



UNIVERSITÄT
LEIPZIG

Medizinische Fakultät

iccas

20 YEARS ICCAS

#Smart_Medicine



#Annual_Report_2025

IMPRINT

EDITOR

Leipzig University
Faculty of Medicine
Innovation Center Computer Assisted Surgery (ICCAS)

Semmelweisstraße 14
04103 Leipzig
Germany
E-Mail: info@iccas.de
Web: www.iccas.de

EXECUTIVE DIRECTOR

Prof. Dr. Andreas Melzer

CONCEPT & LAYOUT

Christoph Zeumer

COVER

©ADOBESTOCK-635835475 | GORODENKOFF

PHOTOS

CHRISTIAN HÜLLER / UNIVERSITÄT LEIPZIG
SWEN REICHOLD / UNIVERSITÄT LEIPZIG
©ICCAS | INNOVATION CENTER COMPUTER ASSISTED SURGERY
© ALBRECHT BLOSSE | ICCAS
© MAXIMILIAN FERLE | ICCAS
© STEFAN FRANKE | ICCAS
©TOBIAS PABST | ICCAS
©TOBIAS PRETZSCH | ICCAS

GRAPHIC ARTS

Simon Rosenow
Christoph Zeumer

DISCLAIMER

All data in this report is due to the Institutes specifications.

No responsibility can be accepted for the correctness of this information.

Leipzig, May 2025

CONTENTS

Preface	2
Foreword by the Dean	3
Timeline	4
Fact and Figures	6
Organization	8
Medical Board	8
Advisory Board	9
Cooperations	10
Selected Activities	18
Highlights	18
Congresses and Fairs	24
Project Works	26
Miscellaneous	28
Interdisciplinary Research	30
The Focus	32
MR-Technology	34
Interdisciplinary Robotics	37
Imagine Technologies	39
Bio Signal Processing	41
Medical Communication Systems	44
Digital Patient Model	49
Smart Clinical Assistants: Decision Support	53
Smart Clinical Assistants: Emergency Management	56
Clinical Workflows and Integrated Assistance Systems	58
University Courses	60
Graduations	61
Publications	62
First & Senior Autorship	62
Co-Autorship	63
Conference Proceedings	65

#PREFACE

Dear Friends and Colleagues,

The year 2025 highlighted many of the qualities that have shaped ICCAS over the past two decades: clinical proximity, technical precision, interdisciplinary cooperation and the ambition to translate research into medical practice. In our twentieth anniversary year, these strengths were visible across our projects, teaching activities and exchanges with partners in Leipzig, Germany and beyond.



The anniversary offered an opportunity to reflect on two decades of development and on the questions that continue to guide our work. In May, current and former staff members, long-standing companions, members of the Scientific Advisory Board, partners and supporters came together to celebrate ICCAS. The demonstrators and projects presented on this occasion showed what has always defined our institute: rigorous research close to clinical workflows, technologies designed for real medical environments, and open dialogue between medicine, engineering and computer science.

Our research in 2025 reflected the breadth of digital medicine at ICCAS. Our teams worked on connected systems, more precise therapy planning, assistance technologies for surgery, emergency and intensive care, and reliable artificial intelligence in medical contexts. Projects such as 6G-Health, CERTAINTY, KIMed, DaDriv-StAC and Rea-FBS addressed key challenges from connected healthcare environments and personalized cancer therapy to stroke aftercare and improved resuscitation support.

Exchange with scientific, clinical and technological communities remained essential. At conferences, trade fairs and scientific meetings, our teams presented results, discussed approaches and strengthened collaborations beyond Leipzig. The visit of the Irish Ambassador further underlined the international reach of ICCAS and provided an opportunity to present key developments in networked and data-based medical technologies.

Teaching, training and public engagement also remained closely connected to our mission. The new elective in disaster medicine at Leipzig University Medicine, together with further teaching formats and public events, strengthens ICCAS' role in linking research, education and public dialogue. In 2025, ICCAS also successfully secured nearly €4 million in third-party funding, providing a strong basis for ongoing and future research activities.

None of this would be possible without the expertise, creativity and collaborative spirit of our teams. We thank all employees, doctoral researchers and students, our clinical and project partners, funding bodies, alumni and friends of ICCAS. Your work gave this anniversary year its substance and continues to define the spirit of our institute.

We hope this annual report offers a vivid insight into the projects, people and ideas that shaped 2025 at ICCAS – and into the questions that continue to guide our work.



Prof. Dr. Andreas Melzer



Prof. Dr. Thomas Neumuth

Dear Readers,

Twenty years of ICCAS are twenty years of curiosity in the service of medicine: research across disciplinary boundaries, technology developed with clinical purpose, and ideas translated from the laboratory into medical practice. For the Medical Faculty of Leipzig University, this anniversary is an occasion to look back with appreciation and to recognize how profoundly ICCAS has shaped the profile of our faculty and Leipzig University Medicine.



Since its foundation, the Innovation Center Computer Assisted Surgery has stood for a distinctive form of translational research. It brings together clinical practice, computer science, engineering and medical technology to address concrete medical needs with reliable technological solutions. ICCAS works where future healthcare takes shape: in networked medical devices, intelligent assistance systems, digital patient and therapy models, medical robotics, intraoperative imaging and connected care.

The year 2025 made this role especially visible. The anniversary celebration brought together staff, alumni, companions, partners and members of the Scientific Advisory Board and offered an impressive view of what has been achieved over two decades. The projects, demonstrators and discussions presented during the anniversary year showed ICCAS as a place where scientific excellence is closely connected to clinical reality, open exchange and responsibility.

ICCAS also contributes significantly to the strategic development of our faculty. Leipzig University Medicine is a place where research, teaching and patient care are closely intertwined, and ICCAS gives this triad a particularly tangible form. The center advances medical technology and digital medicine as research fields while carrying these topics into education and training. Teaching formats in medical technology, digital health and disaster medicine prepare students for a healthcare system in which technological competence, interdisciplinary thinking and responsible action are increasingly important.

At the same time, ICCAS strengthens Leipzig as a national and international location for medical innovation. Its collaborations with clinical partners, research institutions, industry and international guests show that it is not only a place where technologies are developed, but also a platform where ideas are tested, discussed and translated into practice. In this way, ICCAS builds bridges between laboratory and clinic, academic research and industrial application, technological progress and societal benefit.

This anniversary reminds us that progress in medicine is never the achievement of a single discipline. It emerges where different perspectives meet and where solutions are developed with patience, precision and responsibility. ICCAS has worked in this spirit for twenty years. I am confident that it will continue to help shape safer, more connected and more patient-centered healthcare.

I would like to thank all staff members, partners, supporters and companions of ICCAS for their dedication and achievements. I wish all readers an inspiring insight into the work, ideas and perspectives of this remarkable institute.


Prof. Dr. med. Ingo Bechmann
Dean of the Medical Faculty



2025

- 20 years of ICCAS – Anniversary celebration with employees, friends, partners, and supporters
- 3MP-FUS project completion: At the final meeting on October 16, 2025, at ICCAS, the MRI-integrated demonstrator system was presented.
- Visit by the Irish Ambassador with demo tour.
- Project launch Rea-FBS - The Rea-FBS project aims to improve survival after sudden cardiac arrest with a portable ultrasound device for real-time blood flow monitoring during resuscitation
- KliNet5G – Final meeting with key results and demonstration of new 5G-based tracking solutions for clinical environments.
- Project launch KIMed – Network for AI in medicine in Saxony

2024

- Consortium meeting of the MORFEUS project with partners - knowledge transfer between medical technology and aerospace was advanced, in particular for the development of the “synthetic torpor” (sTor)
- Biosaxony held a successful business roundtable in Berlin with the Saudi delegation led by Khalid bin Abdulaziz Al-Falih. The region's excellent life science ecosystem was presented and the first foundations for future cooperation were laid
- Stefan Bohn visited several institutions in Houston/Texas, including the Texas Medical Center and the Rice360 Institute. The aim was to explore innovative medical and eHealth technologies and establish the Houston region as a major center for biomedical and digital health processes
- Tri5G project ended at the DHL hub in Leipzig and presented pioneering innovations in mobility and connectivity. The project emphasized the importance of 5G and edge computing for Leipzig to establish it as a leading center for 5G technologies
- Launch of projects: TeleNoma, FazioTrain, SurgiTrace, SoKoRoMed

2023

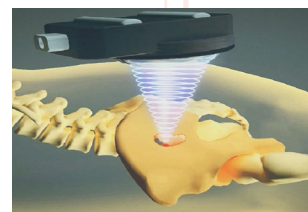
- Start of the 6G-Health-Project, the first Europe-wide project to integrate 6G technology into medical technology
- Thomas Neumuth and his team presented the ICCAS research results on the medicine of the future to Minister of State Sebastian Gemkow
- Andreas Melzer was co-organizer of the second joint meeting ISTU- EUFUS 2023
- Presentation and discussions with Minister of State Oliver Schenk on the developments at ICCAS as a representative of Leipzig as a research location and on the design and further development of the life sciences location
- ICCAS won the „Best Design Award“ at the Hamlyn Robotics Symposium for its contribution „MERODES“
- Launch of the 5G-COMPASS, 5G Pacemaker, VOLTA, RescEU EMT, MIRACLE-5 and CERTAINTY projects

2022

- ISO 13485 recertification for ICCAS has been extended
- ICCAS developed a blue print of a future ambulance with 5G
- ICCAS took part at the BMT 2022 with many program contributions
- ICCAS members participated the 13th International MRI Symposium and held a network meeting for their partners
- More than €13 million in new project volume raised by ICCAS in 2022
- Launch of Projects 3MPFUS, 6G-Health, KliNet5G, MediNet, Tri5G, VISION-CRE, CortexMap, SDC-VAS

2021

- ICCAS is founding member of the first center for robot-assisted and navigated surgery in Saxony
- Minister of State Petra Köpping and now Member of the Bundestag Holger Mann visit ICCAS
- Center for Medicine Innovation (CMI) selected to move to the next phase in the ideas competition „Wissen schafft Perspektiven für die Region“
- ICCAS involved within the framework for the establishment of the Comprehensive Cancer Center (CCC) for Central Germany
- Launch of projects EyeHearU, SCD Controlstation MED, MMMP FUS



2020

- 15th anniversary of ICCAS – Greetings and video message by Saxon Minister for Science Sebastian Gemkow
- Institute at the Faculty of Medicine at Leipzig University
- BMT in Leipzig – Opening by Federal Minister of Health Jens Spahn
- New Research Group Biomedical Data Analysis with project Post-Stroke (Prof. Galina Ivanova)
- Avatera Cooperation: Instrument Positioning
- Launch of projects VITALS, KAIT, MSI-Endoscopy, HSI-Laparoscopy, AIQNET, SORLIC, AutoCuff, Brainsaver

2019

- ICCAS organizes the 'FutureMedTechnologies' doctoral workshop and transfer meeting
- Habilitation of Dr. Claire Chalopin
- OR.Net e.V. presents the SDC-Standard at DMEA 2019
- 6th Digital Operating Room Summer School successfully performed
- ICCAS conducts a public discussion on AI in Medicine in the framework of the BMBF's Year of Science
- Launch of projects MR-Stents, MR Thrombosis, MOMENTUM, MPM and ProDial

2018

- ICCAS welcomes Saxony's Prime Minister Michael Kretschmer
- 5th DORS inspired international participants
- ICCAS takes part at the Surgical Robot Challenge of the Hamlyn Symposium in London
- ICCAS hosts Steering Committee Meeting of the EUMFH project
- ICCAS invites to the 17th Annual Conference of the CURAC-Society
- Launch of projects ENSEMBLE, COMPASS and LYSIS
- EU Commissioner for Humanitarian Aid & Crisis Management Christos Stylianides visits ICCAS

2017

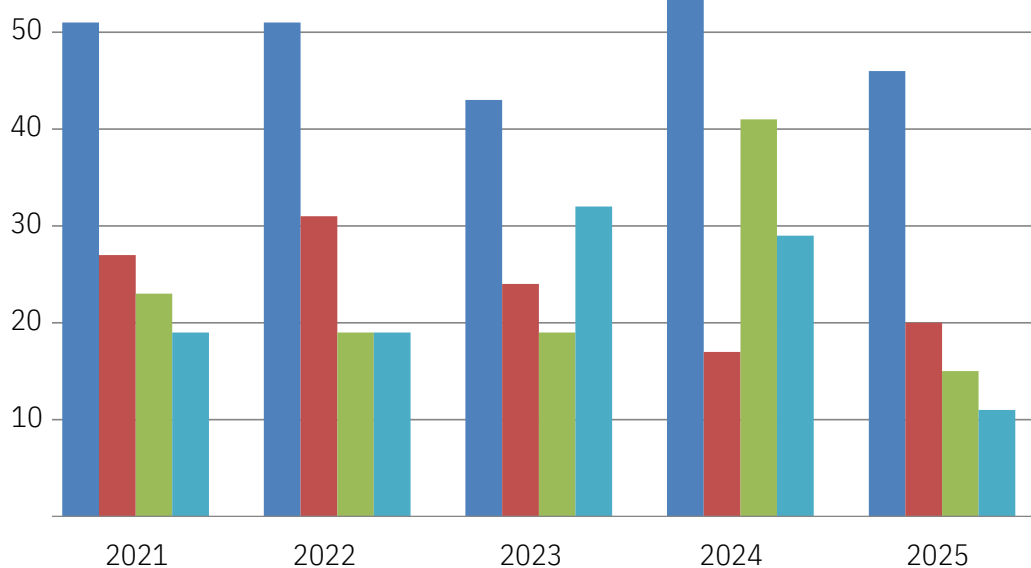
- ICCAS meets Federal Chancellor Angela Merkel at Digital Summit 2017
- 4th DORS consolidates its unique feature
- EUFUS 2017 & Preconference Workshop Experimental FUS and HIFU take place in Leipzig
- Successful non-invasive treatments with HIFU at Leipzig University Hospital
- PROJECT AREA Life Support Systems with projects IMPACT and EMU launches
- Start of projects European Modular Field Hospital (EUMFH), PA-PA-ARTIS and MoVE

