cells present in the blood product, on how the product is produced, and even on the patients receiving the product.

The project, a cooperation with OrthoSera GmbH, characterizes extracellular vesicles, growth factors, cytokines, enzymes, and other components in blood products. Their effect is investigated using an inflammation model that simulates the osteoarthritis disease pattern. The results provide conclusions as to whether therapies with extracellular vesicles, vesicle-free blood products or blood products and all their components can stimulate joint regeneration.

The Role of Microvesicles from Blood Derived Products in Osteoarthritis

FUNDING

Technology Fund, Province of Lower Austria

DURATION

2018–2019

DEPARTMENT

Health Sciences, Medicine and Research

PROJECT LEAD

Stefan Nehrer
Andrea De Luna

PARTICIPATING RESEARCHER

Alexander Otahal

COORDINATION

Danube University Krems

PARTNER

OrthoSera GmbH

Transplants for Bone Regeneration

Bone defects can be caused by fractures or osteoporosis. Treatment with bone grafts from other people is often lengthy and difficult. Therefore, scientists are working on a method to activate bone regeneration.

A tissue engineering model is constructed with know-how combined from areas as diverse as chemical process engineering (material production), biochemistry and biomechanics. In the first step, the extracellular matrix is isolated from the cartilage. This matrix is then combined with a mixture of silk and fibroin to produce the artificial construct, which promotes the formation of new tissue. Finally, hypertrophic chondrocytes are embedded in this ECM-SF construct to stimulate the calcification of cartilage tissue into bone tissue.

Promising implants

The newly formed bone tissue is studied in cooperation with the Karl Landsteiner Private University of Health Sciences using biomechanical tests. These test stability, mineralization, and microarchitecture using micro-computer tomography. In the future, the model of these biomaterial-cartilage complexes will represent a cost-effective means of repairing bone defects. This implant has the advantage of mimicking the natural structure and functional aspects of bone tissue.

Developmental Tissue Engineering Model of Endochondral Ossification for Bone Regeneration

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2018–2020

DEPARTMENT

Health Sciences, Medicine and Research

PROJECT LEAD

Stefan Nehrer

RESEARCHERS

Vivek Jeyakumar
Eugenia Niculescu-Morzsa

COORDINATION

Danube University Krems

PARTNERS

Karl Landsteiner Private University of Health Sciences (Dieter Pahr, Department of Biochemistry)

Optimizing Partial Endoprostheses

Clinical observations have shown that partial joint replacement often results in progressive degeneration of the preserved joint cartilage at the knees and hips. This project investigates different parameters in order to understand the causes of wear and tear.

Osteoarthritis leads to immobility in the knee joint and to pain. Approximately two thirds of 60- to 70-year-olds suffer from joint pain, which can be caused by misalignments, injuries, overstraining or genetic predisposition. The affected knee joints can be replaced either by total knee endoprosthesis or by less invasive partial endoprosthesis. The advantages of partial endoprosthesis include a less extensive surgical intervention as well as faster rehabilitation. However, the success rate is significantly lower compared to total knee replacement. One complication is the progressive degeneration of the preserved joint cartilage.

The Influence of Metal Ions on Chondrocytes

This project analyzes the background of progressive joint wear. For this purpose, the biological and physical (biotribological) properties of the metal implants on the surrounding joint cartilage are investigated. The focus is on the friction of the contact surfaces and the resulting release of metal ions. In detail, the research project investigates the vigour of the chondrocytes (cartilage cells) in the interface between cartilage and metal surfaces. The effects of the metal ions on the chondrocytes are being studied. The results will optimize the use of partial endoprostheses.

Lifetime Assessment and Prediction of Partial Replacement Technology

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2017–2019

DEPARTMENT

Health Sciences, Medicine and Research

SUPERVISORS

Stefan Nehrer
Thomas Klestil

PHD STUDENT

Christoph Stotter

PARTICIPATING RESEARCHERS

Eugenia Niculescu-Morzsa
Christoph Bauer

COORDINATION

AC²T research GmbH

Detecting *Pseudomonas aeruginosa*

The focus of this project is on providing evidence of microbiological contaminations and developing suitable sensor systems for their detection. One specific method is being developed to identify the hospital germ *Pseudomonas aeruginosa*.

P. aeruginosa is a pathogen resistant to many antibiotics. It can cause a wide range of infections in both immunocompromised and healthy people. Its habitats are ubiquitous, but moist surfaces, such as taps are preferred, which can also be colonized in the form of a biofilm. The biofilm makes the cells insensitive to antibacterial agents such as disinfectants, antiseptic detergents, and antibiotics. *Pseudomonas* is also an indicator of hygiene quality in the food industry.

Fast contamination detection

It currently takes about two days to detect the pathogen using cultivation-based techniques and analytical profiling. This project aims to develop an electrochemical method to identify the pathogens within one day, using a biosensor. This enables medical staff to take swift countermeasures in the event of microbial contamination.

In the first step, specific targets are traced by means of screening and electrochemical analysis of specific metabolites and proteins. This is followed by determining the detection limit of the bacterial isolates. This method is then integrated into a biosensor and tested. The developed biosensor can be used in clinical applications as well as in the food industry or for testing water quality.

Development of an Electrochemical Sensor for the Rapid Detection of *Pseudomonas aeruginosa* in Hospitals

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2019–2021

DEPARTMENT

Integrated Sensor Systems

PROJECT LEAD

Martin Brandl

SCIENTIFIC PROJECT LEAD

Jörg Ettenauer

PARTICIPATING RESEARCHER

Sylvia Schneider

COORDINATION

Danube University Krems

PARTNERS

Karl Landsteiner University of Health Sciences;
University Hospital St. Pölten – Clinical Institute for Hygiene and Microbiology

Competence Center MechanoBiology

The Competence Center MechanoBiology is an international research group working in the field of mechanobiology. It operates at the interface of cell biology, immunology and bioengineering to study the impact of force on individual cells in a context of tissues and organs. It incorporates dynamic events such as physical force, dynamic stretching and strain, compression, and shear forces, their conversion into biochemical signals and the transmission of these signals into the nucleus. The knowledge generated within this project will be incorporated into the development of clinical therapies.

Transnational academic research groups from Krems, Vienna, Brno, Nové Hradky and České Budejovice are collaborating to bundle their expertise and create a common research and innovation infrastructure. At the same time, this will allow merging knowledge from a variety of different scientific disciplines such as regenerative medicine, stem cell research, cell biology, biochemistry, immunology, and transfusion medicine and developing young investigators in a PhD program to obtain high class research.

Competence Center MechanoBiology in Regenerative Medicine

FUNDING

European Commission, Province of Lower Austria

DURATION

2017–2020

DEPARTMENT

Biomedical Research

PROJECT LEAD

Michael Bernhard Fischer

COORDINATION

Danube University Krems

PARTNERS

Technical University Vienna
Ludwig Boltzmann Society, Institute for Experimental and Clinical and Traumatology
University of South Bohemia in Budweis
Institutes for theoretical and applied mechanics in the Czech Academy of Sciences
St. Anne's University Hospital Brno



The structured PhD program “Regenerative Medicine” incorporates taught and research elements to provide high-level training in theoretical and practical aspects of regenerative medicine. We offer a strong interdisciplinary research environment to support the development of our students towards independent researchers and scientists.

Pictured (f. l. t. r.)

front row:

Bojana Stojanovic
Olga Kuten-Pella
Sobha Karuthedom George
Bettina Kronsteiner
Christian Endres

back row:

Alexander Otahal
Markus Neubauer
Vivek Jeyakumar
Christoph Bauer
Christoph Stotter
Markus Pasztorek

**Not in the picture
displayed**

Matthias Pilecky

PhD Program Regenerative Medicine

The Faculty of Health and Medicine starts its fourth PhD program in Regenerative Medicine in 2019, and thus promotes the training of next-generation researchers. The PhD students of the first year will graduate in June 2019.

Regenerative medicine operates at the interface of cell biology, mechanobiology, immunology and bioengineering to develop new and innovative technologies to counteract degeneration. Restoring dysfunctional cells with stem cells thereby repairing damaged tissue and organs, unravel the mechanism of self-repair and developing new therapeutic approaches to counteract degeneration are major topics of the PhD Program. Under these circumstances Danube University Krems supports basic and applied research in order to solve medical challenges of the society.

In the course of the PhD program Regenerative Medicine, students have the opportunity to work at an interface between basic research and clinical application in third-party funded projects. They can study the effect of self-organization of cells, changes in the cytoarchitecture during cultivation, mechanobiological effects on cultured cells, the role of forces for the maintenance of cultured cells and the effect of microparticles on immune cells during inflammatory processes. Students will learn to manage projects, how to apply biostatistics, write scientific manuscripts and defend ideas.

Research topics:

- Principles of regenerative medicine and tissue engineering
- Regeneration of articular surfaces (cartilage transplants, growth factor therapy, mesenchymal stem cell implantation)
- Immune-regulatory mechanisms of mesenchymal stem cells
- Tissue and organ replacement
- Methods of organ support and extracorporeal blood purification
- Pathophysiology of sepsis and researching inflammatory mechanisms
- Interactions of blood and tissue with biomaterials

Mesenchymal Stem Cells Regulate the Immune System

Mesenchymal stem cells (MSCs) possess certain regenerative and immunoregulatory capabilities; however, the mechanism how they act is still not fully understood. The goal of this project is to study the mechanisms and the potentials how MSCs are immunoregulatory and by doing so can propel tissue and organ regeneration.

Heart, kidney, lung, liver and pancreas transplants are performed more than 1,000 times a year in Austria. Still, they are accompanied by serious side effects caused by rejection of the organs or high incidence of infection due to immunosuppressive therapy. The donor organ is recognized by the bodies' foreign defense mechanisms and attacked by the immune system. This transplantation barrier comprises the blood group ABO system and the human leukocyte antigen system, a group of human genes central for a tissue imprint.

Suppressing inflammatory processes in the immune system

This project investigates whether immune cell-induced inflammation can be modulated with the aid of MSCs. MSCs are the stem cells of the connective tissue with the potential to regenerate damaged or outdated tissue and organs. They exhibit immunoregulatory capabilities, but the underlying mechanism including specific receptors and their signal transduction pathways, biomechanical couplings and their conversion to biochemical signals and their physical properties are largely unknown. Research needs to be carried out to better characterize MSCs for a potential cellular immunotherapy in a clinical setting.

Immunoregulatory Properties of Mesenchymal Stem Cells

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2017–2020

DEPARTMENT

Biomedical Research, Center for Experimental Medicine

PROJECT LEAD

Michael Bernhard Fischer

PhD STUDENTS

Agnes Kocsis
Markus Pasztorek
Bettina Kronsteiner

COORDINATION

Danube University Krems

PARTNERS

Austrian Center for Medical Innovation and Technology (ACMIT)
Technical University Vienna

Mosaicplasty on the Arthrosis Model

About two thirds of 60- to 70-year-olds suffer from joint problems. Inflammation that occurs as a result of degenerative joint diseases leads to changes in joint fluid and cartilage surface and to increased friction.

The project uses an in vitro arthrosis model to investigate the influence of arthrosis on the tribological (friction and wear), biomechanical and biological properties of cartilage. Different lubricants are being tested to minimize friction on the cartilage.

The second research question deals with repairing cartilage damage by means of mosaicplasty. Mosaicplasty is a cartilage-bone graft, in which a part of smooth cartilage is removed from an area in the knee joint that is not or only mildly subjected to strain, and grafted onto the damaged area. The effects of anti-inflammatory or anti-inflammatory mediators on the friction coefficient, the cartilage surface and molecular biological parameters of the grafts are then tested. Additionally the use of lubricants such as hyaluronic acid to improve the friction coefficient between grafts is being investigated.

Protecting cartilage

In the course of the project, new insights into cartilage physiology and function have already been gained. A cartilage homeostasis disorder with pro-inflammatory mediators resulted in changes to the friction coefficient and the cartilage surface. In order to develop cartilage-protecting substances, various lubricants and their influence on the grafts are being investigated.

Establishing an In Vitro Arthrosis Model

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2016–2019

DEPARTMENT

Health Sciences, Medicine and Research

PROJECT LEAD

Stefan Nehrer

PARTICIPATING RESEARCHER

Christoph Bauer

COORDINATION

Danube University Krems

PARTNER

AC²T research GmbH (Friedrich Franek; Olga Kuten-Pella)



The Department for Biomedical Research and the Christian Doppler Laboratory focus on the development of extracorporeal therapies. One central goal is to develop cell culture models and diagnostic procedures that allow a better understanding and a faster, more accurate diagnosis of sepsis.

Pictured (f. l. t. r.)

front row:

Markus Pasztorek
Anita Aichinger
Stephan Harm
Christiane Gföhler
Anita Schildberger
Lucia Krajčik Lauková
Tanja Eichhorn
Birgit Fendl
Bettina Kronsteiner

middle row:

Andrea Pichler
Ute Fichtinger
Claudia Schildböck
Michael Bernhard Fischer
Eva Rossmann
Ingrid Linsberger
Martina Juppe

back row:

René Weiss
Jens Hartmann
Matthias Pilecky
Karin Strobl
Vladislav Semak
Carla Tripisciano
Viktoria Weber
Sobha Karuthedom George

Advances in Sepsis Therapy

Intensive basic research as well as the availability of new analytical methods have considerably increased our knowledge on the pathophysiology of sepsis.

Sepsis is a life-threatening inflammatory reaction of the body to an infection. It is characterized by pronounced heterogeneity both on pathogen and on patient level. The CD Laboratory for Innovative Therapy Approaches in Sepsis investigates the pathophysiology of sepsis in order to develop efficient diagnostic tools and supportive therapies. The integrity of the endothelium, which is a barrier between the circulation and the surrounding tissue is lost during sepsis. Mechanisms underlying this loss-of-barrier function of the endothelium under septic conditions are investigated in this project.

Extracellular Vesicles

In addition to research on the pathophysiology of sepsis, the role of extracellular vesicles as markers and targets in inflammatory processes and their roles in the activation of coagulation and immune modulation are investigated. Extracellular vesicles serve as signal carriers between cells and as markers for cellular activation. In particular, they can serve as biomarkers for cellular activation in extracorporeal therapies. A spectrum of methods has been established in the CD laboratory for the detection, characterization and quantification of extracellular vesicles.

Christian Doppler Laboratory for Innovative Therapy Approaches in Sepsis

FUNDING

Christian Doppler Forschungsgesellschaft and Fresenius Medical Care, Germany

DURATION

2013–2019

DEPARTMENT

Biomedical Research

PROJECT LEAD

Viktoria Weber

PARTICIPATING RESEARCHERS

Birgit Fendl
Tanja Eichhorn
Carla Tripisciano
Anita Schildberger
Lucia Krajčik Lauková
Ingrid Linsberger
René Weiß
Michael Fischer

COORDINATION

Danube University Krems

PARTNERS

Fresenius Medical Care Deutschland GmbH
Medical University Vienna

www.sepsisresearch.at
www.asev.at

Detection of Blood Stream Infection Using Molecular Diagnostics

Every hour of delay in antibiotic therapy increases the risk of sepsis mortality. In order to reduce this risk, molecular diagnostic methods for rapid pathogen detection in the circulation are being developed as part of this project.

The project Pathogen Detection aims to develop new ways to detect and identify pathogens in the circulation. It investigates how long pathogen DNA remains detectable in the bloodstream after successful antibiotic therapy. This is crucial for the interpretation of molecular diagnostic results in order to exclude possible secondary infections. In addition, the researchers are examining which factors can influence or inhibit pathogen detection in the blood. With the help of these results, existing pre-analytical enrichment methods of pathogen DNA can be improved. It will also be investigated whether next-generation sequencing can be used to identify pathogens directly in patients' blood.