2016

- Final presentation of the flagship project OR.Net
- ICCAS receives ISO 13485 certification
- Federal health minister visits ICCAS
- 3rd DORS
- Project start of Meta-ZIK SONO-RAY

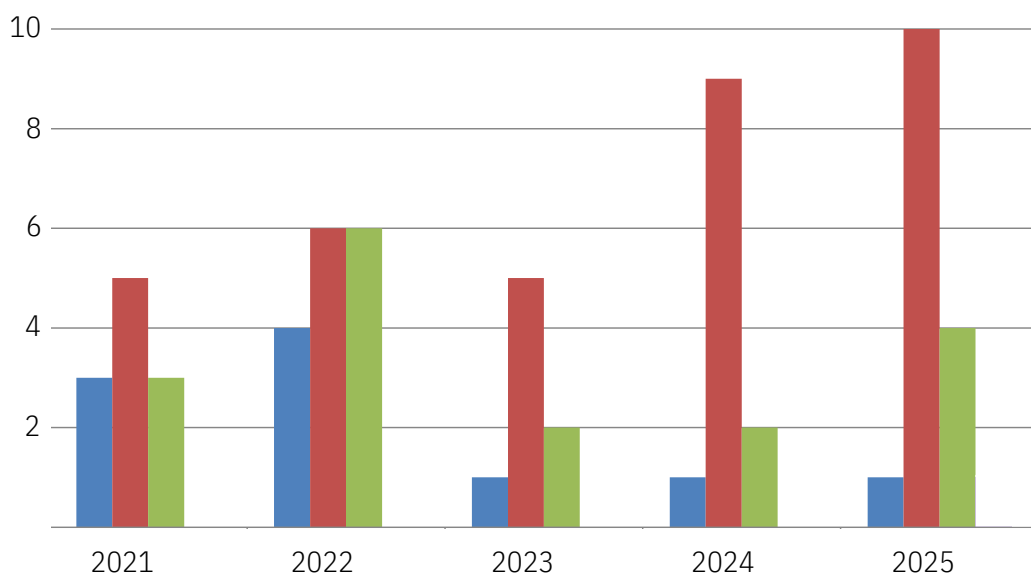
#FACT AND FIGURES

PUBLICATIONS



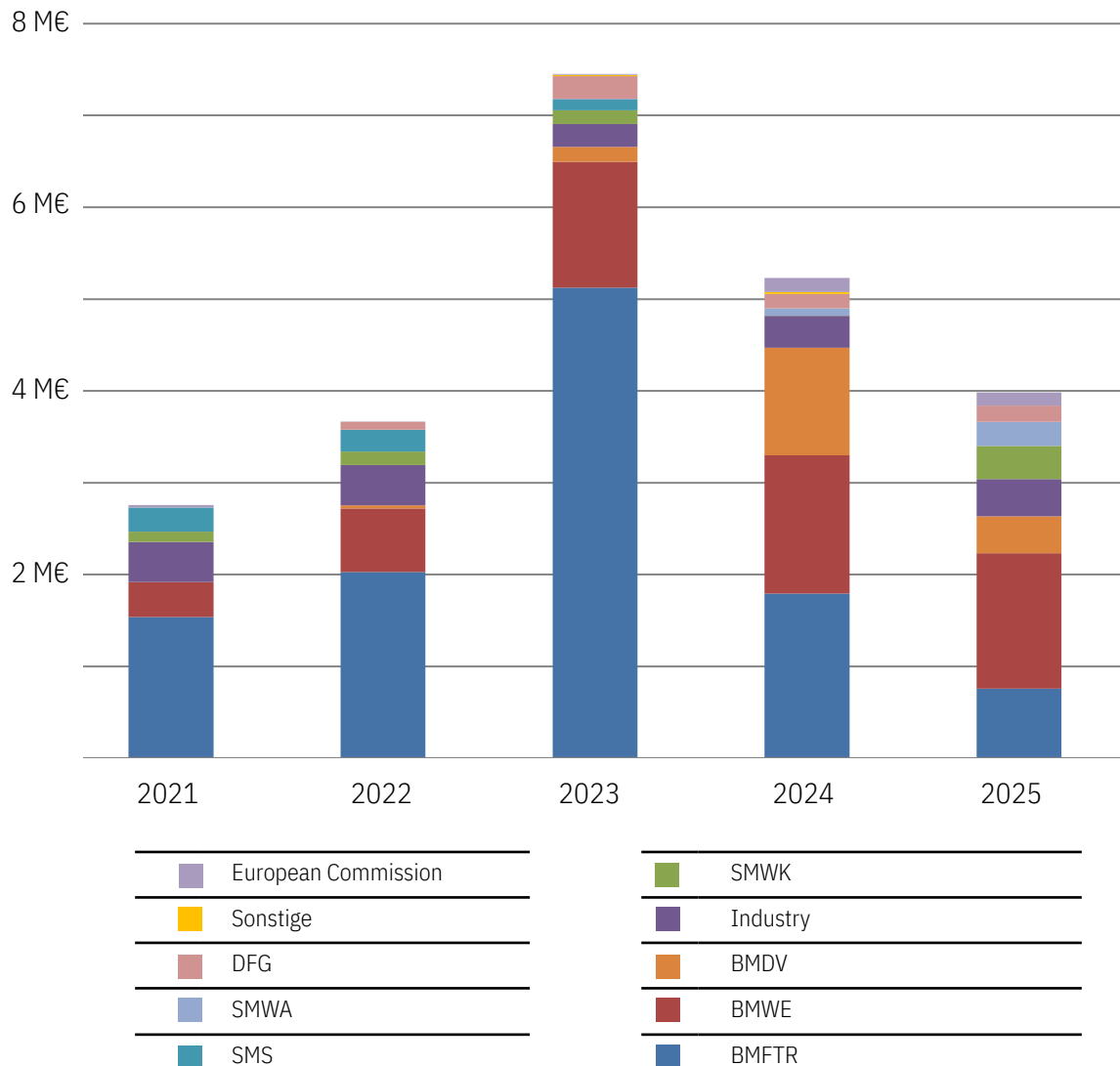
Total	46
First- and Senior authorship	20
Co- Authorship	15
Conference Proceedings	11

GRADUATIONS



Doctoral thesis	1
Master's thesis	10
Bachelor's thesis	4

FUNDING



ICCAS' main funding is provided by the BMFTR - Federal Ministry of Research, Technology and Space. Furthermore, ICCAS receives funding from the BMWK- Federal Ministry for Economic Affairs and Climate Action for projects related to the ZIM Central Innovation Program for small and medium-sized enterprises and other ministries. Leipzig University's Faculty of Medicine provides ICCAS with performance-based funding.

MEDICAL BOARD

Prof. Dr. med. Andreas Dietz

- Speaker of the Medical Board | Department of Otolaryngology, University of Leipzig Medical Center

Prof. Dr. med. Bahriye Aktas

- Clinic Director | Clinic and Polyclinic for Gynecology, Leipzig University Hospital

Dr. med. Erdem Güresir

- Director of the Clinic and Polyclinic for Neurosurgery

Prof. Dr. Ulrike Köhl

- Institute Director-Fraunhofer IZI | Professor of Immuno-Oncology at University and Director of Leipzig of the Institute of Clinical Immunology, Leipzig University Hospital

Prof. Dr. Dr. med. Nils Nicolay

- Professor of Radiotherapy and Radiation Oncology, Faculty of Medicine | Head of the Department of Radiotherapy, Leipzig University Hospital

Prof. Dr. med. Andreas Roth

- Clinic for Orthopaedics, Trauma and Plastic Surgery, University Hospital Leipzig

Prof. Dr. MD-PhD. Osama Sabri

- Director and Chairman of the Department of Nuclear Medicine, University Hospital Leipzig

Prof. Dr. med. Daniel Seehofer

- Head of the Leipzig Transplant Center| Hepatobiliary Surgery and Transplant Surgery, Leipzig University Hospital

Prof. Dr. Sebastian Stehr

- Director Department for Anesthesiology and intensive Care, University of Leipzig Medical Center

Prof. Dr. med. Jens-Uwe Stolzenburg

- Director of Urology, Leipzig University Hospital

Prof. Dr. Arno Villringer

- Director of the Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences Leipzig | Professor, University of Leipzig

ADVISORY BOARD

Prof. Dr. Johannes Fallert

- Executive Director Research & Technology Development, KARL STORZ SE & Co. KG

Prof. Dr. Volkmar Falk

- Medical Director | Department of Cardiothoracic and Vascular Surgery, Deutsches Herzzentrum Berlin

Dr. Robert Krieg

- Siemens Healthcare GmbH | VP in Siemens Healthineers' business line Magnetic Resonance

Prof. Dr. Heinz U. Lemke

- Professor of Computer Science and teaches and supervises research on Computer Assisted Medicine, Technical University of Berlin

Prof. Dr. Nassir Navab

- Head | Chair for Computer Aided Medical Procedures & Augmented Reality, Department of Informatics, Technical University Munich

Prof. Dr. Bernhard Preim

- Head of the Chair of Visualization, Otto von Guericke University Magdeburg

Prof. Dr. Andrea Schenk

- Deputy Institute Director, Fraunhofer MEVIS, Professor for Computer-Assisted Diagnosis and Therapy, Hannover Medical School

Prof. Dr. Dipl.-Ing. Thomas Schmitz-Rode

- Director | Institute of Applied Medical Engineering, Helmholtz-Institute of RWTH Aachen, University & Hospital

#COOPERATIONS





United States of America

Stanford Medical School
Health Tree Foundation
MR Instruments Inc.
Harvard Medical School (HMS), Brigham and Women's Hospital
Memorial Sloan Kettering Cancer Center (MSKCC)
John Hopkins University
FUS Foundation
Children's National Medical Center (CNMC)
University of Guanajuato, Faculty of Electrical Engineering

United Kingdom

University of Dundee, Institute for Medical Science and Technology (IMSaT)
Imperial College, Hamlyn Center
Kings College London

Norway

Norwegian University of Science and Technology, Department of Imaging and SINTEF Medical Tech.

Denmark

Welfare Tech Odense
Danish Emergency Management Agency DEMA

Netherlands

European Society for Blood and Marrow Transplantation (EBMT)
Universitair Medisch Centrum (UMC) Utrecht
Delft University of Technology, Faculty of Mechanical, Maritime and Materials Engineering,
Department of BioMechanical Engineering
European Burns Association

Belgium

ReGEDiM: Research Group on Emergency and Disaster Medicine, Vrije Universiteit
Research Group on Emergency and Disaster Medicine
Belgian First Aid and Support (B-FAST)
Health Food Chain Safety Environment
Myeloma Patients Europe AISBL
University of Namur

France

French DG for Civil Protection and Crisis Management
Institut Curie
Theraclion S.A.
Lyonbiopôle- Cluster Auvergne-Rhône-Alpes
Image Guided Therapy (IGT)
IRCAD – France-Research Institute against Digestive Cancer

Luxembourg

Information Technology for Translational Medicine

Switzerland

Roche Pharma AG
Swiss Federal Institute of Technology Zurich (ETH), Computer Vision Laboratory
Health Tech Cluster Switzerland
Inselspital, Bern University Hospital, Department of Ear, Nose and Throat Diseases (ENT),
Head and Neck Surgery

Italy

Università Trient, Department of Information Engineering and Computer Science
EMT 2 Hospital Regione Piemonte
University of Turin, Department of Surgical Sciences
La Sapienza University
Sant'Anna – School of Advanced Studies, The BioRobotics Institute
Italian Civil Protection Authority

Spain

Hospital Universitario Fundación Jiménez Díaz
EMT, Instituto Nacional de Emergencia Médica

#COOPERATIONS

Poland

Wroclaw Medizinische Universität

Czech Republic

Masaryk University

Austria

MEDIFINA GmbH

HeartBalance GmbH

Medical University of Graz, Institute for Medical Informatics, Statistics and Documentation (IMI)

Slovakia

ASSR- Association of Samaritans of the Slovak Republic

Estonia

Estonian Health Board

Romania

Ministry of the Interior

Romanian Association for Endoscopic Surgery and other Interventional Techniques - ARCE

Medis Foundation

Israel

INSIGHTEC Ltd.

The Chaim Sheba Medical Center at Tel HaShomer

Agypt

Menoufia University, Department of Computer Science and Engineering

Congo

Higher Institute of Applied Technology of Kinshasa (ISTA)

China

Chongqing University of Technology (CQUT)

MeDrea Medical Science & Technology Ltd.

Institute for Medical Instrumentation, Shanghai University

Taiwan

IRCAD Lukang

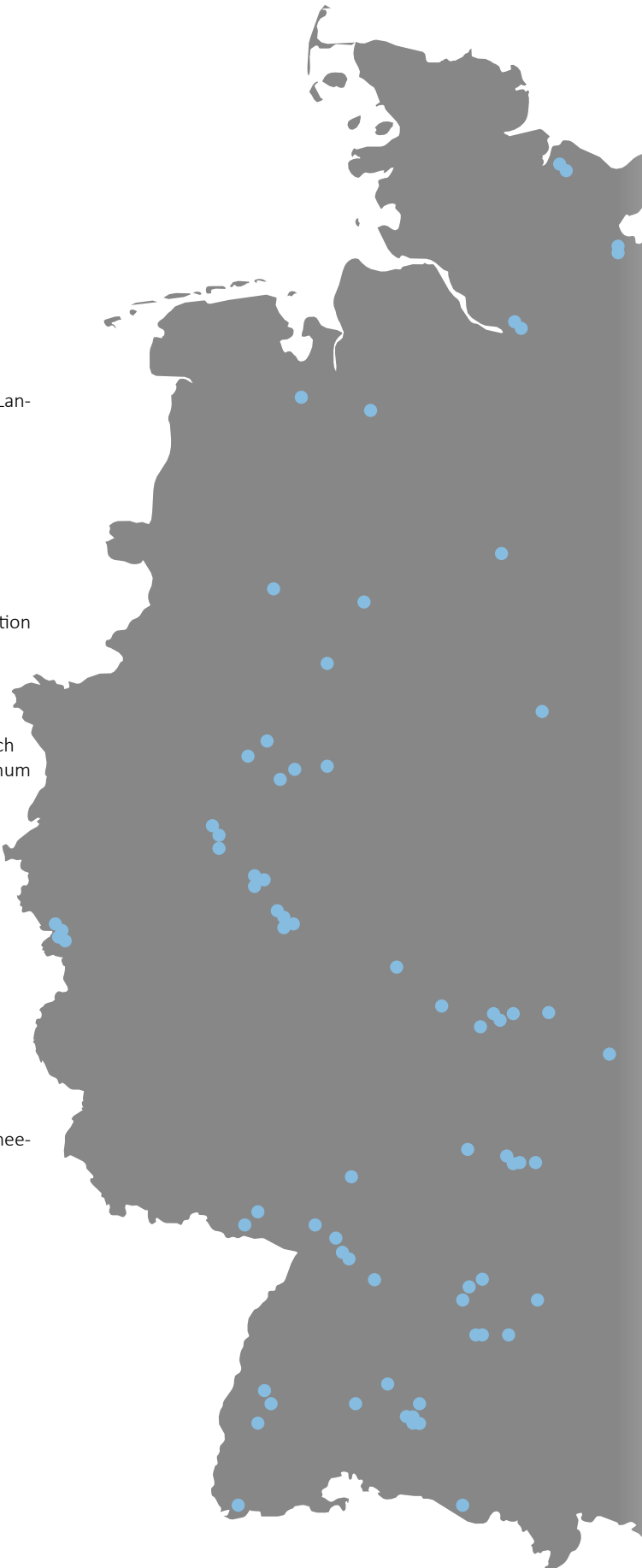
South Korea

National Cancer Center Graduate School of Cancer Science and Policy (NCC-GCSP)



#COOPERATIONS

NOTARZTDIENSTE.DE GmbH
ZBW- Leibniz Information Center for Economics
Draeger AG & Co. KGaA
UniTransferKlinik Lübeck GmbH
University of Lübeck, Institute for Software Engineering and Programming Languages (ISP)
University of Lübeck, Center for Open Innovation in Connected Health
Hamburger Informatik Technologie-Center e.V. (HITeC)
WEINMANN Emergency Medical Technology GmbH + Co. KG
Fraunhofer Institute for Digital Medicine (MEVIS)
OFFIS – Institut für Informatik e.V.
Osnabrück University of Applied Sciences
steute Technologies GmbH & Co. KG
German National Library of Science and Technology (TIB), Leibniz Information Center for Science and Technology
Leibniz University of Hannover
Stiftung Deutsche Schlaganfall-Hilfe
MR:comp GmbH
MRI-STaR- Magnetic Resonance Institute for Safety, Technology and Research
VISUS Health IT GmbH University Hospital Knappschaftskrankenhaus Bochum GmbH, Clinic for Anesthesiology, Intensive Care Medicine and Pain Therapy
MotionMiners GmbH
University Medical Center Göttingen, Clinic for Cardiology and Pneumology
Vodafone Group Services GmbH (VOD)
Bio River e.V.
Janssen Cilag GmbH
Nuromedia GmbH
Singleron Biotechnologies GmbH
ZB MED – Information Centre for Life Sciences
University of Cologne
SurgiTAIX AG
Ilara GmbH
Synagon GmbH
Rheinisch-Westfälische Technische Hochschule Aachen (RWTH)
Helmholtz Institute for Biomedical Engineering, Faculty of Mechanical Engineering, Chair of Medical Technology (mediTEC)
qcmcd – Quality Consulting Medical GmbH
LOCALITE GmbH
Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS)
Telekom Healthcare Solutions GmbH
Fritz Stephan GmbH

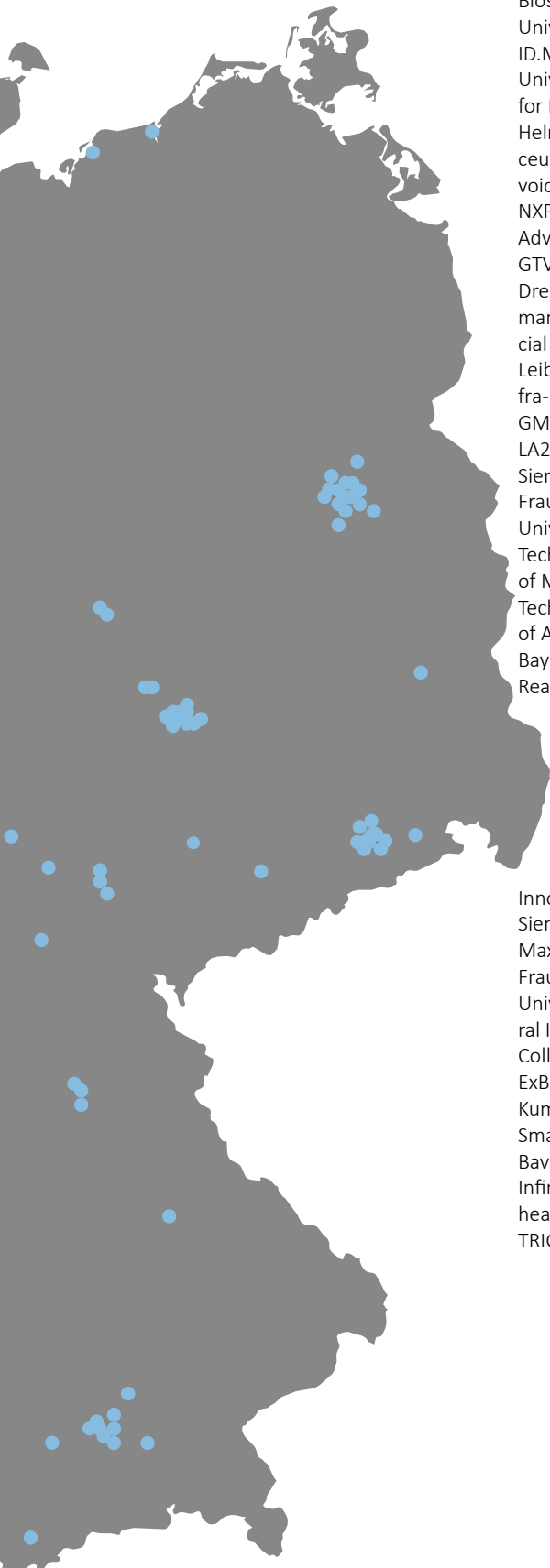




tetronik GmbH
IQVIA Commercial GmbH & Co. OHG
University Hospital Frankfurt, Center of Radiology
Association of Electrical, Electronic and Information Technologies (VDE)
KfH Kuratorium für Dialyse und Nierentransplantation e.V
SIGNUS Medizintechnik GmbH
University Hospital Würzburg
Leibniz Institute for the Social Sciences (GESIS)
Heidelberg University Hospital, Ear, Nose and Throat Clinic
Heidelberg University Hospital, Radiology Clinic
Mediri GmbH
ERNW Research GmbH
Inova DE GmbH
Deutsches Forschungszentrum für Künstliche Intelligenz GmbH
Fraunhofer Institute for Biomedical Engineering (IBMT)
CTC advanced GmbH
HWI pharma services GmbH
Leibniz Institute for Information Infrastructure (FIZ Karlsruhe)
HS Analysis GmbH
WIBU Systems A.G.
ADMEDES GmbH
BioRegio STERN GmbH
Technologie-Transfer-Initiative GmbH
Fraunhofer Institute for Manufacturing Engineering and Automation (IPA)
TZM GmbH
GADV – Gesellschaft für Automatisierung mit Datenverarbeitungsanlagen mbH
University of Tübingen, Ethics Committee at the Medical Faculty
HPZenner Clinical Evaluation GmbH & Co. KG
EPflex Feinwerktechnik GmbH
inomed Medizintechnik GmbH
Schölly Fiberoptic GmbH
TriNetX Oncology GmbH
METRAX GmbH, PRIMEDIC
C.R.S. ii Motion GmbH
MEDAGENT GmbH & Co. KG
KARL STORZ SE & Co. KG
KLS Martin Group – Gebrüder Martin GmbH & Co. KG
HEBUmedical GmbH
Aesculap AG
MedicalMountains GmbH
BioLago e.V. Konstanz

#COOPERATIONS

Diaspective Vision GmbH
Computer Science and Electrical Engineering, Institute for Applied Microelectronics and Data Technology (IMD)
Optris GmbH
Fraunhofer Institute for Open Communication Systems (FOKUS)
SectorCon Engineering Ltd
Hospital Charité- University Medicine Berlin
Berlin Cert GmbH
Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute (HHI)
airpuls GmbH
Technical University Berlin
Berufsverband für Orthopädie und Unfallchirurgie e.V.
Johanniter-Unfall-Hilfe e.V.
Bundesdruckerei GmbH
highstreet technologies GmbH
Freie Universität Berlin, Institute of Computer Science, Human-Centered Computing working group
BIOTRONIK SE & Co. KG Berlin
Berlin Heart GmbH (BH)
Fraunhofer Institute for Computer Architecture and Software Technology (FIRST)
Dornheim Medical Images GmbH
University Hospital Magdeburg
Martin-Luther-University Halle
GAMPT – Gesellschaft für Angewandte Medizinische Physik und Technik mbH
Flughafen Leipzig/ Halle GmbH
DHL HUB Leipzig GmbH
PHACON GmbH
St. Georg Hospital
Deutsche Rentenversicherung Mitteldeutschland
tecVenture GmbH
Gesundheitsforen Leipzig GmbH
Leipziger Verkehrsbetriebe (LVB) GmbH
University of Leipzig, Faculty of Mathematics and Computer Science, Institute of Computer Science
Raylytic GmbH Leipzig
City of Leipzig Administrative Offices
Max Planck Institute for Cognitive and Neurosciences, Department of Neurology
University of Leipzig, Institute for Medical Informatics, Statistics and Epidemiology (IMISE)
University of Leipzig, Institute of Anatomy
University of Leipzig, Biotechnological-Biomedical Center
Leipzig University Hospital, Clinic and Polyclinic for Radiotherapy
Leipzig University Hospital, Clinic and Polyclinic for Ear, Nose and Throat Medicine
Leipzig University Hospital, Polyclinic for Tooth Preservation and Periodontology
Leipzig University Hospital, Clinic and Polyclinic for Nuclear Medicine
University Medical Center Leipzig (UML) Intensive Care and Pain Therapy
Leipzig University Hospital, Medical Clinic and Polyclinic V- Angiology
Kopernikus Automotive GmbH
LeFx GmbH
Universität Leipzig, Sächsischer Inkubator für Klinische Translation (SIKT)
Effigos AG
Fraunhofer Institute for Cell Therapy and Immunology (IZI)
Leipzig University of Applied Sciences (HTWK), Faculty of Engineering (EIT), Institute of Electronics and Biomedical Information Technology (EBIT)
Leipzig Heart Center
ASSKEA GmbH
ITP GmbH- Company for Intelligent Textile Products
Jena University Hospital, Information Technology (IT) Division, Department of ENT
Fraunhofer Institute for Applied Optics and Precision Engineering (IOF)
Avateramedical GmbH
Central Medical Laboratory Altenburg
Chemnitz University of Technology
Biotype Diagnostic GmbH



CampusGenius GmbH
 Biosaxony e.V.
 University Hospital Carl Gustav Carus, Clinic and Polyclinic for Neurosurgery
 ID.MED UG
 University Hospital Carl Gustav Carus, Faculty of Medicine, OncoRay- National Center for Radiation Research in Oncology
 Helmholtz Center Dresden Rossendorf (HZDR), Department of Neuroradiopharmaceuticals
 voice INTER connect GmbH
 NXP Semiconductors Germany GmbH
 Advancing Individual Networks (AIN) GmbH
 GTV – Gesellschaft für Technische Visualistik mbH
 Dresden University of Technology: Center for Information Services and High Performance Computing, International Center for Computational Logic, Institute for Artificial Intelligence
 Leibniz Institute: for Ecological Urban and Regional Development, for Information Infrastructure, for Informatics Schloss Dagstuhl, for Social Sciences
 GMC Systems mbH – Gesellschaft für medizinische Computersysteme mbH
 LA2 GmbH
 Siemens Healthcare GmbH
 Fraunhofer Institute for Integrated Circuits (IIS)
 University Hospital Regensburg, Clinic and Polyclinic for Internal Medicine II
 Technical University of Munich (TUM), Department of Mechanical Engineering, Chair of Microtechnology and Medical Device Technology (MIMED)
 Technical University of Munich (TUM), Department of Mechanical Engineering, Chair of Automation and Information Systems (AIS)
 Bayerische Motoren Werke Aktiengesellschaft
 Reactive Robotics GmbH

Innoroute GmbH
 Siemens AG
 Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.
 Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
 University Hospital rechts der Isar, Clinic and Polyclinic for Surgery, Department Visceral Interventions
 Collaborate Project Management UG
 ExB Labs GmbH
 Kumovis GmbH
 Smart Mobile Labs AG (SML)
 Bavaria Medizin Technologie GmbH
 Infineon Technologies AG (INF)
 healthcare Consulting GmbH
 TRIGA-S Scientific Solutions

#SELECTED ACTIVITIES

HIGHLIGHTS

JANUARY 23TH - 25TH, 2025 - GHEENT, BELGIUM

EAES SYMPOSIUM 2025: INNOVATIONS IN SURGERY

In January 2025, the third Symposium on Innovations in Surgery took place in Ghent, Belgium, organized by the EAES Technology Committee under the leadership of Filip Muysoms. Over three days, participants took part in hands-on courses on abdominal, colorectal and upper gastrointestinal surgery. For the first time, a Robotics Encounters course was also offered, in which state-of-the-art robotic surgical systems such as Da Vinci Xi, Hugo RAS and Hinotori could be tested.