Advanced Pathogen Detection in Blood Stream Infection

FUNDING

FFG – Austrian Research Promotion Agency

DURATION

2019–2022

DEPARTMENT

Biomedical Research

PROJECT LEAD

Viktoria Weber
Matthias Pilecky
Anita Schildberger

COORDINATION

Danube University Krems

PARTNER

Medical University Innsbruck, Section of Microbiology and Medical Hygiene
Ares Genetics GmbH

Developing High-Performance Diagnostic Tools for Pathogen Detection

Swift and targeted treatment is crucial in sepsis and can reduce sepsis mortality. The project Smartdiagnos focuses on the development of diagnostic tools to detect and identify pathogens in the circulation quickly and efficiently.

The European research project deals with the question of how to improve pathogen detection during blood stream infection. Within the framework of the project, a point-of-care system was developed for swift implementation directly in intensive care units, and a lab system for use in clinical laboratories. The latter covers a broad spectrum of pathogens and can also detect antibiotic resistances. The two systems are now being validated using clinical samples.

Next Generation Sepsis Diagnosis – Smartdiagnos

FUNDING

EU – Horizon 2020

DURATION

2016–2020

DEPARTMENT

Biomedical Research

PROJECT LEAD KREMS

Viktoria Weber

COORDINATION

Technical University of Denmark

PARTNERS

Technical University of Denmark, Kongens Lyngby, Denmark
Copenhagen Business School, Lyngby, Denmark
TATAA Biocenter, Göteborg, Sweden
Zoetis, USA
CubeDX, St. Valentin, Austria
Unilabs, Switzerland
University of Skövde, Sweden
Charles University Prague, Prague, Czech Republic
Deutsches Institut für Normung, Berlin, Germany

www.smartdiagnos.eu

Characterizing Extracellular Vesicles

Extracellular vesicles play central roles in intercellular communication and cell regeneration. Vesicles form a very heterogeneous group of subcellular structures in terms of their size, origin and their molecular cargo. Thus their characterization requires a combination of different methods.

Extracellular vesicles are membrane particles secreted by cells which transfer information between cells and are involved in numerous physiological and pathological processes.

Extracellular vesicles overlap in size and density with other biological structures, which makes their enrichment from body fluids or cell culture media challenging. More so, specific protein markers that would clearly identify individual vesicle populations are missing to date.

Characterizing vesicles

The aim of this project is to develop innovative techniques for the isolation, quantification and characterization of extracellular vesicles from biological materials. In particular, Nano Electrospray Gas-Phase Electrophoretic Mobility Molecular Analysis (nES-GEMMA) in combination with mass spectrometry, is used to characterize extracellular vesicles from healthy donors and from septic patients.

Characterization of Blood Cell Derived Extracellular Vesicles with Nano Electrospray Gas-Phase Electrophoretic Mobility Molecular Analysis

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2018–2021

DEPARTMENT

Biomedical Research

PROJECT LEAD

Viktoria Weber
Carla Tripisciano
Günther Allmaier

COORDINATION

Danube University Krems

PARTNERS

Technical University, Vienna
Karl Landsteiner Private University for Health Sciences, Krems
University Clinic St. Pölten, Sepsis-Unit

Interactions Between Endotoxins and Blood

To deplete bacterial endotoxins from the circulation, the interactions of endotoxins with components of human whole blood are examined.

Extracorporeal therapies are used to remove pathogenic substances from the blood. Examples of clinically established procedures include dialysis, liver support, immune adsorption, and lipid apheresis. Some pathogenic substances, such as pathogen-associated molecular patterns, cannot yet be removed or are only insufficiently removed with current approaches. These include bacterial membrane components, such as endotoxins and lipopeptides.

The aim of this project is to characterize the interaction between human lipoproteins and endotoxins by studying different lipoprotein fractions from blood and their influence on the biological activity of endotoxins.

Elimination of Bacterial and Uremic Toxins in Extracorporeal Procedures

FUNDING

Technology Fund, Province of Lower Austria

DURATION

2019–2020

DEPARTMENT

Biomedical Research

PROJECT LEAD

Jens Hartmann

PARTICIPATING RESEARCHERS

Stephan Harm and the team at the Center for Biomedical Technology

COORDINATION

Danube University Krems



Research at the Department for Clinical Neurosciences and Preventive Medicine concentrates on preventing vascular diseases such as stroke, dementia, diabetes and their complications, as well as on the application of new neurorehabilitation therapy methods. Particular attention is paid to maintaining cognitive performance in patients with diabetes, or after a stroke, and to the use of non-pharmacological treatment methods for people suffering from dementia.

Pictured (f. l. t. r.)

front row:
 Michaela Pinter
 Wolf-Dieter Heiss
 Alexandra Dachenhausen
 Karl Matz
 Alina Schwarz
 back row:
 Irene Ebhardt
 Michael Brainin
 Yvonne Teuschl
 Paulina Ratajczak
 Margit Höfler

The Stroke and Dementia Challenge

In view of the rise in neurological disorders, there is an increasing focus on research and teaching in the field of neurosciences. Developing measures for the prevention and treatment of damage caused by neurological diseases is essential for health maintenance.

Stroke is the third leading cause of disability and death worldwide. Every year 24,000 people suffer a stroke in Austria. In close cooperation with the Austrian Stroke Society and the World Stroke Organization, a team at Danube University Krems is studying factors that reduce the risk of stroke and improve the chances of post-stroke recovery.

Lifestyle changes against cognitive decline

The latest results of this research project show which measures prevent post-stroke cognitive decline.

Up to 76 % of patients suffer from cognitive impairment three months after a stroke, and 10 % develop dementia. In a cooperative project with Norwegian scientists, the effectiveness of lifestyle changes on post-stroke cognition was assessed. For this purpose, the data from the only two studies on this topic were jointly evaluated. There were weak indications that intensive lifestyle changes and the improvement of risk factors could slow down post-stroke cognitive decline. Such modifiable risk factors include high blood pressure, sugar and lipid metabolic disorders, smoking, lack of exercise and an unhealthy diet. Further international projects are planned to investigate the effects of lifestyle interventions.

Meta-Analysis on the Effectiveness of Multiple Risk Factor Intervention for the Prevention of Post-Stroke Cognitive Decline

→ Teuschl Y., Ihle-Hansen H., Matz K., Dachenhausen A., Ratajczak P., Tuomilehto J., Ursin M.H., Hagberg G., Thommessen B., Øksengård A.R., Brainin M.; ASPIS Study Group (2018) Multidomain intervention for the prevention of cognitive decline after stroke – a pooled patient-level data analysis. *Eur J Neurol.*, 25: 1182-1188.

The Czech-Austrian Nursing Home Project

Currently, 50 million people worldwide live with dementia. This number will double in the next few years. Therefore, profound scientific data is essential for evidence-based decisions to optimize long-term care.

In the DEMDATA project, data from Austrian and Czech nursing home residents were collected using a common study protocol. The spotlight was on the occurrence of cognitive deficits of residents, the burden of care teams and the needs of relatives. For this purpose, data were collected in four important areas: (1) residents, (2) nursing team, (3) relatives and (4) environmental factors of the facility.

Designing new treatment and care concepts

The first results showed that around 85 % of nursing home residents show symptoms of cognitive deficit and dementia. This figure is much higher than previously assumed. A total of 1,085 people were examined, 571 residents were assessed in Austria. The sample also showed that 81 % of residents demonstrate behavioral symptoms, 44.5 % of the persons complain of slight to severe pain and 78.4 % are restricted in their mobility. This study shows that improved diagnostic services and treatment approaches are needed to improve the care of people with dementia in nursing homes. Results reveal potential differences between countries. This study helps to understand the needs of nursing home residents, to develop new treatment and care concepts, and to break down old routines, structures and processes.

The Czech-Austrian Long-Term Care Home Project – DEMDATA

FUNDING

FWF – Austrian Science Fund

DURATION

2016–2019

DEPARTMENT

Clinical Neurosciences and Preventive Medicine

PROJECT LEAD

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ACADEMIC STAFF

Margit Höfler
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<https://www.donau-uni.ac.at/demenzstudien>

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- Auer S.R., Linsmayer E., Beránková A., Pascher P., Firlinger B., Prischl D. (2017) DEMDATA: The Austrian-Czech institutional long term care project – design and protocol of a two-centre cross sectional study. *BMC Health Services Research* 17:296 DOI 10.1186/s12913-017-2244-x
- Holmerová I., Auer S.R., Beránková A., Höfler M., Ratajczak P., Šteffl M. (2018) Cognitive status and use of analgesics and anxiolytics in residents of nursing homes in the Czech Republic. *Clin Interv Aging*; 13:2511-2515.

Searching Efficiently

Visual search allows people to find targets in a set of very similar objects. This involves various processes such as short-term memory and inhibition of return. This project focuses on how these visual and memory functions interact.

Efficient search plays a major role when looking for abnormalities in X-ray images or dangerous items in luggage in flight safety. A range of processes can facilitate visual searches, such as the interaction between short-term memory and inhibition of return. Smaller amounts of visual information can be stored in the short-term memory and compared with the newly arriving information. Inhibition of return is a phenomenon that prevents us from immediately refocusing the eye on an area that has already been viewed. Both processes are time-limited.

Connections between short-term memory and inhibition of return

This basic research-oriented project uses eye tracking to investigate the relationship between inhibition of return, short-term memory and visual search. It examines whether the same brain resources are used for these activities. Furthermore, it investigates whether short-term memory and inhibition of return influence each other or whether they are independent processes. The results provide information on how the search can be made more efficient and accurate. In addition, these data can be used to implement algorithms for artificial intelligence or machine vision.

Inhibition of Return and Memory

FUNDING

FWF – Austrian Science Fund

DURATION

2019

DEPARTMENT

Clinical Neurosciences and Preventive Medicine,
Center for Dementia Studies

PROJECT LEAD

Margit Höfler

COORDINATION

Margit Höfler

PARTNER

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- Höfler, M., Liebergesell, K., Gilchrist, I. D., Bauch S. A., Ischebeck, A., & Körner, C. (2019) Post-search IOR: Searching for Inhibition of Return after search. *Acta Psychologica*, 197, 32-38



The Department for Psychotherapy and Biopsychosocial Health conducts both basic and clinical application research. The research focuses on the effectiveness of psychotherapy, causes and therapy of physical complaints stemming from psychological causes, psychological factors of pain development or chronicity, digitalization in the psychosocial field, and the interaction between psychotherapists and patients.

Pictured (f. l. t. r.)

Maria Theresia Rohrhofer
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 Christoph Pieh
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Sleep Influences Pain

The project “Sleep and Pain” investigates whether there is a connection between pain and sleep. The results show that sleep deprivation influences pain perception. This connection between sleep and pain can therefore play a significant role in the process of the chronification of pain.

→ Pieh C., Jank R., Waiß C., Pfeifer C., Probst T., Lahmann C., Oberndorfer S. (2018) Night-shift work increases cold pain perception. In: Sleep Medicine: Vol. 54, S. 74-79.

Chronic pain not only causes severe personal suffering, but also leads to high direct and indirect health-care costs. Various factors can influence pain chronification. The project “Sleep and Pain” assesses the influence of sleep deprivation on pain perception. Pain perception and pain threshold were measured in night shift workers at the University Hospital St. Pölten according to their sleep. The pain threshold and pain perception were tested with pain stimulation.

Factors that influence pain perception

The test persons were much more sensitive to pain after the night shift. The same pain stimulus was rated almost 30 % stronger than after normal sleep. After a recovery night, pain sensitivity returned to normal. Future projects should focus on sleep disorders as a chronification factor of pain. Improvement of sleep in patients with chronic pain and sleep disorders might also improve pain. A recent study investigates whether patients with obstructive sleep apnea syndrome have increased pain perception and if this can be influenced by sleep disorder treatment.

Relief for Chronic Diseases

The CHRODIS PLUS project promotes cooperation between EU states to reduce the burden of chronic diseases. Several working groups deal with different topics and work together on solutions.

CHRODIS PLUS is a three-year initiative funded under the Third Health Program by the European Commission and their partner organizations. The aim of this working group is to promote high-quality care for people with chronic diseases. A tool for quality criteria and quality recommendations, jointly developed by the eight different project partners, will support this. This tool will be implemented and evaluated in several countries in a series of pilots. The tool provides an analytical framework that can be used by decision-makers, medical staff and patients. The care and procedures for patients with chronic diseases can thus be monitored, improved and evaluated.

Developing apps for therapies

The Department for Psychotherapy and Biopsychosocial Health, together with other project partners, develops innovative solutions based on mobile technologies. The purpose of these mobile apps, for example, is to help diabetes and tinnitus sufferers regardless of time or place. In addition, the data collected will help to improve care systems and consider the needs of people with chronic diseases.

CHRODIS PLUS

FUNDING

European Commission

DURATION

2017–2020

DEPARTMENT

Psychotherapy and Biopsychosocial Health

PROJECT LEAD

Thomas Probst

COORDINATION

National Institute of Health, Italy
National Institute of Public Health, Slovenia

PARTNERS

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Cantabrian Health Service, Spain
National Center for Health and Analysis, Bulgaria
University Clinic Regensburg, Germany

<http://chrodis.eu>

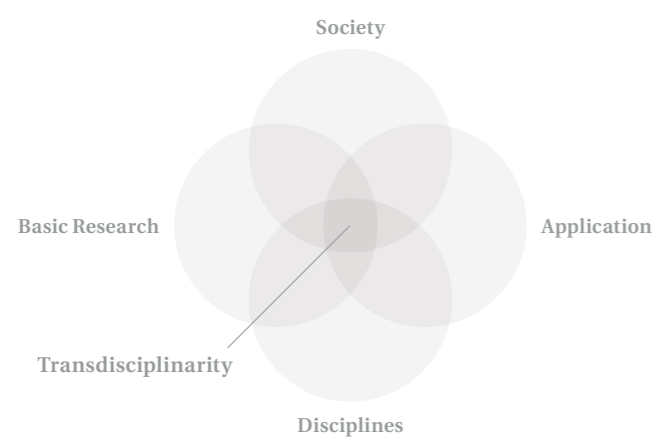




Institution-wide research field

Cohesive and Innovative Societies

- **Digitalization**
- **Migration and Integration**
- **PhD Program Migration Studies**
- **Energy Efficiency**
- **Evidence-Based Medicine**
- **Transdisciplinary Laboratories**





Pictured (f. l. t. r.)

front row: Harald Steiner; Albert Treytl; Thilo Sauter; Peter Parycek; Hubert Brückl; Michael Sachs; Thomas Schrefl; Thomas Lampolts-hammer

middle row: Jörg Ettenauer; Rafael Preuer; Lisa-Marie Wagner; Lisa Brandl; Martin Brandl; Anetta Nagy; Wilfried Hortschitz; Aleksey Bratukhin; Markus Gusenbauer; Harald Özelt; Heike Strumpfen; Shefali Virkar; Alexander Waldemar Kovacs; Maria Schuler; Johann Fischbacher; Herbert Weitensfelder

back row: Karlheinz Kellner; Thomas Posniecek; Thomas Bigler; Matthias Kahr; Gabor Kovacs; Noella Edelmann; Gregor Eibl; Anna-Sophie Novak; Karin Steiner; Bettina Höchtl; Lórinç Thurnay; Günther Kainz

In addressing digitalization, Danube University Krems particularly demonstrates its focus on social impact. Its research covers the technical aspects of the Internet of Things, AI-supported legal information systems, networked administration and automated social media analysis. This takes into account the far-reaching transitions caused by digitalization and all its consequences, which affect almost every area of life.