The symposium featured exciting presentations on the latest developments in robotic surgery, including a lively debate on the importance of hardware versus software. Live broadcasts of robot-assisted operations and insights into flexible endoscopic surgery rounded off the program.

Andreas Melzer from ICCAS was among the experts on site. The event not only offered specialist knowledge at the highest level, but also a platform for intensive exchange and networking. We are looking forward to the next meeting in Belgrade!

JANUARY 29TH - 30TH, 2025 - LEIPZIG

PLASTICS MEETS MEDICAL TECHNOLOGY: SOFT ROBOTICS - FROM ANIMAL TO HUMAN

The plastics and medical technology industry met at the Kunststoff-Zentrum (KUZ) on January 29th and 30th, 2025 to discuss the latest developments and innovations. This year's focus was on the fascinating world of soft robotics. Albrecht Bloße and Manuel Rosenau provided exciting insights into this pioneering field with their presentation „Soft robotics - from animal to human“.

Soft robotics and continuum robotics open up completely new possibilities for reproducing natural processes in great detail. In contrast to rigid mechanics, this technology relies on flexible, adaptable structures. Inspired by nature, in particular by the movement and adaptability of animals, soft robotic systems enable innovative approaches both in everyday industrial applications and in medicine.

The lecture highlighted biological models and

showed the technical principles behind soft materials and actuators. The possible applications are diverse - from flexible gripper arms and adaptable prostheses to high-precision humanoid heart models for medical research. These developments open up new horizons for robotics and medical technology and show how science and practice are increasingly benefiting from each other.

The KUZ event is an important platform for experts, researchers and companies to discuss current trends and initiate future collaborations. Albrecht Bloße and Manuel Rosenau were looking forward to sharing their knowledge with the participants and discussing the future of soft robotics together.

FEBRUARY 24TH, 2025 - BARCELONA, SPAIN

ICCAS @ CELTIC-NEXT PROPOSERS' BROKERAGE DAY 2025

The Innovation Center Computer Assisted Surgery (ICCAS) participated in the CELTIC-NEXT Proposers' Brokerage Day at the Universitat Autònoma de Barcelona on February 24th, 2025. Our employees Tobias Pabst and Alexander Prull were on site to present ICCAS and introduce the latest project ideas.

CELTIC-NEXT is a EUREKA cluster dedicated to the development of pioneering communication technologies to promote a secure, trustworthy and sustainable digital society. By initiating and coordinating international collaborative projects in the field of information and communication technology (ICT), CELTIC-NEXT brings together leading industry players, small and medium-sized enterprises, service providers and research institutions. The aim is to develop innovative ICT solutions and promote their introduction.

With its industry-driven, bottom-up approach, CELTIC-NEXT enables project initiators to explore research topics in the ICT sector with virtually no



© Tobias Pabst | ICCAS

restrictions. This creates space for both evolutionary and disruptive innovations that contribute to the further development of the digital society.

The Proposers' Brokerage Day provided an ideal platform for exchanging ideas with potential partners and developing new collaborations. ICCAS was looking forward to the dialog with international experts to discuss forward-looking ideas, initiate joint projects and forge new partnerships. We are convinced that our innovative approaches and research work can make a valuable contribution to the further development of medical technology and digital health solutions

MARCH 26TH, 2025 - LEIPZIG ESA MEETING @ ICCAS

The Advanced Concept Team Hibernation of the European Space Agency (ESA) met at the Innovation Center Computer Assisted Surgery (IC-CAS) to discuss new approaches at the interface of medicine and space together with scientists from the FUTOR, MORFEUS and 3MP-FUS consortia. The aim of the meeting was to exchange ideas on innovative technologies and their mutual transfer in order to exploit synergies between the disciplines and further expand strategic partnerships.

A central focus was on research into synthetic torpor (sTor) - a key technology for long-term missions in space. ESA's ACT Hibernation team is investigating how sTor can be specifically induced to slow down metabolic processes, minimize muscle and bone atrophy and increase astronauts' resistance to radiation. At the same time, these findings offer promising approaches for medical applications on Earth.

With its research into non-invasive deep brain stimulation, the 3MP-FUS project contributes to a better understanding of the mechanisms of the torpors in the brain and their targeted activation. The FUTOR and MORFEUS consortia are concentrating on the induction of sTor using focused ultrasound in order to open up new therapeutic possibilities in medicine.

A highlight of the meeting was the presentation of new technologies in a live demonstration, including the 5G Ambulance, networked medical devices and FUS neuromodulation. Finally, the participants discussed the further development of

a white paper on the induction of synthetic torpor together with ESA.

APRIL 08TH-10TH, 2025 – BERLIN

ICCAS AT THE DMEA 2025 – INNOVATION YOU CAN TOUCH

What will emergency medicine look like in the future? At DMEA 2025 - Europe's leading trade fair for digital healthcare - visitors were able to experience this first-hand: From April 8th to 10th, we had a diverse trade fair presence in Berlin - at two stands and with a fully equipped, digitally networked ambulance in the outdoor area.



At the joint VDE stand, we presented the 6G Health research project together with partners such as Vodafone, DFKI and inomed Medizintechnik. The focus: wireless sensor technology in the OR. One highlight was the wireless EMG demonstrator, which opened up new possibilities for more flexibility and safety in intraoperative neuromonitoring (IONM).

At the same time, we presented smart solutions for the intensive care unit at the OR.NET e.V. stand. Together with tetronik GmbH and Infrafon, we showed how alarm messages can be forwarded in a context-sensitive manner - a promising strategy to reduce the problem of alarm fatigue.

In the outdoor area, the focus was on the "ambulance of the future". Together with XITASO, we demonstrated live how digital administration shells (IDTA) can be integrated with the IEEE 11073 SDC standard in a realistic emergency scenario. Visitors were able to directly experience how medical devices will communicate across manufacturers in the future - seamlessly, securely and standardized.

The DMEA was not only a stage for us, but also a meeting place. Numerous discussions with interested parties, partners and practitioners resulted in new ideas and contacts - and the clear impres-

#SELECTED ACTIVITIES

sion: connected medical technology is no longer a dream of the future, but a reality in development.

APRIL 28TH, 2025 - LEIPZIG

SHAPING THE FUTURE TOGETHER: INDUSTRY MEETS RESEARCH AT ICCAS



How can science and industry work together to shape the future of medicine? This question was the focus of a special network meeting at ICCAS on April 28th, 2025. Around 50 guests from industry, research and politics accepted the invitation from ICCAS and the Industrieverein Sachsen 1828 e.V. - to an afternoon full of exchange, insights and new ideas.

Our researchers presented the latest developments in medical technology at six interactive stations. These included digital surgical assistance, modern imaging, a networked patient room and robotic systems that could make clinical processes safer and more efficient in the future. It became clear that these technologies are not only exciting for everyday clinical practice - they also offer concrete points of contact for SMEs.



For many guests, it was an encounter with the future - practical, tangible, networked. In her welcome speech, Inés Obergefell, Rector of Leipzig University, emphasized how important it is to actively shape the digital transformation in the

healthcare sector: "At ICCAS, we see how research directly turns into innovation."

Ingo Bechmann, Dean of the Faculty of Medicine, also emphasized the importance of the center for training the next generation of doctors: "Our students are already learning how to use technology to heal in a meaningful way."

Thomas Neumuth - Technical Director - made it clear what is important: "Our goal is to develop technologies that really help in everyday clinical practice - applicable, safe and in the interests of patients."

Such events show: When science, business and society enter into dialog, innovation is created with impact. We are delighted by the great interest - and look forward to further formats that build bridges between ideas, people and applications.

MAY 13TH, 2025 - LEIPZIG

20 YEARS OF ICCAS

On May 13th, 2025, ICCAS celebrated its 20th birthday - together with colleagues, alumni, partners and supporters. Two decades of research, innovation and technology for better medicine - we didn't just want to celebrate this, we wanted to experience it together.



The focus of the day was not only on looking back at what we have achieved, but above all on looking forward. Our Scientific Advisory Board also met as part of the anniversary celebrations - in an open, constructive exchange about current projects, future strategies and technological perspectives. The committee's feedback is a valuable guide for us for the coming years.

Between the program items, our guests took the opportunity to experience ICCAS up close: During guided tours of laboratories and presentations at several stations, it became clear how much innovative power and practical relevance there is in our projects - from digital operating scenarios and AI-

supported diagnostics to smart medical technology in everyday clinical practice.



The evening ended on a festive note - with greetings, reviews, shared memories and many conversations. We were particularly pleased with the words of our guests from the university, city, clinic and business - including Vice-Rector for Excellence Development - Jens-Karl Eilers, Dean of the Faculty of Medicine - Ingo Bechmann and many other long-time companions.

For us, this day was more than just an anniversary. It was an expression of solidarity, curiosity and the conviction that good research can only succeed if we work together.

Thank you to all those who have helped shape the ICCAS journey so far - and to all those who will continue with us!

JULY 01ST-03RD, 2025 – BERLIN

6G FOR HEALTH – PROJECT 6G-HEALTH PRESENTED LIVE



How will 6G change the medicine of tomorrow? This is precisely the question we are addressing in the 6G-Health project. At the 6G Conference on July 1st - 3rd in Berlin, our employees Clemens Möllenhoff, Tobias Pabst, Alexander Prull and Anna Schatz, together with partners from research, industry, and clinics, presented concrete

prototypes for the first time.

At the project stand, visitors were able to experience how medical devices will communicate in real time via 6G in the future, how health data will be processed securely, and how patient-centered applications will be intelligently controlled. From highly reliable communication in the operating room to AR/VR solutions for diagnostics and training to mobile tools for emergency care, 6G opens up completely new possibilities for smart, connected healthcare.

A highlight was the visit by Rolf-Dieter Jungk, State Secretary at the Federal Ministry of Research, Technology, and Space, who learned about the potential for the healthcare system.

The 6G Conference impressively demonstrated how much the next generation of mobile communications can advance healthcare. Together with strong partners, we are working to transfer innovations from research into healthcare, thereby creating real added value for patients and medical professionals.

SEPTEMBER 09TH-11TH, 2025 - BASEL/MUTTENZ, SWITZERLAND

ICCAS AT BMT25: FOCUS ON TELEMEDICINE

The BMT25, the joint annual conference of the biomedical societies of Germany, Austria, and Switzerland, took place from September 9th to 11th, 2025, on the campus of the University of Applied Sciences Northwestern Switzerland in Basel/Muttenz. The traditional tri-national conference covers the entire spectrum of biomedical engineering and attracted around 500 participants this year.

The ICCAS was represented by Manuel Rosenau on September 9th. As part of the TeleNoma project, he presented a poster and a lightning talk on the topic "Architecture for telemedicine applications using nomadic 5G radio networks." This was based on a previously submitted abstract that summarized the results of the project work.

In addition to his own presentation, the conference offered an exciting scientific program. Particularly noteworthy were the keynotes by Andreas Hein (University of Oldenburg) on human-robot interaction in nursing care and by Henning Müller

#SELECTED ACTIVITIES

(HES-SO Valais-Wallis) on multimodal medical machine learning. In addition, sessions on topics such as magnetic methods in medicine and biomaterials and implants provided valuable insights into current developments in biomedical engineering. During the poster session, Manuel Rosenau held numerous technical discussions, including with Mike Fornefett (Furtwangen University), Henning Müller, and Anna Moritz-Fritschen (TU Darmstadt) on the topics of telemedicine and prosthetics. He also exchanged ideas with Katharina J. Appelt (De Gruyter) on open access and new publication approaches. The BMT25 impressively demonstrated the diversity of biomedical engineering and the role that innovative digital approaches—such as those in the TeleNoma project—will play in future healthcare.