The Contribution of Social Media to Radicalization

In the media it regularly plays an important role, but in research still hardly at all: the meaning of social media in the radicalization process. The ComRad project aims to expose the communication patterns behind the radicalization of young people.

So far, there have mainly been isolated violent incidences that have drawn public attention to the question of what role social media played in radicalizing the perpetrators. Although case analyses, interviews and interrogation protocols exist, the radicalization tendencies in Austria have still not been systematically analyzed. The ComRad project closes this gap and aims to capture the status quo of Austrian network communications. Building on this, (criminal) sociological approaches will be additionally developed with regard to criminalization trends. Social media channels on the Internet appear to play a role in the formation of special interest groups.

Content analyses for pattern recognition

The ComRad project researches the question of which linguistic indicators and communication patterns can be used to identify radicalization tendencies in social media and which network areas are particularly affected by them. The connection between communication location and social groups will also be investigated. Experts from journalism and communication science, computer science and sociology of crime are involved in answering these questions.

The project aims to facilitate automatic content analyses. Linguistic radicalization indicators will be translated to corresponding word lists, with the help of which social media portals can be screened for content. A conventional content analysis is also planned and conducted. In a next step, statements relevant under criminal law according to the existing legal framework will be particularly scrutinized. This also includes considerations as to whether legal evaluations solely based on Big Data analyses, without human control, are even possible.

Communication Patterns in Radicalization

FUNDING

Austrian Academy of Sciences, City of Vienna

DURATION

2017–2019

DEPARTMENT

E-Governance in Administration

PROJECT LEAD

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PARTICIPATING RESEARCHERS

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University of Vienna, Faculty of Computer Science, Research Group Multimedia Information Systems

Groundwork for New Localization Algorithms

Localization is a key technology to fully exploit the potential of the Internet of Things. New algorithms based on directional antennas will enable more accurate localization by compensating for common disruptions while reducing energy consumption.

Industry 4.0 is planning factory facilities that will enormously increase flexibility in production through digitalization. The vision is an adaptable industrial Internet of Things that gets by with marginal configuration and installation. Localization fulfils an important function in this context: Mobile devices, automated guided vehicles or even electronic product labels can be linked with their environment (location awareness). But applications go much further: among others, the automotive industry is also showing interest in using structures in the chassis as directional antennas to locate approaching drivers with mobile phones and only to open doors, when the driver is directly in front of the car.

Greater precision thanks to directional antennas

Current localization algorithms are based on the assumption of a perfect omnidirectional, i.e. spherical antenna characteristic that transmits and receives in all directions. Directional antennas, on the other hand, offer great advantages in terms of suppressing interference, increasing communication range and reducing energy consumption in the factory of the future but also other application areas such as supply chain management, automotive industry or building and home automation. The "Pinpoint IoT" project is

conducting important basic research to enable localization by directed antennas. Two major challenges have to be overcome: The ambiguity of the received signal strength values resulting from directional antennas must be eliminated, and the data of the antennas placed at different positions on the factory floor must be combined. In particular, the latter measure serves to increase localization accuracy and coverage.

Pinpoint IoT – Localization Using Directional Antennas in Industrial Internet of Things

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2019–2020

DEPARTMENT

Integrated Sensor Systems

PROJECT LEAD

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COORDINATION

Danube University Krems

PARTNER

Technical University Vienna

Dealing With a Legal Information Overload

It is almost impossible for laypeople to obtain a clear overview of the current legal situation. The project "ManyLaws – EU-wide Legal Text Mining using Big Data Processing Infrastructures" aims to make Austria's and Greece's acquis readily accessible through computer-assisted, conceptive analyses.

The ManyLaws project examines how legal information such as national legislation can be extracted and used by different stakeholders across Europe, and what infrastructure is required to achieve this. The overall objective is to make it possible for citizens, businesses, and administrations to access and analyze law-related texts. The application spectrum ranges from the exploration of national legal systems to analyzing how European legal requirements have been transposed into national law through to complex enquiries as to which legal norms are applied in the two pilot countries of Austria and Greece under specific circumstances.

Comprehensive Overview Through Text Mining Tools and Visualisation Techniques

The proposed platform supports internationalization and European integration through the provision of various services, not in the least by enabling parallel searches with the legal frameworks of European Union member states. Visualizing the chronological evolution of legislation is also planned. Achieving these goals requires networked research in the fields of law, political science and informatics.

With the aid of text mining tools and algorithms, interdependencies, interlinkages, and conflicts within the legal corpora of Austria and Greece should become easier to identify and understand. This knowledge can support public stakeholders in decision-making processes. These core services will be tested within at least two legislative procedures in Austria and Greece.

EU-wide Legal Text Mining Using Big Data Processing Infrastructures

FUNDING

European Commission

DURATION

2018–2020

DEPARTMENT

E-Governance and Administration

PROJECT LEAD

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PARTNERS

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Hellenic Parliament, European Programs Implementation Service
Austrian Parliament, Parliamentary Research Unit

Experimental Space for the Public Sector

GovLabAustria works on innovative solutions for administration and policymaking using an interdisciplinary approach. It aims to bundle expertise from administration, science, business and society and consolidate it by means of continuing education measures.

Digitalization presents new challenges and opportunities for public administration. Within the framework of an open experimental space, GovLabAustria applies different methods to its work on framing future-relevant questions and citizen-focused solutions. Disciplines such as law, governance and public policy, political and social sciences, organizational psychology and economics as well as IT are drawn upon to solve the problem.

Bundled knowledge with an international perspective

The subproject GLAInno1: Transparency and Participation in Legislation focuses on how expertise from politics, administration, science, business and civil society can be brought together in the best possible way and incorporated into the legislative process.

The purpose of the reference project Collective Mind is to investigate specific factors and their impact on collective intelligence. Interventions that increase the collective intelligence of a group and measures that can be derived for stakeholder processes are also studied.

GovLabAustria implements research and development projects in the field of administrative innovation and evidence-based policy-making. It also monitors innovative

international projects, methods and solutions. In addition, GovLabAustria aims to establish a national contact point for innovation laboratories concerned with the public sector.

GovLabAustria

DURATION
Since 2017

DEPARTMENT
E-Governance and Administration
Knowledge and Communication Management

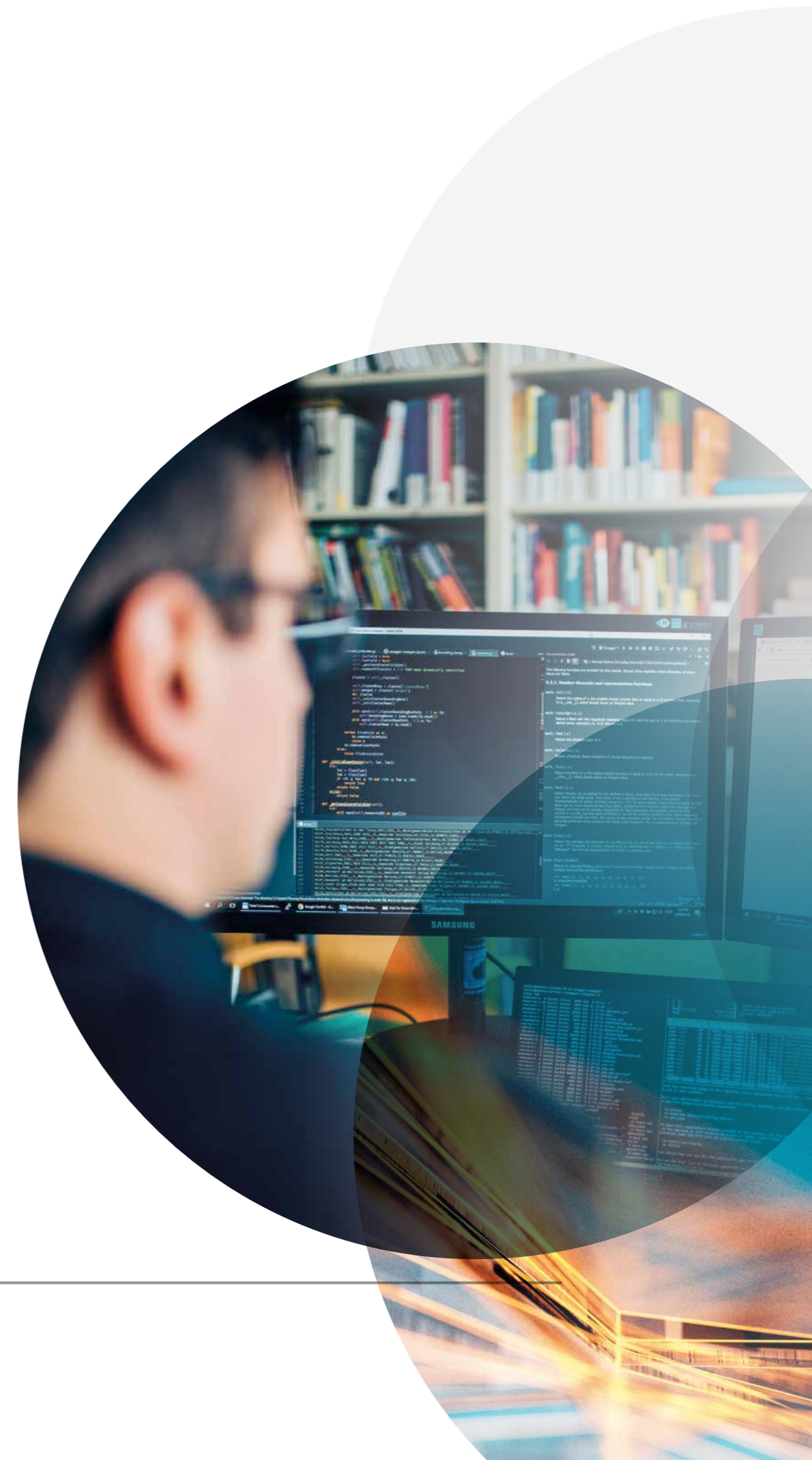
PROJECT LEAD
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Danube University Krems
Federal Ministry Civil Service and Sport

PARTNER
Federal Ministry Civil Service and Sport

www.govlabaustralia.gv.at





The Department for Migration and Globalization investigates the various causes of international migration movements and their effects on the economy and society in the countries of origin, transit and host countries. The spectrum of research topics ranges from investigating long-term refugee situations to systematic and cross-national data collection, policy analysis through to the socio-economic prerequisites and implications of migrant entrepreneurship.

Pictured (f. l. t. r.)

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Lydia Rössl
Manuela Fraberger
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Anna Faustmann
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Knowledge Management and Dissemination of Migration Research

Migration is at the heart of the transformation European societies are currently experiencing, and robust evidence is more than ever needed for informing policy-making and public discourses. The CrossMigration project comprehensively accumulates the current state of knowledge in migration research and establishes an interactive research platform.

To be able to respond to the challenges and opportunities migration represents, it is necessary to know and understand the drivers of migration to Europe, the infrastructures that facilitate migration, and the specifics of complex migration flows. Migration research has developed rapidly over the past two decades, but without establishing the structures required to present the latest research findings and state of knowledge. Accessibility, connections and communication about this knowledge based on current research data and projects are limited. Moreover, there are contradictions, overlaps and gaps within the data and research findings that require systematic processing.

Preparing a research agenda

For this reason, the purpose of the CrossMigration project collects research findings on migration systematically and cross-nationally in order to make knowledge pertaining to migration issues accessible to researchers and policy makers. The first step is to define the questions central to migration. In the next step, a method to coherently collect and merge research findings needs to be developed. This information will also lead to drafting a strategic research agenda for migration research.

As a subject matter of high relevance for European societies, CrossMigration also aims to contribute to a public debate on the topic. A Migration Research Hub as well as dissemination activities and communication means will help hereby.

Cross Migration

FUNDING

EU – Horizon 2020

DURATION

2018–2020

DEPARTMENT

Migration and Globalization

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Aligning Migration Management and the Migration-Development Nexus

MIGNEX, the largest EU-funded research project on migration, conducts extensive research on migration management and how migration and development affect each other. Fieldwork in ten home and transit countries provide a strong foundation for advanced analyses.

The core idea behind the MIGNEX project is to align migration management with migration and development, whereby development at the regional level takes priority. Specific to the project is the balanced project consortium consisting of academic and politically-oriented institutions, and in addition to the European countries, including members from Afghanistan, Ghana, Pakistan and Turkey. In addition to these countries, fieldwork is also carried out in Cape Verde, Ethiopia, Guinea, Nigeria, Somalia and Tunisia. A comprehensive data set of 12,500 surveyed persons will be compiled.

This dataset collects demographic and socio-economic background information at the household level, in particular perceptions of national development, possible future strategies and migration infrastructure. The research also focuses on the experience of migration at the local level, over time and how the benefits and risks of migration are perceived by men and women. It also investigates fulfilled and unfulfilled mobility aspirations. Another focus is on migration policy, its development and the effects of political interventions on migration. How migration policies influence transit migration and how migration impacts the context of national or regional development policy will also be part of the investigation.

The project is expected to deliver findings that include a better understanding of the reasons for migration, how migration and development affect each other, and on a political level, closer and more effective collaboration between the EU and other countries.

Aligning Migration Management and the Migration-Development Nexus – MIGNEX

FUNDING

EU Horizon 2020

DURATION

2018–2023

DEPARTMENT

Migration and Globalization

PROJECT LEAD

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PARTNERS

University of Ghana, Ghana
 Koç University, Turkey
 Lahore University of Management Sciences (LUMS), Pakistan
 University of Maastricht, Netherlands
 Overseas Development Institute (ODI), Great Britain
 Oxford University, Great Britain
 Samuel Hall Consulting Co., Afghanistan

www.mignex.org

Regional Development with Startups by Migrants

The increased influx of migrants into Austria in recent years has set numerous social processes in motion. Migrant entrepreneurship is still a little-researched area that could produce positive long-term economic and social effects.

The aim of this project is to develop a socially robust understanding of the potential and impact of migrant digital entrepreneurship on regional, socio-economic systems, and the underlying capacity for innovation. The research project pursues a holistic approach that is not limited to economic perspectives, but also encompasses the effects on social cohesion and the knowledge potential of regions.

Benchmarks and Leverage Effects

A number of different academic disciplines such as systems sciences, economics, psychology, data science, and sociology contribute within this transdisciplinary approach. The project has two objectives: The implementation of a comparative study of migrant digital entrepreneurship in selected countries and/or regions, taking digital, technological and socio-cultural trends into account. The second objective is to determine the leverage effects through which the interventions at different levels of the innovation system can be particularly effective. With this knowledge, rural areas may be supported in their economic development, new sustainable business models may be developed, and social values may be transformed in the long run.

Migrant Digital Entrepreneurship: Migrants' Startups as Drivers for Innovative Regional Development

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2019–2021

DEPARTMENT

Knowledge and Communication Management

PROJECT LEAD

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PARTICIPATING RESEARCHERS

Lukas Zenk

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Tina Gruber-Mücke

COORDINATION

Danube University Krems

PARTNER

IMC University of Applied Sciences, Krems

Better Understanding Long-Term Displacement Situations

Millions of people are in so-called long-term displacement situations. The TRAFIG project studies how people cope with living in exile for years without hope of a lasting solution. The aim is to provide findings that support political decision makers.

According to the UN refugee relief agency UNHCR approximately 13.4 million people were in protracted refugee situations at the end of 2017. These situations are defined as more than 25,000 people living outside their countries of origin for five years or longer with no UNHCR-supported lasting solution in sight. Such solutions would be return, integration into the host country or a third country. The TRAFIG project investigates why displaced people live in precarious conditions for so long in the host countries and how they cope with this situation. Networks that support refugees, and the role of these local and transnational connections, are also examined. Furthermore, the relationship between the refugees and the host community and the economic impact of the displacement situation is analyzed.

Toolkit for practitioners

In order to understand the importance of social cohesion, networks and mobility in coping with long-term flight situations TRAFIG applies both qualitative and quantitative research methods in camps and cities in the Middle East (Jordan), South Asia (Pakistan) and East and Central Africa (Ethiopia, Tanzania, and the Democratic Republic of Congo). Research is also conducted in Germany, Greece and Italy. The aim of the project is to provide an evaluation method for political decision-makers that can be used to quickly develop needs-based programs intending to strengthen the autonomy of displaced people and their relationship with the host society.

Transnational Figurations of Displacement – TRAFIG

FUNDING

EU – Horizon 2020

DURATION

2019–2021

DEPARTMENT

Migration and Globalization

PROJECT LEAD

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COORDINATION

Bonn International Centre for Conversion (BICC)

PARTNERS

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www.trafig.eu





The PhD program Migration Studies provides a comprehensive understanding of migration issues, ranging from politics, the situation in the affected countries, to social aspects. Danube University Krems relies on a strongly interdisciplinary approach to appropriately deal with these manifold facets.

PhD Program Migration Studies

In the summer semester 2016, the Faculty of Economics and Globalization launched the PhD program in Migration Studies in which currently five students are working on their PhD projects. The first graduations are expected for 2020.

Migration research is one of the most dynamic areas of social scientific research and stands out by its interdisciplinary research perspectives. Research approaches from disciplines such as economics, anthropology, sociology, political science, law, religious studies and communication science are interlinked to provide a comprehensive view and understanding of the subject.

The PhD program Migration Studies welcomes applications primarily by post-graduates of the social sciences (including economics, sociology, political science, and law). However, it is also open to students from the humanities and natural sciences. The aim of the PhD program Migration Studies is to gain a better understanding of migration and integration process, the role of states in these complex societal processes, the drivers and obstacles of migration, the challenges and opportunities emigration and immigration countries are experiencing to ensure quality of life and social cohesion.

Research areas

- Migration, Globalization and Transnationalism
- Education, Work, Housing
- Migration and Integration Policy and Governance
- Security and Human Rights
- Religion, Diversity and Social Cohesion
- International Management, Regimes and Organizations

Understanding the Migration of Highly Skilled People

The project deals with the reasons for migration, and the possible return of highly skilled Turkish origin people. A point of great interest is the formation of migration policy in Austria and Turkey, and how it influences the motivation and decision to return.

Highly skilled migrants significantly contribute to the host country's economic growth and innovation capacity. This is why, from an economic, social and political perspective, emigration of key workers is not in the interest of Austria and its domestic economy. At the same time, these returnees can act as bridge-builders and positively shape the interrelations between the host and migrant societies. Their skills are complemented by transnational attributes and hybrid cultural characteristics that enable them to interact effectively with both societies.

Factors influencing an intention to return

Among other things, the project examines the role that factors such as age, gender, education and qualification play in the intention to return. Further factors studied include the social, economic and political transformation processes in Turkey and Austria as well as the role of migration policy. The expectations of highly skilled migrants from Turkey with regard to life in Austria will be compared with the experiences gained here. The project also investigates the expectations of highly qualified Turkish migrants when they "return" from Austria to Turkey, and how their arrival in Turkey is actually structured.

The project aims to broaden and deepen the understanding of migration of highly skilled people between two very different countries. As there is a long history of migration between Turkey and Austria, the historical dimension is also examined.

Back to the Roots. Return Migration of Highly Skilled Turkish Origin Migrants from Austria to Turkey

FUNDING

European Commission
Federal Ministry of Internal Affairs (BMI)
NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2017–2020

DEPARTMENTS

E-Governance and Administration;
Migration and Globalization

PhD-STUDENT

Hakan Kilic

SUPERVISORS

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COORDINATION

Danube University Krems

Integration Through Extra-Curricular Youth Work

The project examines the significance of youth work in clubs and organizations based on actual integration processes. What role sports and cultural clubs play in integration and acculturation has not yet been academically investigated.

Integration has always been a social challenge, not only since the 2015 refugee influx. The degree of integration of migrants and their children was already an issue when migrant workers immigrated after the 1960s. In addition to school and vocational training, the recreational activities offered by clubs and youth work play a major role for young people.

Best practices in a European context

The project deals with the effects of individual experiences in youth work on the personal history of integration. It involves interviewing extra-curricular youth work experts at all levels as well as young people and young adults. The aim is to find types of extra-curricular activities which have proven to be promising in integrating young people with migrant backgrounds. The next step will be to promote them through appropriate measures. The focus will not remain on Austria alone; best practice examples for integrating young people through youth work will also be sought in other European countries.

Applicability and transdisciplinarity are central to this project. Youth work practitioners will be informed about the research results, and recommendations for youth work and integration policies made.

The Significance of Extra-Curricular Activities for Integrating Youth with Migration Backgrounds

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2017–2020

DEPARTMENT

Migration and Globalization

PhD-STUDENT

Manfred Zentner

SUPERVISORS

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COORDINATION

Danube University Krems



The topic of energy efficiency is gaining in importance against the backdrop of climate change and increasing awareness of resource conservation. The Departments for Integrated Sensor Systems and Building and Environment rise to the challenge by focusing on innovative, environmentally sensitive research that is highly application-oriented at the same time. This contributes to the reduction of the ecological footprint in the industrial nations.

Pictured (f. l. t. r.)

Aleksey Bratukhin
Thomas Posniecek
Markus Winkler
Daniela Trauningner
Albert Treytl
Wolfgang Stumpf

Energy-Saving Alternatives to Air Conditioning Units

The problem of overheating in buildings due to climate change is becoming increasingly acute. The CoolAir project is a response to this fact and is investigating energy-efficient cooling strategies that can easily be implemented in existing buildings and thus ensures increased well-being for their users.

Conventional air conditioning systems require large amounts of technology, energy and money – especially in existing buildings. Passive measures such as natural nighttime ventilation in combination with daylight-optimized shading are an alternative for air-conditioning of rooms. The CoolAir research project investigates methods to evaluate the potential of passive cooling for existing buildings in different climate zones in Austria.

Maximizing passive cooling potential

In the course of the project autonomous, model-based, predictive control systems to maximize the cooling effect will be examined. In particular control algorithms based on machine learning, which automatically adapt to changing environmental conditions and user behavior, are developed. Another key research question is devoted to the optimization of shading in order to keep solar heat load as low as possible and at the same time allowing high quality lighting by using natural daylight. Insights from the building industry, electrical engineering, electronics and information technology are incorporated into the project.

The project aims to provide a simple planning method on the one hand, while on the other hand making it possible to retrofit buildings

with energy-efficient cooling systems that require only minor structural adaptations. The goal is to meet user requirements using model-based control systems and minimal sensor technology.

Some areas of Danube University Krems' old building are being used as living labs for test purposes.

Predictive Control of Natural Night-time Ventilation and Daylight-Optimized Shading for Passive Building Cooling – CoolAIR

FUNDING

FFG – Austrian Research Promotion Agency

DURATION

2018–2020

DEPARTMENT

Building and Environment
Integrated Sensor Systems

PROJECT LEAD

Daniela Trauningner

PARTICIPATING RESEARCHERS

Markus Winkler
Wolfgang Stumpf
Albert Treytl
Aleksey Bratukhin
Thomas Posniecek

COORDINATION

Danube University Krems

PARTNERS

Research Burgenland GmbH
Johann Gerstmann
Woschitz Engineering ZT GmbH
Fürstner RWA Systeme und Technik GmbH
Zach Antriebe GmbH

Components for Tomorrow's Jet Engines

Meet the highest safety standards and withstand extreme mechanical loads: even the journal bearings of aircraft engines must satisfy these requirements. The "HIPERFAN" project is working on new journal bearing materials and the technologies for their production.

The EU's Clean Sky 2 program, a public-private partnership between the European Commission and the EU aviation industry, aims to reduce the environmental impact of air traffic. One way to achieve this is through geared engines, which can significantly reduce fuel consumption. These are aircraft turbines in which the air intake turbine and the compressor turbine are coupled via a planetary gear, allowing the two components to rotate at different speeds. The running surfaces of the gear components are important parts that must withstand extreme mechanical loads.

Challenge: Journal bearing material

The aviation industry looks to new journal bearing materials as the key to future turbofan engines. However, even the most modern journal bearing materials do not meet the demanding operating conditions, calling for entirely new material concepts. "HIPERFAN" therefore aims to produce the most reliable, systematically analyzed, characterized and optimized high-performance journal bearing materials including the associated manufacturing processes. This involves developing a process simulation-supported coating technology. The project synergizes physics, material sciences and IT.

High Performance Journal Bearing Technology for New Geared TurboFAN Generations (HIPERFAN)

FUNDING
EU – Horizon 2020

DURATION
2018–2021

DEPARTMENT
Integrated Sensor Systems

PROJECT LEAD
Thomas Schrefl

PARTICIPATING RESEARCHER
Alexander Kovacs

COORDINATION
High Tech Coatings GmbH

PARTNERS
High Tech Coatings GmbH
Montanuniversität Leoben
Technical University Vienna
Sindlhauser Materials GmbH





Meticulous analysis and independent medical data processing are among the core competencies of the Department for Evidence-based Medicine and Clinical Epidemiology. The aim is to prepare scientific findings objectively and independently for political decision-makers, physicians and laypersons. Within the framework of international research projects, different areas such as evidence-based medicine, methodological research, health promotion and prevention are investigated.

Pictured (f. l. t. r.)

front row:

Bernd Kerschner
 Patricia Julia Harlfinger
 Viktoria Titscher
 Anna Glechner
 Lisa Affengruber
 Ursula Griebler

back row:

Gernot Wagner
 Agnes Ebenberger
 Jana Meixner
 Gerald Gartlehner
 Isolde Sommer
 Angela Kaminski-Hartenthaler
 Ludwig Grillich

Point-of-Care Ultrasound for Patients with Dyspnea

Point-of-care ultrasound is used for patients suffering from dyspnea and other symptoms. This project systematically reviews the use of this device and draws up guidelines with recommendations for clinical practice.

Point-of-care ultrasound describes a mobile ultrasound device used at the bedside on patients in a medical facility, in the emergency room or in an ambulance. In recent years, the ultrasound devices for point-of-care applications have become more compact and accurate due to continuous technical improvements. In internal medicine, ultrasound is used as a diagnostic tool for patients with a variety of suspected illnesses and symptoms as well as for numerous other clinical scenarios, such as ultrasound-directed punctures in pleural effusion, i.e. excessive accumulation of fluid in the pleural cavity, or ascites, i.e. accumulation of fluid in the free abdominal cavity.

Precision, efficacy, and safety

The Department for Evidence-based Medicine and Clinical Epidemiology is conducting a systematic review of the use of point-of-care ultrasound on dyspnea patients. This systematic review was commissioned by the American College of Physicians (ACP). It assesses the evidence on the accuracy, benefits, and harms of point-of-care ultrasound to detect pneumonia, pneumothorax, pleural effusion, heart failure, or pulmonary embolism in patients with dyspnea compared with clinical examination alone. Based on the available evidence of the systematic review, ACP will develop clinical practice guidelines.

Systematic Review Point of Care Ultrasound

FUNDING

American College of Physicians (ACP), Philadelphia, PA, USA

DURATION

2018–2019

DEPARTMENT

Evidence-based Medicine and Clinical Epidemiology

PROJECT LEAD

Gerald Gartlehner

RESEARCHERS

Lisa Affengruber
 Angela Kaminski-Hartenthaler
 Andreea Dobrescu
 Irma Klerings
 Emma Persad
 Gernot Wagner

COORDINATION

American College of Physicians (ACP), Philadelphia, PA, USA

PARTNER

American College of Physicians (ACP), Philadelphia, USA

A Comparative Study of Therapies for Shoulder Injuries

A rotator cuff tear restricts the shoulder function of the affected person. The Department for Evidence-based Medicine and Clinical Epidemiology, in cooperation with the University Hospital Freiburg, compared the therapeutic benefits and harms of surgical interventions with conservative therapies in a systematic review.

The rotator cuff is a muscle group that stabilizes the shoulder joint and consists of four muscles which converge into the rotator cuff tendon. A rotator cuff tear is a partial or complete rupture of the tendon which can be caused by degeneration or trauma. Depending on the severity of the injury, the function of the affected shoulder can become compromised or completely lost. This international project investigated different treatment options for this condition in order to provide patients with the best possible therapy.

Surgical or conservative treatment

Treatment options to improve shoulder function after a rotator cuff tear include surgical or conservative approaches with physiotherapy. The benefit of surgical treatment, however, is controversial. The evaluation of the current studies showed that surgical treatment is statistically more effective than conservative treatment in terms of reducing pain and improving shoulder function. The difference, however, is small and may not be clinically relevant for patients after all. The review found little data on other patient-relevant outcomes such as quality of life, muscle strength, and shoulder mobility.

The research question was nominated by the Swiss Medical Board and refined in collaboration with the research team composed of a multidisciplinary committee of physicians and surgeons. The overall goal of the Swiss Medical Board is to assess diagnostic procedures and therapeutic interventions for rotator cuff tears in regards to clinical, economical, ethical, and legal perspectives.

SMB Rotator Cuff Tear

FUNDING

Swiss Medical Board, Zurich, Switzerland

DURATION

2018–2019

DEPARTMENT

Evidence-based Medicine and Clinical Epidemiology

PROJECT LEAD

Gerald Gartlehner
Viktoria Titscher

RESEARCHERS

Barbara Nußbaumer-Streit
Irma Klerings

COORDINATION

Institute for Evidence-Based Medicine, Medical Faculty at the University Hospital Freiburg, Germany

PARTNER

Institute for Evidence-Based Medicine, Medical Faculty at the University Hospital Freiburg, Germany

Efficiently Treating Autumn-Winter Depression

About 2.5 % of the population in German-speaking countries suffers from autumn-winter depression. A comparison of the treatment methods aims to show whether light therapy or vitamin D supplementation are effective.

Autumn-winter depression is a seasonal disorder that is triggered by a lack of natural light. Patients usually remit in spring and summer. In addition to typical depressive symptoms such as listlessness and sadness, those affected also frequently suffer from atypical symptoms such as an increased need for sleep, carbohydrate cravings, and weight gain. The affected individuals have a high risk of recurrent depression the following winter. Both the quality of life and work performance suffer.

Testing the efficacy of therapies

The aim of this Health Technology Assessment (HTA) is to investigate the efficacy and safety of light therapy and vitamin D therapy in adults suffering from autumn-winter depression. The two interventions will be compared with each other and with no therapy or placebo, antidepressants or psychotherapy. In addition, the costs of light therapy and vitamin D therapy will be determined and their cost-effectiveness assessed. Furthermore, the study will include an analysis of ethical, social, legal and organizational aspects associated with light or vitamin D therapy.

The topic for this research work was chosen by German citizens. The German Institute for Quality and Efficiency in Health Care offers German citizens an opportunity to propose topics for HTAs.

Autumn-Winter Depression: Do Drug-Free Methods such as Light and Vitamin Therapy Lead to Better Results?