SEPTEMBER 17TH-20TH, 2025 - TORONTO, CANADA

ICCAS PRESENTS AI METHODS AND NEW PROGNOSTIC MARKERS AT THE IMS MEETING

From September 17th to 20th, 2025, the 22nd Annual Meeting of the International Myeloma Society (IMS) took place in Toronto, Canada—the world's largest annual conference for experts in multiple myeloma. The IMS brings together clinical and experimental scientists to promote research, education, and clinical trials and to advance innovation in diagnosis and therapy.



Maximilian Ferle presented the latest research. Among other things, a new machine learning method for risk assessment was presented, which automatically divides patients into different prognostic groups based on their survival differences. In tests with multiple myeloma and lung cancer patients, the method was able to identify clinically relevant risk factors, revealing previously hidden prognostic patterns. This model-independent method opens up new possibilities for more accurate predictions and personalized therapies. (Preprint:

<https://doi.org/10.48550/arXiv.2506.12944>).

In addition, another study examined whether spleen size could be used as a new prognostic marker in patients with relapsed or refractory multiple myeloma undergoing BCMA-CAR-T cell therapy. Its correlation with side effects such as thrombocytopenia, a decrease in the number of blood platelets, tumor burden, survival rates, and established prognostic scores was analyzed. Initial results suggest that spleen size could be an additional predictive factor. (Publication: <https://doi.org/10.1016/j.jtct.2025.07.003>).

Participation in the IMS meeting highlighted the contribution our research makes to the international myeloma community. Together with clinical partners, we are working to use digital technologies to improve patient care in the long term – in line with the IMS mission.

OCTOBER 08TH, 2025 – ICCAS, LEIPZIG

IRISH AMBASSADOR VISITS ICCAS



On October 9, 2025, the Irish Ambassador to Germany, Her Excellency Maeve Collins, visited the Innovation Center Computer Assisted Surgery (ICCAS) at Leipzig University. The focus of her visit was on the ICCAS's current research and development at the interface of medical informatics, engineering, and medicine. In discussions with Thomas Neumuth and scientists from the center, the ambassador gained insights into key research topics such as intraoperative assistance systems, the networking of medical devices, data-based decision support, and the concept of the patient room of the future. She was particularly interested in how ICCAS's research results are being translated into practical technological solutions in colla-

boration with clinical partners and industrial companies.

Another item on the agenda was the signing of a memorandum of understanding (MoU) between ICCAS and the Irish company RedZinc, represented by CEO Donal Morris. RedZinc specializes in AI-supported technologies in the field of “hospital-at-home” solutions. The aim of the agreement is to initiate a joint research initiative on digital technologies that support everyday clinical practice and patient-centered care.



The ambassador was accompanied by Thomas Horn, Managing Director of Wirtschaftsförderung Sachsen GmbH, as well as representatives from the Saxon State Ministry for Economic Affairs, Labor, Energy, and Climate Protection, Invest Region Leipzig, leap:up GmbH, and the Office for Economic Affairs, Labor, and Digitalization of the City of Leipzig. Their participation underscored the importance of international cooperation for Saxony as a center of technology and innovation.

OCTOBER 08TH, 2025 – ICCAS, LEIPZIG

SUCCESSFUL PROJECT COMPLETION: 3MP FUS SYSTEM PAVES THE WAY FOR NEW THERAPIES

On October 16, 2025, the final meeting of the 3MP-FUS project, funded by the German Federal Ministry of Education, Research, Technology, and Space, took place at the Innovation Center Computer Assisted Surgery (ICCAS). The interdisciplinary joint project, in which partners such as MRI-StaR GmbH, Localite GmbH, the Fraunhofer Institute for Biomedical Engineering (IBMT), the Max Planck Institute for Human Cognitive and Brain Sciences (MPI CBS), and ICCAS as consortium leader, aimed to further develop non-invasive methods for neuromodulation of mental and neurological disorders.

Until now, neuromodulation has been limited primarily to areas of the brain close to the surface. Deeper regions of the brain could only be stimulated using invasive methods. The innovative approach of the project was to use focused ultrasound (FUS) – a technology that not only offers high depth penetration but can also be precisely focused. The 3MP-FUS project aimed to develop a multimodal, platform-independent FUS system that enables targeted modulation of deeper brain areas without surgical intervention.



During the final meeting, the 3MP FUS system, which is fully integrated into an MRI environment, was successfully demonstrated. The demonstrator was presented on the 1.5 Tesla Siemens Healthineers MAGNETOM Sola, and the planned study design for human application on the 3.0 Tesla MAGNETOM Cima.X at MPI CBS was presented. With the successful technical development of this system, the next phase is now imminent: application in humans, particularly for neuromodulation in dystonia and rare forms of Parkinson’s disease. The successful completion of the project represents an important milestone on the path to innovative and less invasive treatment options.

OCTOBER 28TH-29TH, 2025

6G SUMMIT 2025, NUREMBURG

On October 28 and 29, 2025, experts from research, industry, politics, and start-ups gathered at the Thinknet 6G Summit 2025 in myEvent World Nuremberg. The summit, organized by Bayern Innovativ in collaboration with the Thinknet 6G network, highlighted the future of mobile communications technology and upcoming developments in the field of 6G.

We were there with our smart ambulance from the

6G Health project. The vehicle demonstrated how modern network technologies can improve emergency care: with the help of integrated cameras and sensors, real-time images and medical data are transmitted directly from the ambulance to doctors in the hospital. This allows patient data to be analyzed before arrival, treatment measures to be prepared, and medical staff to be informed at an early stage.

Another highlight was the presentation by our colleague Clemens Möllenhoff on the topic of “To Be Connected or Not to Be Connected: Visions, Potentials, and Challenges of 6G-Enabled Healthcare.” In it, he addressed the challenges facing the healthcare sector, which is confronted with increasing patient numbers, staff shortages, and cost pressures worldwide. He showed how 6G can offer a promising solution by connecting hospitals, outpatient care, and patients at home, as well as by integrating new sensors and optimizing data analysis. As part of the 6G Health project, leading hospitals, manufacturers, and research institutions are working together to explore the 6G-enabled medicine of the future and develop solutions to the challenges ahead.

Researchers at ICCAS (Innovation Center Computer Assisted Surgery) also showed great interest in the possibilities of 6G, especially in the field of telemedicine. 6G not only offers higher data rates, but also extremely low latencies, enabling new applications in connected healthcare.

In addition to the healthcare sector, the exhibition also provided insights into many other applications of 6G that could take digital communication and networking to a new level. The summit made it clear that 6G is much more than just the next mobile communications standard—it is a decisive step toward a connected, digital society. The development of 6G could drive numerous innovations in areas such as smart cities, Industry 4.0, and artificial intelligence.

CONGRESSES AND FAIRS

MARCH 19TH - 20TH, 2025 - WÜRZBURG

ICCAS @ 54TH DGE-BV CONGRESS IN WÜRZBURG: INNOVATION AND INTERDISCIPLINARY EXCHANGE

The 54th Congress of the German Society for Endoscopy and Imaging (DGE-BV) took place in Würzburg from 19th to 20th March 2025 - an important forum for new developments in interventional endoscopy, the use of artificial intelligence (AI) and current health policy challenges such as ambulantization and the Nursing Competence Act. Andreas Melzer opened the congress with a few words of welcome and chaired the CTAC/DGBMT joint session, which focused on the latest technologies in minimally invasive surgery and computer-assisted procedures. The perspectives of the CTAC (Section for Minimally Invasive Surgery) and the technological trends of the DGBMT (Society for Biomedical Technology) were discussed here.

Annekatriin Pfahl presented the current status of hyperspectral and multispectral imaging in endoscopy, which improves the precise analysis of tissue during interventions. Tobias Pabst highlighted the potential of 5G and 6G for the networking of medical devices and their influence on future medical care.

The congress also focused on topics such as the ambulantization of endoscopy as an opportunity for further development, the legal pitfalls in everyday clinical practice and new perspectives in the Nursing Competence Act.

We are delighted about the intensive interdisciplinary exchange and the inspiring impulses that will have a decisive impact on the future of endoscopy and medical technology!

APRIL 23RD–26TH, 2025

IEEE ROBOsoft 2025, LAUSANNE

ICCAS and HTWK Leipzig presented the SoKoRo-Med project for the development of soft robotic end effectors for medicine. Albrecht Bloße presented, among other things, the SoRo Pneu-Gripper and poster contributions.



MAY 06TH–07TH, 2025
dHEALTH 2025, VIENNA

Adrian Lindenmeyer presented an AI-based prediction model for delirium risk assessment - a joint project with Graz University of Technology and KAGes. Focus: Uncertainty assessment for clinical decision support.

MAY 06TH–08TH, 2025
MEDCONF 2025, MUNICH

Together with XITASO, Stefan Franke presented the SDC standard - for cross-manufacturer networking of medical devices. The aim: interoperable, secure system landscapes in the OR.

MAY 14TH–15TH, 2025
IEEE 6G SUMMIT, DRESDEN



ICCAS presented the 6G Health project together with Vodafone. Among other things, a networked ambulance with 6G technology and use cases for the emergency sector were shown. Prof. Neumuth discussed in the expert panel '6G for Healthcare'.

JUNE 04TH–05TH, 2025
TI-SUMMIT 2025, LEIPZIG

ICCAS presented the EU project CERTAINTY for the development of digital twins for personalized cancer therapy. The focus: data-based decision support for CAR-T cell therapies.



JUNE 17TH–20TH, 2025
EAES-CONGRESS, BELGRAD

Andreas Melzer was co-lecturer at the hands-on course "Ultrasound for Surgeons". Focus: practical ultrasound applications for minimally invasive surgery.

JULY 14TH–17TH, 2025
IEEE EBMC 2025, COPENHAGEN

ICCAS will participate in the 47th IEEE EMBC Conference from July 14th-17th, 2025, in Copenhagen. Clemens Möllenhoff will present the poster "Towards 6G-Connected Healthcare: Perspectives, Risks and Real-World Applications for Smart Hospitals", showcasing results from the BMBF-funded 6G-Health project, coordinated by ICCAS. The study explores how future 6G technologies can enhance connectivity, safety, and data exchange in intelligent hospital environments.

SEPTEMBER 17TH–20TH, 2025
DGU-CONGRESS, HAMBURG

Andreas Melzer attended the 2025 DGU Congress and held a session on the topic of "Where is medical robotics headed?" In his presentation, he explored the question of whether true robotic surgery is possible—or whether robots will remain

#SELECTED ACTIVITIES

limited to assisting roles in the long term.

NOVEMBER 17TH-20TH, 2025

MEDICA 2025, DÜSSELDORF

Thomas Neumuth presented his lecture on “Integration of 5G and 6G technologies in medicine” at MEDICA, which took place in Düsseldorf from November 17 to 20, 2025. He discussed the role of 5G and 6G in mobile diagnostics, telemonitoring, and networked operating room scenarios, and showed how these technologies are revolutionizing healthcare. He also addressed the challenges relating to security, interoperability, and regulatory requirements.

PROJECT WORKS

FEBRUARY 6TH, 2025 - LEIPZIG

PROJECT LAUNCH AND KICKOFF-MEETING: REA-FBS

On January 1st, 2025, a new research and development project was launched with the aim of significantly improving the chances of survival after sudden cardiac arrest. The focus is on the development of a portable, non-invasive ultrasound device that measures the blood flow in the common carotid artery in real time during resuscitation. Immediate feedback is intended to optimize the quality of cardiac massage and thus improve the oxygen supply to the brain. In addition, the innovative system will be used to conduct a study to investigate the correlation between the blood flow values determined and the neurological prognosis. The innovative approach is based on a new Doppler ultrasound method that enables precise vessel localization without complex parameterization. The device should be easy and safe to use by medical professionals and lay helpers and could therefore be used in both clinical and pre-clinical emergency situations. The project is being implemented in close cooperation between Leipzig University Medicine and the company GAMPT. The clinical studies will be conducted under the direction of Leipzig University Medicine, while the further development and production of the device will take place in Germany. The kick-off meeting to coordinate the next steps

will take place on February 6th, 2025. A brief introduction of the project partners will be followed by a presentation by the VDI and subsequent discussion. This will be followed by an overview of the Rea-FBS project before the company GAMPT mbH presents its specific tasks and technical approaches. The University Medical Center Leipzig (UML) will then present its role in the project and the planned study design. Finally, the final agreements will be made and a strategy for regular Jour-Fix meetings for further coordination will be defined.

FEBRUARY 11TH, 2025 - LEIPZIG

KliNet5G - FINAL MEETING

The final meeting of the KliNet5G research project took place at ICCAS on February 11th, 2025. Together with the project partners - IMD (Institute for Medical Diagnostics), MM (MotionMiners), TUC (Leipzig University of Technology), .steute, inova and Schölly - the key results of the project were presented. A particular highlight was the demonstration of the 5G tracking developed, which opened up new possibilities for digital networking in medicine. The partners showed how 5G technologies can be used in clinical environments to optimize processes and improve patient care. In addition to the presentation of the research results, the discussion focused on the future of 5G campus networks in German medicine. What challenges and potential does this technology bring with it? How can innovative solutions be sustainably integrated into everyday clinical practice? These and other questions were discussed with experts from science and industry. The KliNet5G project has thus made an important contribution to the digital transformation in the healthcare sector. The final meeting provided an opportunity to reflect on the insights gained and develop perspectives for the further use of 5G technologies.