FUNDING

Institute for Quality and Efficiency in Health Care (IQWiG)

DURATION

2018–2020

DEPARTMENT

Evidence-based Medicine and Clinical Epidemiology

PROJECT LEAD

Barbara Nußbaumer-Streit

COORDINATION

Barbara Nußbaumer-Streit

RESEARCHERS

Viktoria Titscher
Angela Kaminski-Hartenthaler

PROJECT ADMINISTRATION

Sandra Hummel

PARTNERS

Ludwig Boltzmann Institute for Health Technology Assessment (Department of Health Economy and Ethics)
Stephan Kallab (legal expert)
Maximilian Huhn (psychiatrist, clinical expert)

www.themencheck-medizin.iqwig.de



The Transdisciplinary Laboratories at the Faculty of Business and Globalization, with their principle of knowledge integration and mutual learning between science and application, are dedicated to the complex societal challenges arising from digitalization, dynamic demographic developments and climate change. The transdisciplinary research approach adopted by Danube University Krems takes particular effect in the interaction of basic research, the individual scientific disciplines, application and society.

Pictured (f. l. t. r.)

Georg Neubauer
Tanja Lumetsberger
Heidemarie Weinhäupl
Andrea Höttl
Liliya Satalkina
Gabriel M. Lentner
Gerald Steiner

Transdisciplinary Lab for Sustainable Mineral Resources

The world's growing population and increasing prosperity pose a great challenge to securing global food supply. Approximately half of the world's crop yields relies directly on the use of mineral fertilizers. Phosphorus, as one of the three bio-essential macronutrients, plays an essential role. Unlike nitrogen (atmosphere) and potassium (ocean sphere) its primary form, phosphate rock, is a practically limited resource.

The transdisciplinary laboratory Sustainable Mineral Resources was founded in 2016. Its research contributes to responsible, sustainable and efficient phosphorus management and thus to global food security. The research team consists of many international experts who, in the sense of transdisciplinarity, come from science and practice. Before a system can be improved, it must first be understood in detail. Starting from the central research issues, phosphate extraction and processing, the upstream exploration phase and the subsequent phases up until to the finished fertilizers must be considered in the context of a holistic value chain.

Main research areas and highlights

In the journal Sustainability a special issue on the topic "Phosphorus Circular Economy: Closing Loops through Sustainable Innovation" was published in guest editorship, including a comprehensive editorial and framework paper on the phosphate supply chain. Furthermore, a conceptual alternative fertilizer subsidy system was developed and uncertainties regarding phosphate data were investigated. The presentation at the conference "Mines of the Future" (AIMS 2018, RWTH Aachen)

led to a further publication on the role of phosphate mining in a circular economy.

Transdisciplinary Laboratory Sustainable Mineral Resources – SMR TdLab

FOUNDED
2016

SCIENTIFIC CO-LEADERS

Gerald Steiner
Bernhard Geissler
Roland W. Scholz
Michael Obersteiner

CO-LEADER PRACTICE

Michael C. Mew, CRU
Ludwig Hermann, ESPP

Transdisciplinary Lab for Sustainable Digital Environments

Digitalization affects businesses, politics and society. The transdisciplinary laboratory Sustainable Digital Environments was founded at the Faculty of Business and Globalization to shed scientific light on these effects.

One objective of the SDE TdLab is to gain a deeper understanding of the complex change processes that trigger digitalization. Another is to use this as a basis to develop strategies for a sustainable transition into the digital age based on a transdisciplinary approach. This is achieved through interdisciplinary research and close cooperation between scientists and stakeholders from industry and business, public administration and civil society. As an example, researchers and practitioners assume joint responsibility for a project in the sense of co-leadership, starting at the problem definition phase. In a moderated and analyzed process, the basis for decision-making is developed for the sustainable use and further development of digital technologies in the future.

The human being in digital space

The Sustainable Digital Environments Laboratory's activities include transdisciplinary projects, processes and educational programs. The projects investigate the manifold interfaces between human systems (individuals, companies, national institutions) and digital systems with the aim of establishing resilient relationships. As a most recent example, the project DiDaT (Digital Data as part of a Transdisciplinary process) deals with the relationship between digital data ownership and its economic value, as well as the way digital data is accessed and used. Experts currently consider the interaction between these issues as the biggest unexplained problem in digital transition, accompanied by potentially unintended side effects.

Transdisciplinary Lab for Sustainable Digital Environments – SDE TdLab

ESTABLISHED
2017

ACADEMIC CO-LEADERS

Roland W. Scholz
Peter Parycek
Gerald Steiner

CO-LEADER PRAXIS

Reiner Czichos
Michael Dell

ASSOCIATED RESEARCHERS

Thomas Lampoltshammer
Gabriel M. Lentner
Kay Mühlmann
Gabriela Viale Pereira
Shefali Virkar
Clemens Fischer

PROJECTS

DiDaT – Using Digital Data as Part of a Transdisciplinary Process
Teaching research project “Digital Governance”

→ Scholz, R.W., Bartelsman, E.J., Diefenbach, S., Franke, L., Grunwald, A., Helbing, D., Hill, R., Hilty, L., Höjer, M., Klauser, S., Montag, C., Parycek, P., Pereira, G.V., Prote, J.P., Renn, O., Reichel, A., Schuh, G., Steiner, G. (2018) Unintended Side Effects of the Digital Transition: European Scientists' Messages from a Proposition-Based Expert Round Table. *Sustainability*, 10(6): 2001. DOI: 10.3390/su10062001.

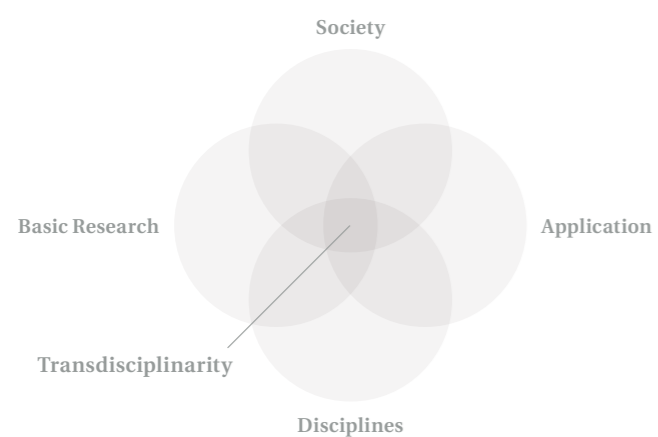




Institution-wide research field

Cultural Heritage

- **Revitalization and Cultural Heritage**
- **Archives of Contemporary Arts**
- **Image Science and Media Art Research**
- **Museum Collections Management**





Thematic priorities include the utilization of existing buildings while taking into account conservational, building climatic, ecological and economic aspects over the buildings' entire life cycle; concepts for the protection of cultural assets against the effects of climate change and armed conflicts, with particular emphasis on UNESCO World Heritage Sites. An additional focal point is regional development and exploring cultural tourism potentials.

Pictured (f. l. t. r.)

Patricia Engel
Gregor Radinger
Anna Maria Kaiser
Silvia Hofbauer
Peter Morgenstein
Darya Haroshka
Klaus Winiwarter
Peter Strasser
Christian Hanus

The Danube as an Identity Founder

The project DANUrB develops the “Danube Region” brand further by means of sustainable cultural and touristic concepts. The aim is to allow communities along the river to profit from this and to underscore transnational identity in the Danube region.

The Danube is attributed a uniting role in historical, geographic and cultural respects in many riparian states. To date, however, a uniform strategy for exploiting its potential has been lacking at the transnational level. A coordinated approach to tap into the socio-cultural power of the river, especially its valorisation for communities and local and regional tourism, has so far been a desideratum. The DANUrB project addresses this task with the aim of further developing the “Danube Region” brand, identifying the “undiscovered” cultural heritage along the river and underscoring this region’s shared identity. The aim is to overcome partially lacking infrastructure, language and spatial barriers or the inhabitants’ lack of awareness.

Danube cultural promenade

Central to the project is to develop a transnational geographic and cultural network along the Danube, the “Danube Cultural Promenade,” and to create innovative, sustainable cultural and tourism strategies to economically and socially stimulate the region. The question of which instruments can be used to form transnational networks that will unite local and regional stakeholders in taking an international, strategic approach to enhancing the cultural potential of the Danube is as much a part of the research as the right path to sustainable tourism, and how

regions can benefit from local and regional tourism. The project is supported by an online platform that connects regional stakeholders transnationally, an app to raise awareness about the cultural heritage of the Danube region, and a travelling exhibition on nature and culture in the Danube region.

DANube Urban Brand – a Regional Network Building Through Tourism and Education to Strengthen the “Danube” Cultural Identity and Solidarity – DANUrB

FUNDING

European Commission

DURATION

2017–2019

DEPARTMENT

Building and Environment

PROJECT LEAD

Peter Morgenstein

PARTICIPATING RESEARCHERS

Christian Hanus
Darya Haroshka
Gregor Radinger
Peter Strasser

COORDINATION

Budapest University of Technology and Economics

PARTNERS

18 partner institutions from countries in the Danube region and 20 associated project partners

www.interreg-danube.eu/approved-projects/danurb

Better Protection for Cultural Heritage in Times of Disaster

In Europe, emergency plans for the protection and evacuation of cultural assets in the event of disasters are rare. ProteCHt2save strengthens international cooperation and aims at practicable protection of cultural assets in case of a crisis.

The Central European countries have a high density of built monuments, cultural heritage ensembles and mobile cultural heritage with the legal obligation of their protection and preservation. Although the structure of the protection mechanisms has continuously improved over the past decades, a number of important aspects in cultural heritage protection have not yet been satisfactorily developed and implemented. For example, emergency plans for cultural assets at national and transnational level are largely lacking, mechanisms for cooperation between the various levels of administration, as well as emergency forces and specialists in conservation and restoration, are not in place. There is also little awareness of the necessity and possibilities of preserving movable and immovable cultural heritage. The issue of climate change has so far been little associated with the conservation and protection of cultural heritage.

Risk management for cultural heritage

The ProteCHt2save project focuses on historical buildings and sites, museums, archives and libraries in urban environments and develops regional and local strategies for better protection, management and sustainable utilization of cultural heritage. Critical points for cultural heritage resilience and risk management are also investigated, e.g. inventories or interactive maps for risk management and cultural asset protection are developed. An important element: The development of a transnational strategy for the protection of movable and immovable cultural heritage in the event of natural

disasters such as torrential rain, floods, tidal waves and fires, and its implementation through practical exercises with emergency forces.

Risk Assessment and Sustainable Protection of Cultural Heritage in Changing Environment – ProteCHt2Save

FUNDING

European Commission

DURATION

2017–2020

DEPARTMENT

Building and Environment

PROJECT LEAD

Anna Kaiser

PARTICIPATING RESEARCHERS

Patricia Engel
Christian Hanus
Peter Strasser
Klaus Winiwarter

COORDINATION

Institute of Atmospheric Sciences and Climate – National Research Council of Italy

PARTNERS

Ústav teoretické a aplikované mechaniky, Czech Republic
Akademie věd České republiky, Czech Republic
Powiat Bielski, Poland
Agencja Rozwoju Regionalnego S.A w Bielsku-Białej, Poland
Comune di Ferrara, Italy
Městská část Praha – Troja, Czech Republic
Baranya Megyei Önkormányzat, Hungary
Grad Kaštela, Croatia
Občina Kocevje, Slovenia
Danube University Krems

Plattenbau – Architecture Worth Preserving

An international seminar series aims to change attitudes. Contemporary revitalization can provide high quality of living and at the same time contribute to climate protection.

In the Czech Republic too, “Plattenbau” (buildings constructed of prefabricated concrete slabs) once stood for substandard housing. Now, more and more urban planners and authorities responsible for the preservation of buildings are rethinking. In the recent past a number of research projects and exhibitions have taken place in the Czech Republic, presenting prefabricated housing estates as a valuable architectural contribution. Experience shows that with modern revitalization the functionalist prefabricated housing estates have the potential to improve the quality of living and to develop the so-called blue-green infrastructure in order to mitigate the effects of climate change.

At the moment however, reluctance still prevails, and a balance between protection and revitalization has still not been found in the Czech Republic. Value is lost through urban densification and the removal of the functional elements and building parts that once served as community facilities, thus improving the quality of living.

Raising awareness

By organizing an international seminar series on the value and revitalization potential of functionalist prefabricated housing estates, in cooperation with the National monument institute of the Czech republic, the Department for Building and Environment aims to

contribute to changing awareness among experts active in the care and protection of housing estates. Interdisciplinary conferences are planned in Austria and the Czech Republic, involving experts in fields of architecture, urban planning, preservation of historical monuments but also experts on green infrastructure and mitigation of climate change effects. The intention is not only to increase the quality of living and protect architectural values through modern revitalization, but also to reduce the effects of climate change in cities.

Plattenbau Housing Estates – Revitalizing vs. Preserving Values

FUNDING

European Commission, Province of Lower Austria

DURATION

2018–2019

DEPARTMENT

Building and Environment

PROJECT LEAD

Peter Morgenstein

PARTICIPATING RESEARCHERS

Christian Hanus
Peter Morgenstein
Christine Rottenbacher

COORDINATION

National Heritage Institute, Czech Republic

Preserving First World War Architectural Heritage

The Networld project aims to counteract the decay of First World War architectural heritage in the Danube region by means of a database and a touristic utilization concept, the centerpiece of which is the “Walk of Peace.”

With First World War architectural heritage in countries of the Danube basin threatened by decay, a socially relevant memory landscape is in danger of disappearing. However, this heritage – also known as “contested heritage” – is part of national identity as well as European and non-European history. The intention is to develop various concepts to simultaneously ensure the protection, valorisation and knowledge transfer of this heritage. The project focuses on the question of which measures and concepts are necessary for preserving, communicating, managing and exploiting this architectural heritage for culture tourism, while at the same time contributing to education about peace.

Database World War One Sites

For this reason the project not only aims to document, preserve and use the First World War architectural heritage in nine Danube region countries for culture tourism, but also to stimulate regional development. Important elements are systematically documenting the heritage in a database designed for broad use, the “World War One Sites – the NETWORLD Database”, a protection strategy and a tourism concept centering on the “Walk of Peace.” Educational activities, exhibitions, maps and events at selected sites in the partner countries complement the research.

Networking in Preserving the First World War Multicultural Heritage in the Danube Countries – Networld

FUNDING

European Commission

DURATION

2017–2019

DEPARTMENT

Building and Environment

PROJECT LEAD

Julia Walleczek-Fritz

PARTICIPATING RESEARCHERS

Christian Hanus
Anna Kaiser
Peter Strasser

COORDINATION

Posoški razvojni center/Soča Valley Development Centre

PARTNERS

The Walk of Peace in the Soča Region Foundation, Slovenia; Rozmberk Society, Czech Republic; Varna Economic Development Agency, Bulgaria; Regional Museum of History – Dobrich, Bulgaria; Cultural LAB Social Cooperative, Hungary; Municipality of Town Veszprém, Hungary; Danube University Krems, Austria; die Berater Unternehmensberatung GmbH, Austria; National Institute for Research and Development in Tourism, Romania; Institution for Development of Competence, Innovation and Specialization of Zadar County, Croatia; University of Presov, Slovakia; School of Economics and Business in Sarajevo, Bosnia and Herzegovina; Department for Development and International Projects of Government of Zenica-Doboj, Bosnia and Herzegovina

ww1sites.eu





The Archives of Contemporary Arts is dedicated to preserving, preparing and presenting the collections of outstanding artists from the fields of music, literature, film and architecture. In addition to archival tasks, the Archive's activities also include designing and implementing research projects and scientific conferences as well as publishing its own literature. As an institution of the Federal Province of Lower Austria, the archive is embedded in Danube University Krems.

Pictured (f. l. t. r.)

front row:

Reinhard Widerin
Gundula Wilscher
Marco Hoffmann
Brigitta Potz

back row:

Christine Rigler
Hanna Prandstätter
Simon Wimmer

Friedrich Cerha Online

The Archives of Contemporary Arts at Danube University Krems collects and archives the musical estate of the Austrian composer Friedrich Cerha. With the development of an interactive, on-topic online portal, the public presentation of the archive materials will also provide digital access to scientific knowledge.

The pre-mortem bequest of the distinguished composer Friedrich Cerha (born in 1926) has been part of the Archives of Contemporary Arts at Danube University Krems since 2010. One outstanding feature of this institution is its notable treatment of the pre-mortem bequests of contemporary artists by maintaining the authenticity and trustworthiness of unique sources through personal contact and close collaboration with the artists.

The Archives of Contemporary Arts regards cultural, scientifically-oriented mediation work, taking the significance of artistic personalities for cultural heritage into account, as one of its core tasks. For this reason the project focuses on developing and maintaining the online database "Friedrich Cerha Online".

New access to Cerha's musical estate

The research-based portal is bilingual in German and English and is intended to provide researchers, students, teachers and musicians with innovative, first-hand access to archival materials and information on the life and work of the composer Friedrich Cerha.

Under the academic direction of the Cerha researcher Matthias Henke (University of Siegen), the project's methodological approach to categorizing Friedrich Cerha's complete works is a classification scheme based on cultural-scientific topics and not, as is usual, in chronological order. "Friedrich Cerha Online" also aims to become a prototype for other pre-mortem collections in the Archives of Contemporary Arts.

Friedrich Cerha Online

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2019–2021

DEPARTMENT

Art and Cultural Studies

PROJECT LEAD

Christine Rigler
Matthias Henke

PARTICIPATING RESEARCHERS

Marco Hoffmann
Gundula Wilscher

COORDINATION

Danube University Krems

PARTNER

University of Siegen, Chair for Historical Musicology



The Department for Image Science centers its research on the global image revolution – heavily influenced today by media and digitalization – and how it affects our culture. Based on several extensive text and image archives, the department combines its world-renowned media art research with teaching in international courses and conferences. Furthermore, the Lab for Digital Humanities provides an experimental space for innovative research.

Pictured (f. l. t. r.)

Janina Hoth
Viola Rühse
Oliver Grau
Wendy Jo Coones
Carlos Rodrigo Guzman Serrano

Image Science and Media Art Research

The Department for Image Science unites concepts from science and media art to understand the complex system that is digital image. It regards its research, teaching and documentation as a trans-disciplinary answer to the digital image and media revolution taking place today.

The image sciences see themselves as a transdisciplinary response to the current digital image and media revolution. They analyze the transformation processes in culture, science and political iconography. The Department for Image Science works closely with international museums, archives and media as well as (media) artists and institutions from the humanities and cultural sciences.

The department also investigates the qualitative peculiarities of the pictorial in the production, distribution and reception of knowledge. In addition to art and cultural studies analysis, the department focuses on researching reception and immersion in the respective areas of the visual - from art to popular and scientific culture through to social networks. The Digital Humanities Lab documents media art as part of international research projects. The department also continues with the "Commented Bibliography of Digital Arts Research Publications".

MediaArtsCultures

The research findings are directly incorporated into the department's teaching. It focuses on the Erasmus Mundus Joint European Master Programme Media Arts Cultures, whose funding was extended by the European Commission in 2018. The four-

semester Master's program aims at a better understanding of the image revolution and digital cultures. The partners are Aalborg University, Denmark, the University of Lodz, Poland as well as the Lasalle College of the Arts in Singapore and the Ars Electronica Center in Linz. The program is flanked by research projects.

Image Science Archives as the Basis for Research, Teaching and Documentation

- Archive of Digital Art as the internationally most extensive overview of contemporary digital art with over 500 artists, tens of thousands of documents and the first Web 2.0, 3.0 Archive of Humanities.
www.digitalartarchive.at
- The Archive of the MediaArtHistories World Conference hosted by the department with thousands of submissions, articles and videos from seven world conferences
www.mediaarthistory.org
- The Graphic Collection Göttweig-Online includes thousands of high-res digital copies from Dürer to Klimt, a knowledge cosmos of the Baroque as well as sources to explore image history and media technology.
www.gssg.at

Meta-Thesaurus and Visual Literacies

Building on the AT-MAR project, the integration of media art into art history is currently being continued. The Visual Literacies project, completed in 2018, explored the role that visual media plays in scientific knowledge.

Building on the project “Interactive Archive and Meta-Thesaurus for Media Art Research”, funded by the FWF from 2013 to 2016, the department continues to pursue the goal of integrating media art into art history. It also intends to investigate new questions from the digital humanities, such as the influence of artistic inventions in the digital age, by means of projection research using high-resolution 2D and 3D image material as well as researching data annotation, new digital search tools and innovative analysis methods (Big Data). The contributions will create an overall history of the human relationship with images. The research findings flow into study programs such as Digital Collection Management and Media Art Histories as well as Media Arts Cultures (Erasmus+).

Visual Literacies (VILI, Erasmus+)

The research project Visual Literacies, which investigated the role and significance of visual media in the production, communication and dissemination of scientific knowledge, was completed in 2018. In this context, different techniques and practices in visual knowledge transfer were addressed systematically-comparative, critically-reflective, and historical-genealogically. The study focused on video, which is omnipresent in the age of online moving picture media (YouTube, Vimeo, Benchfly or Ooyala) and creates collective knowledge on the internet. In the course of

the project, an open platform with didactically prepared research and teaching materials with five webinars was set up on the basis of theoretical models and empirical evaluations.

Visual Literacies – VILI

FUNDING

EU – Erasmus+

DURATION

2017–18

DEPARTMENT

Department for Image Science

PROJECT LEAD

Oliver Grau

PARTICIPATING RESEARCHER

Ramon Reichert

COORDINATION

Danube University Krems

PARTNERS

Lancaster University (UK)

CARDET (Cyprus)

WIDE Services (Greece)

<https://mooc.viliproject.eu/>

Digital Humanities Lab

Documenting media art is one of the core tasks of the Department for Image Science. The Digital Humanities Lab projects and dissemination measures such as the conference series Re:Trace ensure that media art collections are preserved for research and posterity.

The mission of the Digital Humanities Lab is to continue developing an online database as well as research tools for documenting media art. The team studies the documentation and preservation conditions of media art online, and analyzes case studies and data about media art in their aesthetic, socio-political and technological characteristics, focusing on image-centered methods. With these innovative research methods, questions regarding artistic inventions, practices and influences in the digital age can be investigated and placed into the context of new questions in the digital humanities.

Work is currently taking place on expanding documentation of the most important media art trends. The aim is to integrate these into art history and facilitate comparability by developing new instruments, such as the first Web 2.0-3.0 digital graphics/picture stories archive and a comprehensive thesaurus bridging categories/bridge thesaurus.

Imaging media art institutions

Another ongoing documentation project is DARIAH-DASTIN. As part of the Archive of Digital Art it aims to render the research, teaching and exhibition of this contemporary art visible. All areas of media art infrastructure are covered, from museums, research centers, universities through to organizers of

music festivals and hackathons. Institutions can upload and manage information themselves.

Conference series Re:Trace

To disseminate the research results, the department organizes the international conference series Media Art History (Re:Trace), which takes place every two years on a different continent. The conference “On the Histories of MediaArt, Science and Technology”, held in November 2017 at Danube University Krems, was the most successful edition of the series with more than 250 participants from 50 countries. The results are currently published in three parts.



Museum collections, as an important depository for our cultural heritage, require sophisticated concepts for their care and study. Closely tied to the Lower Austrian state collections, collections research mainly focuses on cultural heritage, archaeology, art and natural science, conservation and preservation sciences. The concept of collecting as a museum research field also extends to contemporary forms of artistic expression such as performance art or digital themes.

Pictured (f. l. t. r.)

front row:
Marlies Surtmann
Kathrin Kratzer
Elisabeth Nowotny
Sandra Sam

back row:
Theresia Hauenfels
Franziska Butze-Rios
Stefanie Juch

Research Brings Monastic Music Treasures to Light

For the first time the core holdings of three monastic music collections will be researched, their networks explored and insights gained into music-making practices and everyday music culture of the 18th and 19th centuries. Digitalization opens up the collections to the world.

Extensive music collections are waiting to be explored in the Lower Austrian monasteries of Göttweig, Klosterneuburg and Melk. The core collections at all three institutions, dating from the 18th and early 19th centuries, each more than 1,000 objects, have so far remained unexplored. The university professor for cultural history and museum and collection studies Anja Grebe and her research team are in the process of unearthing these treasures.

The aim of the project is to document the music holdings and the collection history by systematic basic research. It intends to provide information on the historical links between the collections as well as the best methods for cataloging them. By exploring the music archives, the project will shed new light on the history of music in Lower Austria and beyond. This includes testimonies of sacred, but also of profane music-making practices in the monasteries themselves and of everyday music culture in the associated parishes. They have remained largely unnoticed by previous research, which mainly focused on a canonized concert repertoire.

Digitalization opens up collections

An important component of the interdisciplinary project, which involves collection studies, history, cultural studies, musicology and computer science/digital

humanities, is the opening of the monastic music collections. A Linked Open Data web application will allow anyone interested to access the collections worldwide. The archive material will be digitized for this purpose. Finally, the project is intended to provide information on which edition formats, whether analogue, digital or hybrid, are best suited to different user groups.

Monastery_Music_Collections

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2017–2019

DEPARTMENT

Arts and Cultural Studies

PROJECT LEAD

Anja Grebe

PARTICIPATING RESEARCHERS

Stefanie Preisl
Johannes Prominczel
Eva Maria Stöckler
Günter Stummvoll
Max Theisen
Ulrike Wagner

COORDINATION

Danube University Krems

PARTNERS

Austrian Academy of Sciences, Institute for History of Art and Musicology
Masaryk-University Brno, Institute of Musicology at the Faculty of Arts
Göttweig Abbey
Klosterneuburg Monastery
Melk Abbey

A Challenge for Museums: Performance Art

Archiving performance art has so far been a knowledge gap in museum collections. Marlies Surtmann's dissertation project aims to close this gap by developing a concept for a performance archive. The documentation holdings of the Kunstraum Niederoesterreich serve as a starting point.

Happenings and fluxus in the 1960s and 1970s, feminist movements and action art ... these new manifestations gave birth to performance art. Its essence: the ephemerality of what is trapped in the moment. Transience by nature, only its documentation remains. So, how to archive the acts and knowledge of performance art? The dissertation project attempts to answer this question, which arose in connection with integrating the documentation holdings of the Kunstraum Niederoesterreich into the State Collections of Lower Austria – systematically and from a collection-scientific perspective. The aim is to develop a concept for a performance archive.

Knowledge for posterity

The research's pivotal concern is: how can artistic performative practices be archived, delivered to posterity, and conveyed to the public? The dissertation draws on private artist archives of first generation performance artists as well as oral history, body-to-body transmission and re-enactment to analyze the most suitable form of archiving and delivering performance art knowledge. Copyright issues and references to contemporary performance art forms are also dealt with.

The project incorporates approaches taken by art history, cultural anthropology, collection and archive sciences, media theory and performance studies. A further aspect is to establish ways in which performance art archives can be made accessible to the public.

Archive for Performance Art? About Archiving, Delivering to Posterity and Communicating an Art Form on the Move

FUNDING

NÖ Forschungs- und Bildungsges.m.b.H. (NFB)

DURATION

2019–2021

DEPARTMENT

Arts and Cultural Studies

PROJECT LEAD

Theresia Hauenfels

PARTICIPATING RESEARCHERS

Franziska Butze-Rios
Helmut Neundlinger
Kathrin Kratzer

COORDINATION

Danube University Krems, Center for Museum Collections Management

PARTNERS

State Collections of Lower Austria, Kunstraum Niederoesterreich;
Academy of Fine Arts Vienna (Elisabeth von Samsonow)

Building and Life in the Middle Ages

The Czech-Austrian museum landscape in the border regions is set to become more attractive, with the cultural heritage of the shared border area placed more in the center of interest.

Two border regions, one cultural offering: This is the short formula of the I-CULT. International Cultural Platform project. The project focuses on exhibitions and educational programs on the cultural heritage of the two countries' border regions. It includes the following topics: the history of the border, life and customs in the border region, glass production, as well as "building(s) and life in the Middle Ages". The latter will be presented as an exhibition at the MAMUZ Museum in Asparn/Zaya Castle in 2020. This show is one of the main results of the project's archaeological track. The reconstruction of a small stone church based on the early medieval model is also planned on the museum's open-air grounds. The exhibition is curated by the Center for Museum Collections at Danube University Krems, which is also responsible for providing scientific advice on the church's construction.

Studying the Finds

The research carried out within the framework of the cross-border project enables in-depth examination of the archaeological and archaeobotanical finds as well as the building structures at various sites in the Czech-Austrian border region. Building on this, it will be possible to present the current state of research to the public. Among other things the development, characteristics and function of residential buildings and villages, of fortified residences, of fortification systems as well

as of towns and rural settlements, nutrition, agriculture and the landscape of the time will be addressed. Research also focuses on production, crafts and trade.

International Cultural Platform – I-CULT

FUNDING

European Commission, Province of Lower Austria

DURATION

2017–2020

DEPARTMENT

Arts and Cultural Studies

PROJECT LEAD

Elisabeth Nowotny

PARTICIPATING RESEARCHER

Stefanie Juch

COORDINATION

The Südböhmische Kreis

PARTNERS

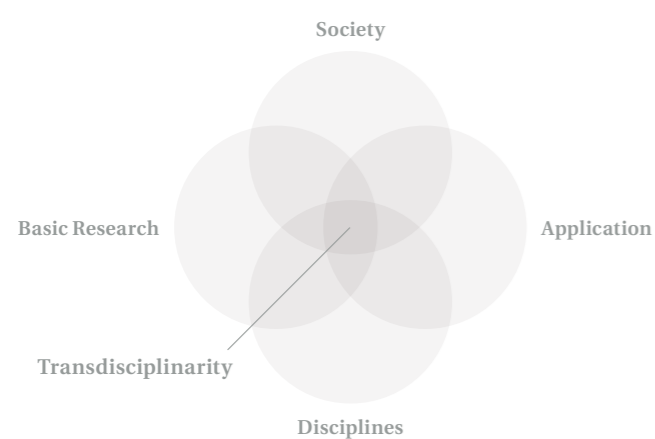
Muzeum Vysočiny Třebíč, Czech Republic
Jihomoravské muzeum ve Znojmě, Czech Republic
Regionální muzeum v Mikulově, Czech Republic
Museumsmanagement Niederösterreich GmbH
MAMUZ Museumszentrum Betriebs GmbH
Stadtgemeinde Retz
Danube University Krems, Center for Museum Collections Management



Institution-wide research field

Continuing Education Research

- **Educational Technologies and Professionalization in Higher Education Management**
- **Inter-Faculty Research Groups**





Technological changes, the transition towards lifelong learning and the internationalisation of education are important fields of research at Danube University Krems. The topic of education is studied on various levels, including learning materials that utilize digitalization possibilities, promoting the third mission at universities, university management and transnational vocational training.

Pictured (f. l. t. r.)