APRIL 23TH, 2025 - LEIPZIG

PROJECT LAUNCH KIMed - NETWORK FOR AI IN MEDICINE IN SAXONY

The KIMed project was launched in Leipzig on April 23th, 2025. The aim is to establish a Saxony-wide network for artificial intelligence in medicine. The partners involved include Leipzig University, TU

Dresden, Mittweida University of Applied Sciences as well as clinics, IT companies and healthcare providers. The focus is on developing a secure digital research environment in which medical data can be used for AI applications in compliance with data protection regulations.

In addition, a public directory of partners, tools and data sources is being created. KIMed will receive €3.6 million in funding from the ERDF and the Free State of Saxony until 2027.

MAY 15TH, 2025 - LEIPZIG

PROJECT START DATA-DRIVEN DECISION SUPPORT FOR LONG-TERM TREATMENT OF STROKE (DaDriv-StAC)

The DaDriv-StAC project is the launch of a digital platform for the aftercare of stroke patients. The focus is on a virtual patient twin that links health data across sectors - from the hospital to rehab and GP practices.

AI-supported evaluations are intended to enable personalized therapy decisions and improve care processes. The project is being implemented and scientifically evaluated by Leipzig University Medicine, together with Actimi GmbH.

JULY 28TH, 2025 - LEIPZIG

FINAL MEETING OF THE PROJECT MIRACLE-5

The MIRACLE-5 project addressed the question of how 5G campus networks can support the next generation of XR-based telemedicine. The focus was on both technical feasibility and practical relevance for users.

Key findings were presented at the final meeting: a live demo of the AR application in a realistic environment, evaluation of the first medical internships carried out in practice, results of the analysis of the requirements and performance of 5G campus networks, and an outlook on future fields of application. At the heart of the project is a technology demonstrator that enables the testing and further development of XR telemedicine applications based on state-of-the-art 5G infrastructure.

JUNE 01ST, 2025 - LEIPZIG

PROJECT START NEO-TAPI - NON-INVASIVE ELECTROMAGNETIC AND INFRARED BASED OBSERVATIONS FOR LATE-ONSET SEPSIS AND APNEA IN PRETERM INFANTS

The NEO-TAPI project aims to develop a contactless measurement method that records respiratory movements, heart rate, and skin temperature in premature and full-term infants in order to detect and classify premature infant apnea and late-onset sepsis at an early stage.

Technically, the system combines FMCW radar (micro-movements of the thorax) with infrared thermopile sensors (surface temperature measurement); algorithms use heart rate variability and central-peripheral temperature differences, among other things, as early markers. Compared to wired monitoring, this approach reduces skin trauma, infection risks, nursing care, and consumables—while also improving hygiene conditions and lowering running costs.

JULY 01ST, 2025 - LEIPZIG

PROJECT START AID4HER2 - DEEP LEARNING BASED DETERMINATION OF HER2 STATUS OF GASTRIC TUMORS AFTER H&E STAINING

The AID4HER2 project is investigating whether the HER2 status in gastric carcinomas can be determined directly from routinely stained tissue sections using modern deep learning methods. The HER2 status describes the overexpression of a growth factor receptor, which is crucial for the selection of targeted therapies. The aim is to optimize or replace the previously costly and time-consuming procedures. Based on a large data set, neural networks are trained, the results of which enable faster and cheaper diagnostics and personalized treatment. The models and results are made openly available to the research community.

NOVEMBER 05TH-06TH, 2025 - LEIPZIG

6G-HEALTH: NETWORKED HEALTH SYSTEMS FOR THE FUTURE

As part of the 6G Health Project funded by the Federal Ministry of Research, key technological components were integrated into realistic clinical test beds during the two-day plugathon in Leipzig.

#SELECTED ACTIVITIES

The aim of the project is to tap into the potential of 6G for medical care by developing concepts for the secure and efficient networking of medical systems, with a focus on networked medical technology, mobile biosignal acquisition, and collaborative working environments in everyday clinical practice.

MISCELLANEOUS

FEBRUARY 28TH, 2025 - LEIPZIG

ICCAS @ MEFALE 2025: DISCOVER MEDICAL TECHNOLOGY AND SHAPE THE FUTURE

On February 28th, 2025, the ICCAS - Innovation Center Computer Assisted Surgery at Leipzig University opened its doors to young researchers as part of MEin_Ferien_Abenteuer_LEipzig (MEFALE). Under the motto "Wissenschaft erlebbar und verständlich machen", the young researchers had the opportunity to discover the fascinating world of medical technology up close.

10 young researchers immersed themselves in various areas of research, including hyperspectral imaging (HSI). The young scientists were given an exclusive insight into the innovative technology that ensures more precise diagnoses and safer treatments in medicine. A brief insight into the application of the technology was provided in the demo operating station.

MEFALE is a great opportunity to introduce young talents to the exciting world of medical technology, robotics and ultrasound and to get them excited about the future of science. Not only is knowledge imparted, but also the vision of actively helping to shape the future of medicine.

It was an inspiring and educational experience that gave the young researchers many new perspectives and impressions. ICCAS is pleased to contribute to the promotion of STEM interests and the next generation of scientists with this event.

MARCH 6TH-7TH, 2025 - LEIPZIG

SUCCESSFUL SCIENTIFIC COLLOQUIUM 2025

On March 6th and 7th, 2025, the ICCAS scientific colloquium took place at BioCity Leipzig. The two-day event offered a platform for interdisciplinary exchange, scientific discussions and practical

workshops. Andreas Melzer and Thomas Neumuth opened the colloquium with valuable impulses for the research community.

Particular attention was paid to the presentations by our doctoral students, who presented their projects to a wide audience and received valuable feedback. In addition to scientific topics, the program also included practical content such as the preparation of project applications and dealing with grant applications.

The colloquium once again highlighted the importance of interdisciplinary dialog for scientific progress - not only in medical technology, but also within the ICCAS. Many thanks to all participants for two inspiring days!

JUNE 05TH, 2025 - LEIPZIG

LEIPZIG BECOMES A ONEHEALTH LOCATION WITH A HIGH-TECH FOCUS

Leipzig is setting an example for the medicine of the future: ICCAS and Leipzig University's Clinic for Cloven-hoofed Animals are launching a new collaboration under the name "One Health Leipzig" - at the interface of human medicine, veterinary medicine and environmental research. The aim is to use modern technology to better understand and specifically protect the health of humans, animals and the environment.

The centerpiece is a common data space in which information from all three areas is brought together securely and interoperably - in line with the objectives of the European Health Data Space. This allows zoonoses or antibiotic resistance, for example, to be detected at an early stage.

We contribute expertise in sensor technology, networking (5G/6G), AI and AR, while veterinary medicine adds field knowledge and livestock data. Together, we are developing practical applications - from mobile diagnostic systems to AI tools for early warning systems.

Leipzig is thus positioning itself as a pioneer for digital OneHealth initiatives in Europe.

SEPTEMBER 04TH, 2025 - LEIPZIG

ICCAS AT THE FUTURE SAX INNOVATION FORUM "LIFE SCIENCES & HEALTHCARE"

On September 4th, 2025, ICCAS was represented at the futureSAX Innovation Forum "Life Sciences

& Healthcare” in BioCity Leipzig. The event brought together over 300 stakeholders from business, science, and healthcare to discuss future technologies, market launch, and digital transformation. Saxony has been investing specifically in life sciences and healthcare for around 25 years – more than 1 billion € in funding has created a strong innovation ecosystem with over 300 companies, research institutions, and infrastructure such as BioSquare Leipzig.

Thomas Neumuth, Technical Director of ICCAS, gave the keynote speech at the forum and emphasized the opportunities offered by digital technologies for healthcare.

In addition, participants in the Synergy Workshop discussed topics such as personalized medicine, AI-supported care, and smart medical devices. The program was complemented by a panel discussion on “Innovation & Responsibility” and an innovation show with 34 exhibitors.

At the same time, the side event “Innovations for the Healthcare and Nursing Industry” showcased approaches such as the Lausitz Vital project and the latest findings from the Digital Technologies Forum.

AUGUST 22TH, 2025 - LEIPZIG

VISIT BY PROF. DR. GETU ABRAHAM TO ICCAS



On August 22th, 2025, we welcomed Getu Abraham to ICCAS. As a renowned scientist in the field of veterinary pharmacology and clinical pharmacology at the University of Leipzig, and as a city

council member, he showed great interest in our current areas of research.

During a demo tour, he was presented with our latest developments in the field of intelligent assistance systems. The tour included the demo operating room, the ambulance of the future, hyperspectral imaging (HSI), and the smart patient room. These technologies demonstrate how digital instruments in medicine can actively support not only diagnostics but also patient care.

Getu Abraham’s visit underscores the importance of exchange between research institutions and clinical and applied practice. Such encounters promote mutual understanding, provide impetus for new projects, and help make innovative visions a reality.

OCTOBER 21ST, 2025 - LEIPZIG

„CULTURE OF INNOVATION“ –BRIDGES BETWEEN INDUSTRY AND ACADEMIA

At the ICCAS at Leipzig University, the interface between industrial innovation culture and scientific research was examined. In a presentation by Dr. Bernhard Glaser (AWS), it was shown how rapid, experimental innovation processes in industry can be combined with scientific precision to achieve advances in medical care. The discussion emphasized that openness, interdisciplinary cooperation, and the courage to change are essential elements of a successful innovation culture.

Digitalisierte Medizin verbindet Sachsen und Polen: ICCAS beim Wirtschaftsforum in Wrocław

On October 21 and 22, 2025, the 16th Polish-Saxon Economic Forum on the topic of “Medicine of the Future” took place in Wrocław, where Thomas Neumuth represented ICCAS in a panel discussion and with a keynote speech on innovative technologies and AI in medicine. The forum brought together companies and research institutions from Saxony and Lower Silesia to discuss technological trends such as digital health and AI and to promote cooperation. At the same time, the KIMed network, in which ICCAS is involved, networked with international partners to promote safe AI applications in medicine.



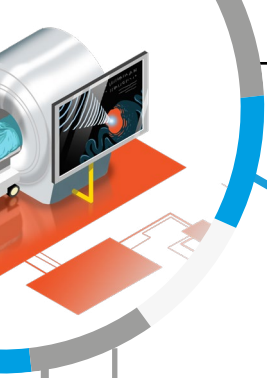


#THE FOCUS OF OUR INTERDISCIPLINARY RESEARCH

Our research focuses on the integration of biomedical device technology with medical information systems, data analysis technologies, medical communication protocols, digital twins, and biomedical sensors to advance the next generation of smart healthcare solutions. A central aspect of these innovations is the development of adaptive operating rooms that dynamically respond to surgeons' needs and medical technologies leveraging 5G infrastructures for advanced communication. The ultimate goal is to enhance clinical workflows, increasing both efficiency and patient safety through intelligent, interconnected systems.

A key area of our work is the advancement of MRI-guided procedures, enabling minimally and non-invasive approaches for diagnosis and treatment. MRI provides superior soft tissue contrast while eliminating the need for iodine-based contrast agents and ionizing radiation. Our research aims to develop MR-compatible instruments, optimize medical workflows with restricted patient access, and improve communication within the MRI environment. Additionally, we are exploring applications of focused ultrasound, minimally invasive catheter interventions, and robotic-assisted procedures to further enhance precision and patient outcomes.

Through the integration of cutting-edge medical technologies and data-driven approaches, we strive to refine clinical efficiency and elevate patient safety, setting new standards for modern healthcare.



LEAD

Prof. Dr. Andreas Melzer

ICCAS researches on new technologies for computer-assisted image-guided procedures. This theme is a logic development of the traditional ICCAS research on computer-assisted surgery towards less invasive image-guided surgery and interventions.



LEAD

Prof. Dr. Thomas Neumuth

Modern medicine is no longer conceivable without the use of technology: medicine, information management and biomedical technology converge to an ever greater extent. This development requires a combination of traditional medical devices.

► MR TECHNOLOGY

The project group deals with the development of MR-supported therapy procedures and the transfer of minimally invasive interventions to the MR environment. Minimally invasive procedures are used for patient-friendly diagnosis and therapy and are currently primarily performed using X-ray imaging. The advantages of the transfer to MRI are improved soft tissue contrast, the absence of iodine-containing contrast agents and the absence of ionizing radiation. In addition to the patients, this also benefits the hospital staff involved in the procedure.

The development of MRI-compatible instruments and devices is a central objective for the implementation of our projects. At the moment, our main focus is on developing therapy procedures using focused ultrasound (FUS) in MRI. With FUS, the sound waves can be bundled in a focus approximately the size of a pine nut. Due to the constructive interference, higher pressures and sound intensities can be achieved in the focal area, which can be used therapeutically without affecting the surrounding tissue. In combination with the excellent soft tissue contrast of MRI, this opens up the possibility of non-invasive use of FUS for therapeutic purposes. We are particularly interested in the use of FUS for neuromodulation and neurostimulation. By applying low-energy FUS, ion channels of neurons can be activated or inhibited in order to modulate the corresponding brain areas.

The aim of our research group is to use MR-guided low-energy FUS non-invasively to modulate deep brain areas in order to treat stroke, addiction and chronic obsessive-compulsive disorder, for example.