Sonja Brachtl
Wolfgang Rauter
Susanne Gschossmann
Attila Pausits
Andrea Ghoneim
Stephan Längle
Filiz Keser Aschenberger
Edmund Panzenböck
David F. J. Campbell

Bandwidth of Continuing Education Research

The Department for Continuing Education Research and Educational Technologies at Danube University Krems pursues a topic of high social relevance: the research of lifelong learning in all its different aspects. The spectrum ranges from didactics and media competence to the possibilities of using technology-supported digital tools.

Continuing education research is an important topic at Danube University Krems, the only public university for continuing education in the German-speaking countries, particularly in regard to its mature students. The Department for Continuing Education Research and Educational Technologies works on lifelong learning concepts that are closely tailored to the needs of mature working students, enabling them to reconcile work, family, studies and leisure time.

Professional and academic continuing education are considered in the context of adult education in general. Innovative teaching and learning concepts aim to create optimal conditions for acquiring competencies in different phases of life; the students themselves are pivotal in these efforts.

To ensure that this succeeds, managing educational institutions and expert organizations is a critical factor. For example, the project "Modernisation of Higher Education Institutes through Enhanced Human Resource Management" deals with the issues of efficient personnel management at universities. This project develops the structural and functional basics of university-compatible personnel management based

on an international comparison. The project will assess the status quo and formulate guidelines by which management and organizational processes at universities should be regulated. An open resource self-assessment instrument is provided. The department establishes connections between applied research and career-oriented continuing education, focusing on the possibilities that the latest educational technologies open up.

Digitalization Calls for New Priorities

The radical changes taking place today have strongly impacted the activities of the Department for Continuing Education Research and Educational Technologies. Digitalization and the growing importance of lifelong learning are taking research and teaching in new directions.

Digitalization encompasses and revolutionizes the possibilities of knowledge transfer and knowledge acquisition. Research therefore concentrates on investigating, adapting or newly developing technology-supported learning scenarios.

Danube University Krems practically applies its expertise in the field of lifelong learning and digitalization. The project "Towards European University Lifelong Learning Model in Moldova" develops strategies for lifelong learning for six Moldovan universities.

As the world becomes increasingly connected, access to information is easier today than ever before. At the same time, however, it has become apparent that handling digital media requires more advanced skills. This applies to both personal and social challenges in dealing with the new media.

A further area of research at the department focuses on the approach to knowledge transfer, and communicating these new approaches. Didactic arrangements are developed to facilitate knowledge transfer.

Seamless Learning: On the Way to School Book 4.0

In the field of education the printed book is still the leading medium. No other successful model has been able to establish itself so far. The Seamless Learning research project is working with educational publishers to explore how the potential of interactive, multimedia learning environments can be exploited.

SeLe aims to qualify the employees of Austrian educational publishers for creating didactically sophisticated educational resources for the digital age. First, surveys are conducted as to the areas in which publishing houses need qualification, and what requirements digital learning materials will have to meet in future in the Austrian education sector.

New structures for digital content

The project highlights the need to develop a viable business model for these new educational resources. Marketing digital learning materials requires new strategies to establish feasible business models that safeguard the interests of learners, authors and publishers.

The practical, innovative student projects emerging from SeLe will be presented to the general public at EDUIdays 2020, a conference for teachers of all subjects. After the project phase, SeLe will be continued as a course at Danube University Krems. An education hub for sharing and developing new ideas will continue to connect the project partners.

Seamless Learning – SeLe

FUNDING

FFG – Austrian Research Promotion Agency

DURATION

2018–2020

DEPARTMENT

Continuing Education Research and Educational Technologies

PROJECT LEAD

Wolfgang Rauter

PARTICIPATING RESEARCHERS

Peter Baumgartner
Edmund Panzenböck
Isabell Grundschober
Andrea Ghoneim
Andrea Schlager
Stephan Längle

COORDINATION

Danube University Krems

PARTNERS

Publisher Ed. Hölzel
Helbling Publishing Company
Publisher Hölder-Pichler-Tempsky
Innverlag Lehr- und Lernsystem
Knowledge Markets
Österreichischer Bundesverlag
Westermann Group Austria

www.seleprojekt.at

Increasing the Social Impact of Universities

The project aims to raise students' awareness for societal challenges. The topic evolved from the current political discussion about the role and tasks of universities, particularly in regard to their responsibility towards society.

The project investigates so-called service learning, an action-oriented method of competence acquisition that is often referred to as "learning through engagement". In the higher education sector, this means that academic content is combined with students' civic engagement. Universities should be geared more strongly to the needs of society, not only in research but also in teaching.

Social responsibility as part of teaching

Three research questions were at the outset of the project. The first was to define which challenges universities face in particular with regard to service learning. Furthermore, to study the existing institutional models for implementing social responsibility in teaching; and finally, to make an international comparison of how universities can be supported in developing service learning.

The project intertwines knowledge from the educational sciences with knowledge from management and organizational sciences.

Service-Learning in Higher Education – Fostering the Third Mission of Universities and Civic Engagement of Students

FUNDING

EU – Erasmus+

DURATION

2017–2020

DEPARTMENT

Continuing Education Research and Educational Technologies

PROJECT LEAD

Attila Pausits

PARTICIPATING RESEARCHER

Florian Reisky

COORDINATION

Matej Bel University, Banská Bystrica, Slovakia

PARTNERS

Babeş-Bolyai-University Cluj, Romania
Catholic University Eichstätt-Ingolstadt, Germany
Palacký-University Olmütz, Czech Republic
University Rijeka, Croatia

Research on the Vocational Education Systems in Border Regions

The job market in the border region between the Czech Republic and Austria is particularly demanding. Companies seek personnel with skills required in both countries. However, the education sector still lacks a common strategy for teaching these competences.

This project's research goal is derived from the requirements of the business sector and job market in the border region between the Czech Republic and Austria. The goal is to establish a pilot strategy for trans-border professional training. The prerequisites for this will be created by providing vocational high schools and professional training institutions with guidelines for cooperation with comparable schools in the neighbouring country.

Connecting theory with practice

In order to better meet the demands of the job market, vocational guidance coordinators who are familiar with the specifics of the border region will be trained. Another objective is to link the education sector with the business sector. An important part of the vocational training is the students' contact with industry and business.

Measures are jointly developed and implemented within the framework of trans-border pilot school cooperations. These include the harmonisation of qualifications, bilateral training projects, language training and the development of occupation-specific learning materials. The counselling competences of the vocational training coordinators will be extended in order to support young people in gaining an overview of the trans-border job market.

Concepts for Professional Education in Border Regions

FUNDING

European Commission

DURATION

2018–2021

DEPARTMENT

Continuing Education Research and Educational Technologies

PROJECT LEAD

Stephanie Nestawal

PARTICIPATING RESEARCHERS

Sonja Brachtl
Filiz Keser Aschenberger
Lucie Procházková
Jindřiška Svobodová

COORDINATION

Danube University Krems

PARTNERS

PH Lower Austria
Vysočina Education
SPŠT – Střední průmyslová škola Třebíč (Technical High School Třebíč)
SSŠ Brno – Středisko služeb školám a Zařízení pro další vzdělávání pedagogických pracovníků Brno (Service Centre for schools and facilities for the further education of teachers in Brno, state-funded organisation)



Pictured (f. l. t. r.)

front row:
 Daniela Trauningner
 Sonja Brachtl
 Filiz Keser Aschenberger
 Nicole Hynek
 Peter Parycek
 Christina Ipsper
 Gregor Radinger
 back row:
 Gerald Steiner
 Attila Pausits
 Alexander Braun
 Günther Schreder
 Thomas Lampoltshammer
 Günther Kainz
 Lukas Zenk
 Albert Treytl
 Cornelia Winter
 Christian Hanus

Pictured (f. l. t. r.)

Klausjürgen Heinrich; Arleta Anna Franczukowska; Alexander Braun; Eva Krczal; Isolde Sommer; Lydia Rössl; Filiz Keser Aschenberger

The inter-faculty research groups at Danube University Krems, which were established for the first time in 2016, combine questions on several research foci and expertise from different departments. Their interdisciplinary approach enables research in complex subject areas and strengthens cooperation across organizational boundaries. Two new groups started their research in 2018. They combine continuing education with issues of ageing and innovation.

Space for Continuing Education

The effect buildings have on human beings has been studied ever since it has been known that our spacial surroundings influence our health and our behavior. The transdisciplinary research group Learning and Innovation Spaces for Continuing Education studies the characteristics of multi-dimensional learning and innovation spaces.

Danube University Krems as a university for continuing education offers the ideal framework for studying how spatial design influences the learning outcome of adult education. Not only in terms of learning success, but also in maintaining and encouraging motivation, creativity and health of teachers and students. Many disciplines – among them architecture and building research, continuing education research, media and communication sciences, transdisciplinary research, complexity science, economics, health sciences, medicine, psychology, sociology, and information technology – contribute findings to this topic.

Knowledge transfer required

While much is known in different disciplines about spacial characteristics that promote learning and innovation and how these are influenced by social and technological developments, a knowledge transfer between the disciplines is still largely lacking.

Together the research group identifies the spatial and structural design requirements for learning and innovation spaces, and merges these into future scenarios defined for Danube University Krems. This theoretical-conceptual work will be field tested under scientific supervision using specific case studies related to Danube University Krems.

Learning and Innovation Spaces for Continuing Education

DURATION

2019–2020

COORDINATION

Department for Building and Environment

PROJECT LEAD

Christina Ipsper
 Gregor Radinger

PARTICIPATING DEPARTMENTS

CORE TEAM

DEPARTMENT FOR BUILDING AND ENVIRONMENT

Gregor Radinger
 Christina Ipsper
 Cornelia Winter

DEPARTMENT FOR CONTINUING EDUCATION RESEARCH AND EDUCATIONAL TECHNOLOGIES

Filiz Keser Aschenberger
 Attila Pausits
 Isabell Grundschober

DEPARTMENT FOR KNOWLEDGE AND COMMUNICATION MANAGEMENT

Gerald Steiner
 Lukas Zenk
 Nicole Hynek
 Günther Schreder

Age-Sensitive Learning

As lifelong learning is becoming more and more important, new questions are in the limelight: How can older people learn, or rather, how can they deal with the challenges of an increasingly digitized world? What setting, which learning concepts do they require? These are the questions a faculty-overarching group of researchers at Danube University Krems is exploring.

Continuing education can pose challenges on employees who are not yet “digital natives”: Modern teaching materials require being familiar with digital systems, and modes of knowledge acquisition changes with age. The research group Age-Sensitive Learning is therefore concentrating on teaching formats and methods enabling learning and knowledge transfer across all generations. The aim is to prepare the older workforce for the challenges of the increasingly digitized workplace by providing a suitable learning environment.

New didactic insights for continuing education

The research group Age-Sensitive Learning explores factors that affect employees as they acquire digital competencies. Influences relevant to older people’s digital media skills are studied as well as the learning biography and the roles learning receptivity and experience play in the process. One of the research group’s aims is to create a solid planning basis for designing continuing education programs. The findings from this research group will be used to further develop on-topic curricula of Danube University Krems. A transdisciplinary approach was

chosen to embrace findings from the educational sciences, media sciences, medicine, health economy and sciences, sociology, cultural sciences and psychology.

Research Group Age-Sensitive Learning – Stress-Free Learning with Digital Media for the Older Workforce

DURATION
2019–2020

COORDINATION
Department for Economy and Health

PROJECT MANAGEMENT
Eva Krczal

PARTICIPATING DEPARTMENTS

EVIDENCE-BASED MEDICINE AND CLINICAL EPIDEMIOLOGY
Agnes Ebenberger
Isolde Sommer
Birgit Teufer

MIGRATION AND GLOBALIZATION
Anna Faustmann
Lydia Rössl
Isabella Skrivanek

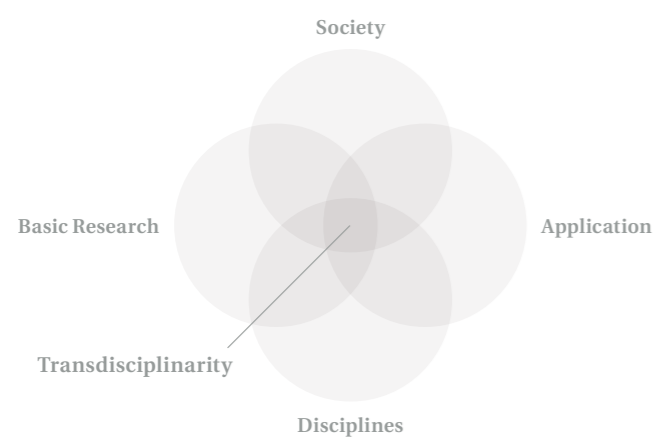
ECONOMY AND HEALTH
Eva Krczal
Arleta Franczukowska
Alexander Braun

CONTINUING EDUCATION RESEARCH AND EDUCATIONAL TECHNOLOGIES
Andrea Ghoneim
Stefan Längle
Klausjürgen Heinrich
Filiz Keser Aschenberger





Research Clusters



- **WasserCluster Lunz**
- **Complexity Science Hub Vienna**



Danube University Krems, in collaboration with the University of Vienna and the University of Natural Resources and Applied Life Sciences Vienna, operator of the WaterCluster Lunz, conducts ecological water research with the Aquatic Lipid Research and Ecotoxicology (LIPTOX) research group. LIPTOX's basic research focuses on aquatic food chains, from algae to microorganisms and fish, with a special focus on lipids, fatty acids and potential pollutants.

Pictured (f. l. t. r.)

Samuel-Karl Kämmer
Peter Dechant
Nadine Ebm
Katharina Winter
Martin Kainz
Richard Adams
Margaux Mathieu-Resuge
Hannes Hager

Aquatic Animals Influence Terrestrial Ecosystems

The AquaTerr research project investigates the transport of organic material from rivers and lakes into the surrounding terrestrial ecosystems. The quality and quantity of energy in the transferred biomass and in the terrestrial animals will be investigated. The results contribute to the understanding of nutrient flows across system boundaries.

Currently aquatic research is mainly conducted in rivers or lakes. Not enough importance is attached, however to the role of aquatic life in surrounding terrestrial ecosystems. And yet, the productivity of the surrounding terrestrial ecosystems can be increased by these aquatic organisms and by organic material. Emerging aquatic insects, for example, are significantly involved in the transport of organic material from inland waters to adjacent terrestrial systems. These insects provide essential biochemical nutrients such as polyunsaturated fatty acids.

Overview of Biomass Export

Possible effects of nutrient fluxes on adjacent food webs depend primarily on the amount of biomass transferred. The aim of this project is to quantify the export of essential biochemical nutrients in the form of emergent insects from inland waters. This will determine the importance of these nutrients for adjacent terrestrial habitats. A new method – the application of stable isotopes and fatty acids as biomarkers – will provide new insights. The nutrient changes in lakes and their effects on energy quality in insect larvae will subsequently be investigated followed by studying the effects of qualitative differences in biomass on adjacent food webs.

Aquatic-Terrestrial Coupling: Export of Polyunsaturated Fatty Acids from Aquatic Ecosystems by Insects and Possible Consequences for Terrestrial Consumers – AquaTerr

FUNDING

FWF – Austrian Science Fund, DFG – German Research Foundation

DURATION

2019–2022

DEPARTMENT

WasserCluster Lunz

PROJECT LEAD

Martin Kainz

COORDINATION

WasserCluster Lunz

PARTNER

Universität Konstanz, Germany

Studying Ecosystem Interrelationships

The Mitchell River is an unregulated river in North Australia and famous for its unspoiled riparian forests. The “QueenIsFat” project examines the aquatic ecosystem and attempts to preserve sustainable stream management despite encroaching agriculture.