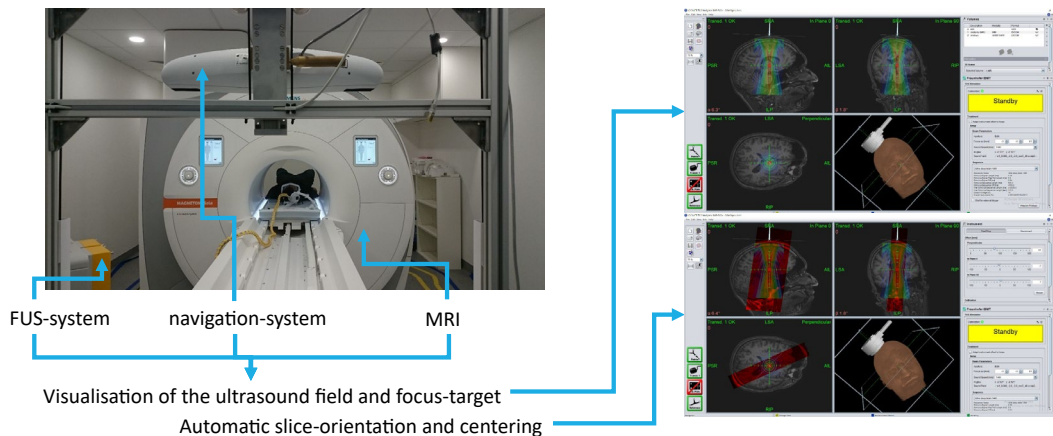
PROJECTS

- 3MP-FUS
- MRg-FUS
- Imaging Robotics

TEAM MEMBERS

- Andreas Eger
- Till Handel
- Leon Schülert

▶ 3MP-FUS: MULTIMODALITY MULTI PURPOSE MULTI PLATFORM FOCUSED ULTRASOUND – “NEUROMODULATION IN RARE NEUROPSYCHIATRIC DISORDERS WITH FOCUSED ULTRASOUND.”



Integration of 3MP-FUS System into MRI-neuro-navigation with automatic slice orientation

The objective of this project is to develop and demonstrate the feasibility of a multi-purpose, multi-parameter, multi-platform FUS System (3MP-FUS System) for transcranial neuromodulation.

Neurological diseases are often accompanied by focal changes in the brain. Therapy options mainly aim to normalize the altered brain function, e.g. by neurostimulation such as Transcranial Magnetic Stimulation (TMS). For treatment of deep brain regions such as the Globus Pallidus internus, Deep Brain Stimulation (DBS), a neurological intervention, is used. An alternative would be non-invasive stimulation techniques, such as TMS. However, these have a low spatial resolution without reaching the relevant deep structures of the brain. Focused Ultrasound combines good spatial focality and depth penetration and therefore is of great interest for non-invasive modulation of deep brain regions.

Throughout 2025 we improved the MRI feasibility of the ultrasound system with FhG IBMT. With our partner Localite we integrated the neuro-navigated FUS system into our 1.5 T MAGNETOM Sola. The fully integrated 3MP-FUS System enables automatic MRI slice orientation along the acoustic lobe and centered on the acoustic focus. The 3MP-FUS System can subsequently receive MRI-images and through voxel based registration of the image, visualize the acquired images as a fused image in the navigation software. We transferred the setup to the 3.0 T MAGNETOM Cima.X at our partner MPI CBS. There we are currently preparing the setup for a neuromodulation pilot on volunteers.

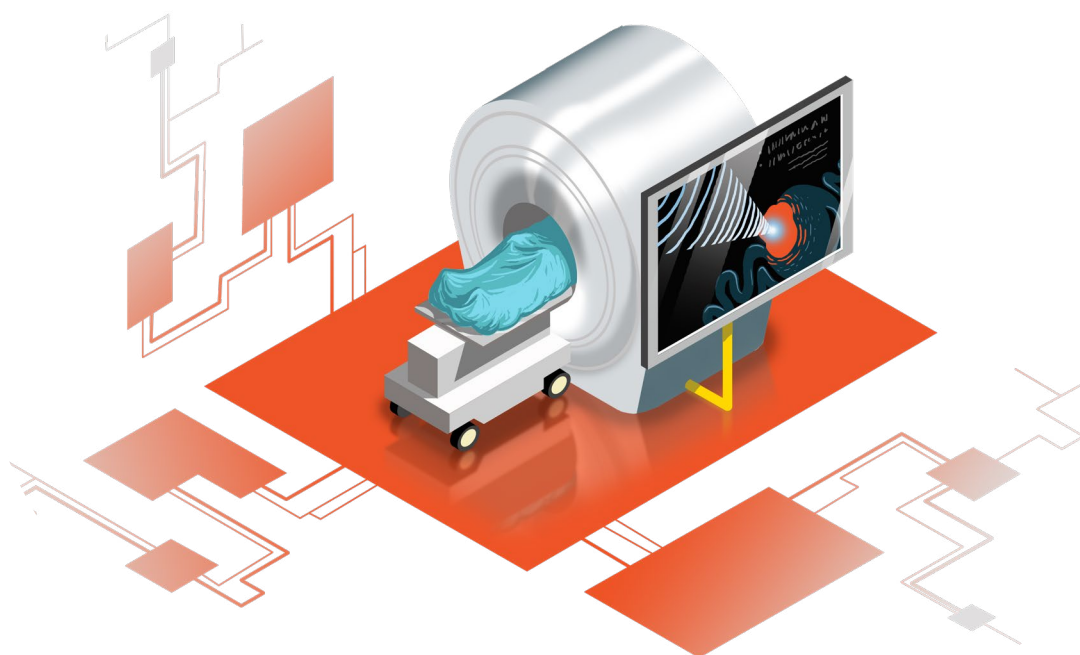


► **MRgFUS - NON-INVASIVE MAGNETIC-RESONANCE-GUIDED FOCUSED ULTRASOUND IN THE TREATMENT OF UTERINE FIBROIDS**

Non-invasive therapy of symptomatic uterine fibroids after unsuccessful drug treatment. The ablating ultrasound waves can be precisely focused on a circumscribed area. MR-Imaging is used for the positioning and controlling of the ablation in real time, as well as for the temperature mapping while the ablation. The gentle ablation allows the patient to go back to usual day activities almost right after the therapy. The complication rate is very low. Relevant complications like skin burn or organ damage are very rare. The complications of the more invasive alternatives as well as the incapacity to work can be avoided and the overall therapy costs reduced.

► **IMAGING ROBOTICS - DEVELOPMENT OF AN INTEGRATED ROBOTIC SYSTEM FOR THE APPLICATION IN FOCUSED ULTRASOUND INTERVENTIONS**

The robotics group at ICCAS aims for the integration of robotic systems into the clinical workflow of image-guided interventions. The main goal is the development of a robotic control software that provides enough modularity for medical robots to serve in multiple use-cases and, thereby, improve acceptance in the clinic. Utilizing the KUKA lbr iiwa 7 R800 and Med robotic arms and their collaborative concepts (direct user interaction during automated movement), shall further reduce the complexity of handling the robots during surgical workflows. Using the IEEE 11073 SDC standard for medical device connectivity, the ICCAS researchers implemented a first demonstrator with two robot arms. A feasibility study for ultrasound-guided biopsies was published in the Journal of “Frontiers in Robotics and AI” in 2022 and the system won the Best-Design-Award at the Hamlyn Symposium on Medical Robotics in London in 2023.



► INTERDISCIPLINARY ROBOTICS

Since September 2024, the “Interdisciplinary Robotics” project team has been working on the further development and optimization of medical robotic systems by integrating principles of soft and continuum robotics as well as networking and standardization. Soft robotics deals with the development of robots made of flexible, soft materials that are characterized by high adaptability and safety. These systems are based on biological models and offer particular advantages when handling sensitive tissues. Continuum robotics describes robot systems whose continuous structure does not require rigid joints. These technologies enable fluid movements and precise adaptations to complex geometries, making them ideal for medical applications.

The team’s aim is to make diagnostic and interventional robotic systems safer, more user-friendly and more efficient in order to facilitate their clinical application and promote the translation of innovative technologies into everyday medical practice. In addition, realistic, patient-specific structures are to be developed for use in the planning and execution of interventions as well as in training and simulation scenarios. These approaches help to expand the skills of clinical staff and improve the quality of patient care. The team’s work is based on research into alternative technologies from soft and continuum robotics in order to develop innovative approaches for medical applications. A central focus is on patient protection, which is ensured through the use of soft components and end effectors such as gripping or guidance systems. In addition, realistic organ models, such as an actuated heart simulator, are being developed that can be used for training complex interventions under clinically relevant conditions. One of the main challenges here is the optimization and adaptation of existing soft robotic systems to the specific requirements of clinical practice. The aim here is to overcome known limitations such as the generation of sufficient forces, biocompatibility and flexibility.

At the same time, the team is developing standardized descriptions of robotic systems and procedures for integrating these systems with other medical devices using modern network technologies and standards, in particular IEEE 11073 SDC. These standards create the basis for the smooth integration of different systems and increase interoperability in medical technology.



TEAM LEAD

Johann Berger
johann.berger@medizin.uni-leipzig.de

PROJECTS

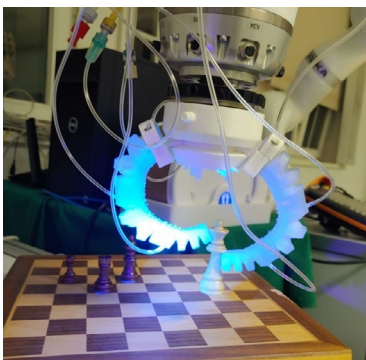
- SoKoRoMed

TEAM MEMBERS

- Albrecht Bloße
- Joel Focking
- Manuel Rosenau
- Julia Pretschner
- Andres Gonzalez
- Marharyta Podliian



► SoKoRoMed: SOFT AND CONTINUUM ROBOTICS FOR MEDICAL APPLICATIONS



Hydraulic soft gripper

The “Soft and Continuum Robotics for Medical Applications (SoKoRo-Med)” project aims to establish defined processes for the production of patient- and application-specific soft end effectors. In the project, soft end effectors are to be designed and used in combination with conventional medical and robotic technology in an overall clinical demonstrator for specific interventions. The definition of standards for the system and functional description of soft robots is intended to facilitate clinical translation. The planned project aims to develop strategies and procedures for the utilization and application of existing and new soft robotics technologies in the clinical environment.

A central reference use-case is the development of an actuated heart model as training system for transcatheter aortic valve implantation (TAVI), a minimally invasive procedure that demands a high degree of precision and adaptability. In collaboration with clinical partners, requirements (e.g. ultrasound compatibility and anatomical constraints) were defined and the first 3D-printed cardiac and vascular models were developed and tested. A specialized ultrasound test bench was set up to evaluate materials for their suitability for realistic medical imaging and sufficient actuation.



Prototype of 3D-printed Heart Model

The project is currently focused on developing new materials and test environments, investigating silicones, hydrogels, and special additives to replicate mechanical properties and ultrasound characteristics close to human tissue. Additional test benches are developed to simulate heart muscle and valve functions. Future work will focus on the definition of a standardized workflow for patient and application specific tool manufacturing.

► IMAGING TECHNOLOGIES

The team researches new imaging technologies and methods for non-invasive use in medicine. The focus is on optical procedures for perfusion imaging and tissue differentiation in the context of surgical interventions. In close cooperation with several clinics and industrial partners, all areas from evaluation in the laboratory to the analysis of study data and its utilization are currently being worked on.

The team has many years of experience in the field of spectral imaging in particular. This technology can support the intraoperative assessment of tissue perfusion, identification of tissue structures and tumor tissue. By recording and analyzing spectral measurement data with various multi- and hyperspectral imaging systems in the laboratory, preclinical and clinical environment, potential medical fields of application and current limits of the technology are to be evaluated. The resulting information will be used, for example, to support intraoperative decision-making and thus contribute to patient safety.

In order to support the transfer to clinical application, methods for the automatic classification and visualization of tissue based on optical image data are being researched and implemented. In addition to conventional machine learning methods, neural networks are also used. The team supports the planning, application and implementation of clinical studies in order to build up clinical evidence and evaluate the methods developed.

In addition to research, the supervision of student theses in the fields of medicine, computer science and engineering is an important part of the team's work.

TEAM LEAD

Hannes Köhler
hannes.koehler@medizin.uni-leipzig.de

PROJECTS

- Basic studies on the clinical relevance of multi- and hyperspectral imaging Industry-sponsored research by KARL STORZ SE & Co. KG

TEAM MEMBERS

- Annekatrin Pfahl
- Denis Gholami Bajestani
- Julia Pretschner
- Andres Gonzalez
- Nadja Baumann
- Angela Martinez Antonini



► BASIC STUDIES ON THE CLINICAL RELEVANCE OF MULTI-AND HYPERSPECTRAL IMAGING INDUSTRY-SPONSORED RESEARCH BY KARL STORZ SE & Co. KG

Multi- and hyperspectral imaging (MSI and HSI) can support the intraoperative assessment of tissue perfusion, the identification of tissue structures, and the detection of tumor tissue. The aim of this project is to acquire and analyze spectral data using different MSI and HSI systems in clinical and preclinical settings. Potential clinical fields of application and the limitations of the technology will be evaluated. In addition, methods for the automated classification and visualization of tissue based on spectral image data will be developed and implemented.



Fig.: Laparoscopes for multi- and hyperspectral imaging were evaluated in the laboratory, in an animal model, and in several human studies. The findings obtained are intended to support surgical procedures in the future.

In 2025, key milestones included the publication of the first clinical study on nerve identification using laparoscopic HSI and the launch of an animal study investigating video-rate perfusion imaging. In addition, a patent application was filed (DE102024114647A1), and a further patent was granted (DE102021121025A1).

► BIO SIGNAL PROCESSING

The project team focuses on the use of sensors and technologies to improve medical practice. They combine innovative approaches in diagnostics, treatment and training to increase quality and precision in modern medicine.