There is broad interest in expanding agriculture in the catchment area of the Gulf of Carpentaria, the Mitchell River. However, intensive use of land and water resources can have negative impacts on floodplain forests, fish recreation areas and endangered species. This project aims to gain new knowledge on how to protect aquatic ecosystems and to enable sustainable stream management in the context of expanding cultivation in northern Australia.

Identifying nutrient sources

Stream patterns and nutrient flows during dry seasons and periods of flooding are studied. In addition new methods to identify nutrient sources are being used: With the help of stable isotopes the sources of fatty acids are differentiated in order to determine whether these have been washed into the river or enter the river in the form of algae or other resources. The quality of the nutrient sources is also measured. These findings provide information on where the food for fish and living beings comes from and whether different food sources have an influence on the growth, reproduction and fitness of consumers. In addition, the project investigates how the different nutrients in the fish are converted into cell membranes for example.

The results will not only provide information about stream food in freshwater ecosystems; the project also investigates the ecosystem connections between river, floodplain forests and flood currents.

Critical Water Needs to Sustain Freshwater Ecosystems and Aquatic Biodiversity in the Mitchell River – Investigating Stream Food Webs in Queensland’s Floodplain Ecosystems Using Stable Isotopes and Fatty Acids – QueenIsFat

FUNDING

Government Queensland, Australia

DURATION

2019–2022

DEPARTMENT

WasserCluster Lunz

PROJECT LEAD

Martin Kainz

COORDINATION

WasserCluster Lunz

PARTNERS

Department of Environment and Science,
Government Queensland, Brisbane, Australia
Australian Rivers Institute, Griffith University,
Brisbane, Queensland, Australia

Studying Systemic Risks

The Complexity Science Hub Vienna aims to understand complex issues and their impact on society in using Big Data. Danube University Krems is a member of the hub since 2018.

Climate change, financial crises, global urbanization trends, the rising number of natural disasters, the repercussions of fake news, migration ... mastering the great challenges of the 21st century requires a deep, quantitative and far-seeing understanding of complex systems. Studying such complex systems opens up new methods and ways to analyze systems that, only a few decades ago, were considered incomprehensible.

Complexity science combines mathematics, modeling, data, and information technology to approach basic questions posed by different disciplines such as medicine, economy, ecology or social sciences with the goal of achieving a deeper understanding of systemic risks, resilience, efficiency and the challenges of sustainable innovation and creativity.

Center for Complexity Science in Europe

The Complexity Science Hub Vienna sees itself as an incubator for radical new ideas in the field of complexity science. It strives to become the center of complexity science in Europe. The hub’s researchers aim to provide a creative environment without bureaucratic constraints.

The hub includes several universities and research institutions in Austria and works in an international network with the Santa Fe Institute, the NTU Singapore Complexity Institute, the Arizona State University and the Institute of Advanced Studies Amsterdam.

Danube University Krems became a member of the Complexity Science Hub Vienna in 2018.

Complexity Science Hub Vienna

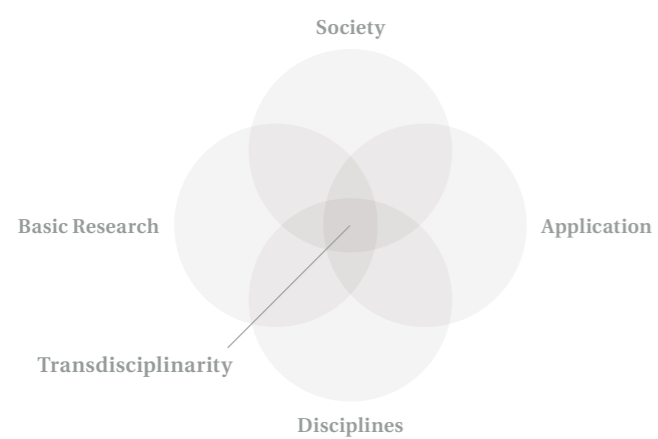
DURATION

Since 2018

<https://www.csh.ac.at/>



Science & Society



→ **Tableau Vivant – Old Pictures Come Alive Again!**

Danube University Krems takes it as an obligation and task to convey research to the public by giving an insight into its structure and the daily work researchers are involved in. To satisfy the public interest Danube University Krems organizes events and participates in initiatives supporting science communication, such as The Long Night of Research or The Research Festival Lower Austria.



→ Girls' Day

Every year female high school students aged 13 to 18 take advantage of the Girl's day to visit Danube University Krems in order to gain information about career paths leading toward science and technology.

→ Research Festival Lower Austria

The Research Festival Lower Austria celebrated its first showing in 2017. Danube University Krems will again participate in this event presenting a number of its research projects in the Palais Niederösterreich, Vienna in September 2019.



→ The Long Night of Research

In 2018 Danube University Krems was part of The Long Night of Research nationwide held in Austria, and invited every man, woman and child independent of age to participate at its 30 stations.

Tableau Vivant – Old Pictures Come Alive Again!

The 300th birthday of Krems' most famous baroque painter Martin Johann Schmidt was the occasion for a project that builds bridges between epochs. Teenage fashion students from Krems studied his works to create tableaux vivants, "living pictures", with a 21st century twist.

In the 18th century, tableaux vivants were a popular form of entertainment in which people re-enacted paintings and sculptures. In this context it was chosen as a means of introducing pupils of the fashion class at HLM HLW Krems to the works of "Kremser Schmidt". The primary goal of the research project was to scientifically accompany contemporary reinterpretations of individual paintings and prints by Schmidt. The starting point was to examine the formal and content-related aspects of original works. In a next step, selected historical aspects of these were specifically modified by the students during the re-enactment, and interpreted for the 21st century.

Experiencing exhibition practice at first hand

In addition to intensively studying the work of the Krems genius loci, another focus was on the professional presentation of the art project. A professional photographer documented the tableaux vivants. Her photos were shown at museumkremms as part of an exhibition designed by the students. An accompanying educational program supported the fashion students in their task. In the process, the risks and opportunities in museum and exhibition management were examined by way of example through authentic participatory projects. Another research question was how

young people react to both the freedom and the responsibility in participatory activities. The self-staging of the selfie generation within the framework of this project was also academically studied.

Tableau Vivant – Old Pictures Come Alive Again!

FUNDING

Viertelfestival Niederösterreich – Kulturvernetzung NÖ

DURATION

February–October 2018

DEPARTMENT

Art and Cultural Studies

PROJECT LEAD

Barbara Margarethe Eggert

COORDINATION

Viertelfestival Niederösterreich/ Kulturvernetzung NÖ

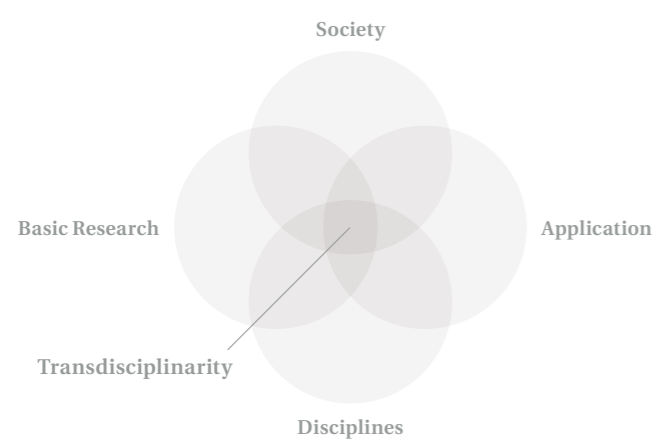
PARTNERS

Verena Taschner, specialist teacher, and 3rd year fashion pupils from HLM HLW Krems
museumkremms (Stadt Krems)
Verein raumgreifend, Krems



Facts & Figures

- **Office for Research Services**
- **Recently Appointed Professors and Assistant Professors**
- **Key Figures and Diagrams**





Pictured (f. l. t. r.)

Karin Siebenhandl; Sabina Ertl; Edith Huber; David J. Krych; Claudia Paulhart

The Office for Research Services at Danube University Krems supports researchers applying for research projects, project administration through to disseminating the results.

Support, advice, documentation: The Office for Research Services at Danube University Krems offers researchers a range of support. Researchers are assisted in identifying suitable international, European or Austrian funding instruments for research projects as well as mobility, in application processes, and in dissemination of results. Furthermore, it documents all research projects in the research database established at Danube University Krems, and offers training for researchers.

→ **Mathias Czaika**

Mathias Czaika was appointed university professor of Migration and Integration (§98) on September 1, 2017. Czaika earned his PhD at Freiburg University (Germany). Since 2010 he was Senior Research Officer and Senior Fellow at the Oxford Martin School and from 2015 onwards Governing Body Fellow at Wolfson College, both at the University of Oxford (UK). In 2015, Mathias Czaika became associated professor of Migration and Development, and a year later was conferred the position of Director of the International Migration Institute in Oxford. At Danube University Krems, Mathias Czaika heads the Department for Migration und Globalization.



→ **Thomas Probst**

Thomas Probst was appointed university professor for Psychotherapy Sciences (§98) on October 1, 2017. Probst studied psychology at Regensburg University and is a certified cognitive-behaviour therapist in Germany. He obtained his doctorate in psychology (PhD) from Humboldt University, Berlin. Probst has worked at several German universities, among others as interim professor for clinical psychology and psychotherapy at Georg-August-University Göttingen, Germany.



→ **Hubert Brückl**

Hubert Brückl was appointed university professor of Sensor Technology (§98) on May 1, 2019. Brückl studied physics and obtained his doctorate degree at the University of Regensburg. After two years as postdoctoral researcher at Technical University of Darmstadt, Brückl served as group leader at the Institute for Solid State and Materials Research (IFW) in Dresden. Following a research stay at Siemens, Brückl became head of the business division Nano Systems of the AIT, Austrian Institute of Technology, in Vienna from 2005 to 2012. Brückl heads the Department for Integrated Sensor Systems at Danube University Krems.



→ **Assistant professorships**

In 2017, Danube University Krems appointed the first assistant professors in accordance with its new academic career model. So far, assistant professorships have been awarded to 13 academic staff members.

Assistant professorships

Elisabeth Donat, Assistant Professor of Empirical Democracy Studies
Jens Hartmann, Assistant Professor of Apheresis and Extracorporeal Therapies
Filiz Keser Aschenberger, Assistant Professor of Educational Research and Lifelong Learning
Eva Krczal, Assistant Professor of Health Management
Thomas Lampoltshammer, Assistant Professor of Information and Communication Technology (ICT)
Gabriel M. Lentner, Assistant Professor of International Law and Arbitration
Andrea De Luna, Assistant Professor of Regenerative Medicine and Tissue Engineering
Karl Matz, Assistant Professor of Vascular Prevention
Walter Seböck, Assistant Professor of Security Studies
Isolde Sommer, Assistant Professor for Clinical Epidemiology
Yvonne Teuschl, Assistant Professor of Clinical Neurosciences and Preventive Medicine
Carla Tripisciano, Assistant Professor for Biomaterials and Blood-Material-Interaction
Lukas Zenk, Assistant Professor of Innovation and Network Research

Associated professorship

Attila Pausits – Associate Professor of Educational Research and Lifelong Learning

Research at Danube University Krems is characterized by its transdisciplinary approach. Exchanges among the disciplines, between basic science and application as well as interconnection between research and teaching ensure innovation and knowledge transfer.

Research at Danube University Krems is guided by the search for answers to societal challenges. It combines basic and applied research, and integrates knowledge from outside the academic sphere.

Research follows a clear profile in **four main fields:**

- Cohesive and Innovative Societies
- Cultural Heritage
- Regenerative Medicine
- Continuing Education Research

Research is conducted by the **three faculties** and their departments:

- Faculty of Health and Medicine
- Faculty of Business and Globalization
- Faculty of Education, Arts and Architecture

The inter-faculty research groups underscore interdisciplinarity and support the research across the departments.

Publications total: 450

Number of scientific/artistic publications



- a → First edition reference books and textbooks: 31
- b → Articles first published in SCI, SSCI and AHCI journals: 142
- c → Articles published in other scientific journals: 51
- d → Articles published in compilations: 181
- e → Other scientific publications: 34
- f → Artistic sound, image, data carriers: 4
- g → Contributions to artistic sound, image, data carriers: 3
- h → Art catalogs and other art publications: 2
- i → Articles in art catalogs and other art publications: 2

Source: Intellectual Capital Report 2018

Facts & Figures

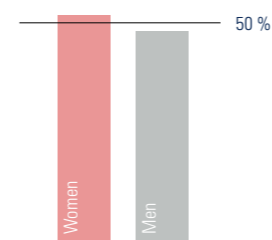
Data collected 2018

Academic Staff

Total: 359

Women: 186

Men: 173

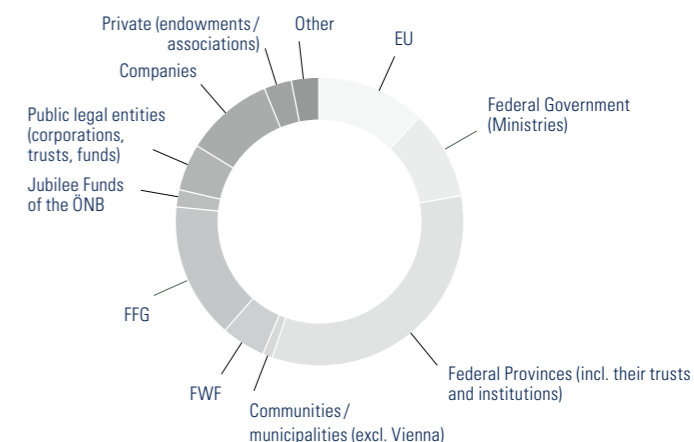


Source: uni:data (As per 31.12.2018)

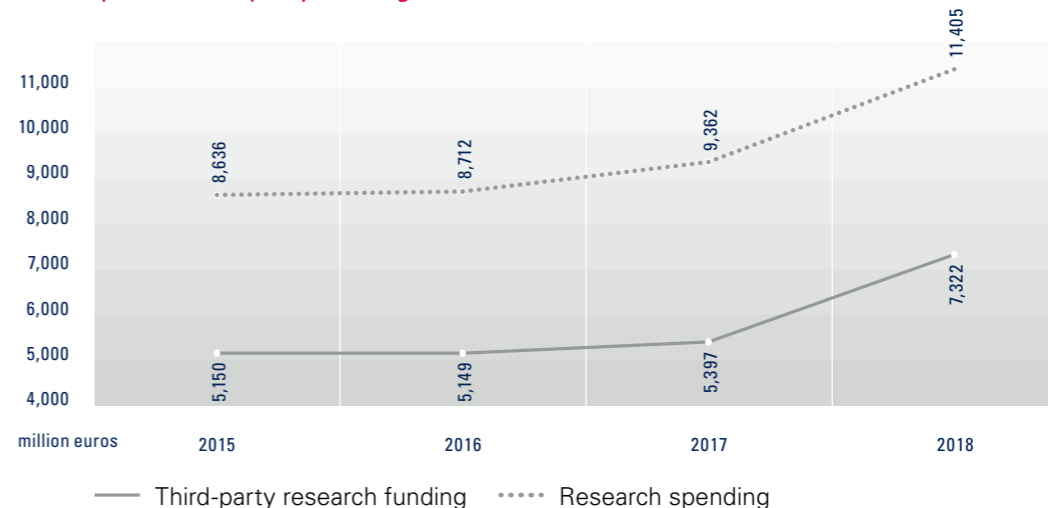
Third-party research funding in 2018

Total: 7.3 million euros

By funding parties:



Development third-party funding and cost of research



Projects according to sponsors total: 176



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