The projects are dedicated to non-invasive neurological mapping by developing state-of-the-art methods for the precise recording and visualization of neuronal activity through the measurement of muscle activity. The aim is to process complex data in such a way that it can be seamlessly integrated into clinical workflows and support decision-making.

Another project focuses on improving surgical training processes through data-based assistance systems. These systems analyze training progress, provide targeted feedback and thus promote individual skills development. With the help of sensor technology and artificial intelligence, the learning curve of trainees is optimized, which ultimately increases patient safety.

The third project creates realistic simulation environments that reproduce anatomical conditions with a high level of detail. By mimicking real biomechanical reactions in combination with the integration of sensor technology for condition monitoring, practical training is supplemented with immersive, realistic experiences that facilitate the transition from theory to practice.

Together, the projects demonstrate how technological innovations address fundamental challenges in medicine. They not only promote precise diagnostics and effective treatment, but also the practical teaching of essential skills to define future medical standards.

TEAM LEAD

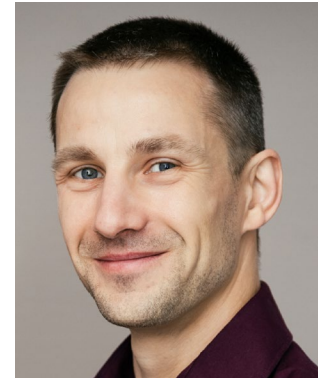
Michael Unger
michael.unger@medizin.uni-leipzig.de

PROJECTS

- CortexMap
- EyeHearU
- FazioTrain
- ReaFBS
- NeoTapi

TEAM MEMBERS

- Reinhard Fuchs
- Sven Martin
- Marie-Louise Herrmann
- Mohamed Awad
- Martin Hertel



► CORTEXMAP: DEVELOPMENT OF A NOVEL NAVIGATED TRANSCRANIAL MAGNETIC STIMULATION SYSTEM FOR EFFICIENT PLANNING AND EVALUATION OF NEUROSURGICAL PROCEDURES, AS WELL AS OPTIMAL INTEGRATION INTO THE SURGICAL WORKFLOW.

The aim of the CortexMap project is to develop a navigated transcranial magnetic stimulation system for non-invasive mapping of the motor cortex in patients with brain tumors. A new system for integration into the surgical workflow, including the necessary hardware components and new software functionalities, was developed. An electromyography device with multiple electrodes for measuring motor evoked potentials (MEPs) enables faster and more precise examination. Functionalities for automatic adjustment of stimulation intensity and for post-processing of MEPs were implemented. Visualization and data analysis functions support the surgeon in interpreting the data. This is intended to make the monitoring of patients before and after surgical treatment more efficient.

► EYEHEARU: MULTIMODAL ACQUISITION, SIMULATION AND AUDIOVISUAL ENHANCEMENT FOR THE INDIVIDUAL TRAINING OF BASIC FUNCTIONAL LAPAROSCOPIC SKILLS

Minimally-invasive endoscopic surgery is a well-established surgical practice. However, decoupled hand-eye-coordination, limited field-of-view, and operating space as well as decreased depth perception, are demanding for both surgeon and equipment. Surgeons are required to train their spatial awareness and instrumentation skill, but training quality and effects vary individually, depending on available resources and the predisposition of trainees. We have developed a training assistance system that captures and records multimodal data from laparoscopic exercises, which can be used to predict training progress. Since 2024, two studies have been conducted in which the training progress of untrained students was analyzed using this technology. Based on the results, evaluation algorithms and model-based assessments were evaluated to record training progress depending on the feedback used. The results of the evaluation are currently being published and will be used for further optimization.

▶ **FASZIOTRAIN: DEVELOPMENT OF A SENSOR-BASED MEDICAL TRAINING MODEL FOR FASCIOTOMIES.**

The aim of the FaszioTrain project is to develop a realistic training environment for fasciotomies of the lower leg. Different tissue types were produced using rapid prototyping and classical manufacturing methods and integrated into a model that reproduces the physical properties, colors, and textures of real anatomical structures. The model consists of several anatomical structures that realistically represent the anatomy of the lower leg, including the different compartments. To enable realistic simulation of fasciotomy, the model will reproduce swelling caused by blood congestion in the tissue as well as the resulting pressure on the nerve pathways. Users are intended to learn how to open the tissue correctly, work their way toward the decompression point, and achieve the best possible decompression.

▶ **REAFBS: FEEDBACK SYSTEM FOR REDUCING BRAIN DAMAGE DURING CARDIOPULMONARY RESUSCITATION**

The project focuses on researching and developing a device that enables quantitative measurement of arterial blood flow during resuscitation and can be used by the majority of the population outside of hospitals without additional training. The main component of the project is the use of a method from the field of non-invasive Doppler ultrasound frequency measurement. An automatic process for evaluating the measured Doppler frequencies is intended to calculate a suitable measurement regime without the need for parameterization, with which the window for Doppler measurement within a vessel is optimally selected and the recorded blood flows are quantified, converted into sound, and stored. Database analysis has been finished, and a mobile device featuring automated vessel location is in development.

▶ **NEOTAPI: DEVELOPMENT OF A NON-INVASIVE AND CONTACTLESS METHOD FOR MEASURING PHYSIOLOGICAL PARAMETERS FOR THE DETECTION AND CLASSIFICATION OF APNEA OF PREMATURITY AND NEONATAL SEPSIS.**

The aim of the NeoTapi project is to develop a method for detecting preterm infant apnea and neonatal sepsis for use in neonatal intensive care units. Using time-of-flight measurements of electromagnetic waves, thoracic micromovements in neonates are to be recorded and used to extract heart rate and respiratory movements. In parallel, contactless measurement of skin surface temperature will be performed to enable early detection of incipient sepsis. This methodology allows the acquisition of essential physiological parameters such as respiratory rate, heart rate, thoracic movements, and central and peripheral body temperatures. Minimizing the number of required contact electrodes reduces the burden on neonates and the risk of skin injuries. At the same time, hygiene is improved and the nursing workload is reduced.

► MEDICAL COMMUNICATION SYSTEMS

In our team, we address the challenges arising from increasingly interconnected medical technology and the associated demands on communication technologies. Our focus is twofold: identifying potential application areas and selecting the most suitable technologies for implementation. We always strive to start from the perspective of potential clinical applications and the resulting benefits for users, working collaboratively with our partners from industry and academia to develop powerful demonstrators.

Currently, we rely on technologies in the areas of mobile communication (5G / 6G), interoperability (FHIR, IEEE11073 SDC), augmented and virtual reality, model-based approaches for smart hospital applications, and various tracking technologies (BLE, UWB, 5G). In terms of applications, we address challenges arising from increasingly strained personnel situations. Together with our clinical partners from the ENT department, trauma surgery, and anesthesiology, we develop patient journeys to gain a better understanding of clinical needs and suitable applications.

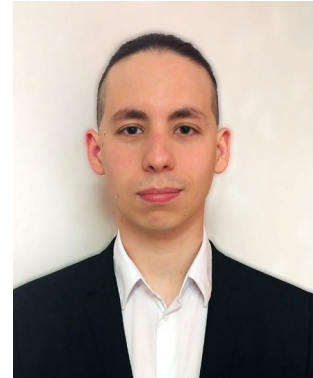
To bridge the gap between identified needs and technological solutions, we focus on integrating cutting-edge innovations into practical workflows that directly address the challenges faced by healthcare professionals.

Here, technologies enabling high-performance teleconsultations can improve treatment quality. To effectively utilize additional diagnostics outside of clinical settings, we are developing applications that leverage edge computing, such as for mobile ultrasound at the scene of emergencies with guidance features for the user. Wireless sensor technology is designed to better support patients in their postoperative recovery process both at the clinic and outside the clinic, enabling the early detection of healing complications. Through intelligent networking within the hospital, traditional spatial concepts can be reconsidered, and mobile medical technology can be utilized effectively.

To improve the integration of medical devices, we rely on open communication standards wherever possible, such as the IEEE 11073 SDC standards family or HL7 FHIR, and actively contribute to the further development of the SDC standard.

TEAM LEAD

Tobias Pabst
tobias.pabst@medizin.uni-leipzig.de



PROJECTS

- Miracle-5
- 6G-Health
- KliNet5G
- QoE
- SUSTAINETguardian

TEAM MEMBERS

- Alexander Prull
- Anna Schatz
- Christoph Georgi
- Clemens Möllenhoff
- Gregor Thürk
- Ivana Stjepic
- Ken Paulitz
- Ahmed Eid
- Jonas Heine
- Misha Justen

► MIRACLE5: MIXED-REALITY INTEGRATED REMOTE ASSISTANCE AND COMMUNICATION IN 5G-ENABLED LOCAL ENVIRONMENTS.

MIRACLE-5 investigates how XR-based telemedicine can be integrated into clinical workflows in a technically robust and medically meaningful way via 5G campus networks. The focus is on scenarios in which remote medical specialists are involved in consultations, training, or medical queries: geriatric assessments following fractures near the hip joint, ENT teleconsultations, ENT teaching, and remote medical advice. The project considers not only AR functionalities, but also process integration, data provision, image and audio quality, and network parameters such as latency, jitter, bandwidth, and connection stability.

In 2025, practical mobile network integration was added as a key focus. SML (Smart Mobile Labs) was selected as the provider of the second 5G system. With the SML system, ICCAS was able to take greater control of the integration process itself and use an open 5G core. In terms of content, the focus shifted from an externally operated managed-service network to a more flexible and controllable test setup with dedicated campus networks. In 2025, the open 5G core was installed, and test networks were established and made operational. Building on this, adaptations were made to XR glasses, 5G modems, QoS and slicing parameters, and measurement setups. The medical application scenarios were developed and evaluated in collaboration, among others, with Dr. Markus Pirlich from the Department of Otorhinolaryngology at Leipzig University Hospital. In addition, the use cases were refined based on clinical feedback and compared with Wi-Fi in order to realistically assess the suitability of 5G for real-time telemedical applications.

6G-HEALTH: HOLISTIC DEVELOPMENT OF HIGH-PERFORMANCE 6G NETWORKING FOR DISTRIBUTED MEDICAL TECHNOLOGY SYSTEMS



Great interest at the 6G Conference in Berlin, where ICCAS and its project partners presented an immersive “patient room of the future.” Demonstrations also included intelligent telemonitoring of surgery, localization technologies, and the integration of body-worn sensors.



The ICCAS research ambulance invites visitors at the Vodafone booth in Dresden to talk shop with ICCAS staff about the applications of 6G in medicine.

The 6G-Health project brings together the domains of communications engineering and medical engineering, along with medical and technical end users, to enable tailored technology development in the field of sixth-generation mobile communications (6G). The project not only develops specific 6G technology components, but also identifies market-entry barriers at an early stage and develops possible countermeasures. These primarily include aspects of approval, operation, and standardization. Within the project, UML sees its role as a mediator between the domains of medicine, communications engineering, and medical engineering. In line with a holistic understanding of the project, UML will address not only the technical applications, but also the requirements for future technologies arising from standardization and operation. At the technical level, the focus is on collaborative work and the field of “Smart Hospital”. In the 2025 reporting year, substantial results were achieved in three key areas:

Teleneuromonitoring: The technical infrastructure for the remote monitoring of neurosurgical procedures has largely been established. Medical devices can now be integrated into the transmission chain in compliance with standards via SDC and FHIR, and data can be transmitted with prioritization. Based on clinical interviews with surgeons and IONM specialists, a medically evaluated dashboard concept was developed that enables remote experts to monitor several operating rooms simultaneously, including a complete neuromonitoring, anesthesia, and transcription view. Implementation as an operational demonstrator is planned for 2026.

Smart Hospital and indoor localization: Three different real-time localization technologies — UWB from NXP, BLE AoA from the University of Rostock, and BLE RSSI multilateration — were harmonized for the first time via a shared MQTT middleware and successfully put into operation in the ICCAS testbed. The results were documented in a comparative paper. This provides the basis for the automated tracking of patients, staff, and devices in clinical environments.

Visibility and transfer: The consortium presented itself at the 6G Conference Berlin with one of the largest joint exhibition booths at the event. For the first time, the specific medical added value of 6G was demonstrated to the public using a complete patient journey, with the participation of almost all project partners. In addition, UML was represented at DMEA, the 6G Summit Dresden, and the ThinkNet 6G Summit in Nuremberg.

► **KliNet5G: CLINICAL NETWORKS VIA 5G**

KliNet5G investigates the feasibility of a secure, standards-based 5G campus network infrastructure for clinical environments. The aim is to assess whether 5G Open RAN can complement or replace existing heterogeneous communication solutions in hospitals. To this end, clinically oriented test and demonstration environments are being established in which medical technology, biosensors, and hospital logistics are considered jointly. The scenarios address high bandwidth, low latency, reliable communication, localization, and mobile devices. In addition, operation, IT security, regulatory approval, and economic viability are analyzed. The results will feed into demonstrators as well as guidelines for hospitals and manufacturers.

In 2025, the focus was on integration, evaluation, and transfer. The network components were installed and tested at ICCAS and used for measurement campaigns. This allowed the experimental environment to be specified as a basis for evaluation. SDC alarms were integrated into the management and orchestration environment, further deepening the connection between 5G infrastructure, medical device communication, and operational monitoring. The overall system was assessed with regard to reliability, secure data transmission, and usability. Further work addressed indoor tracking, the 5G testbed, packet loss analyses, AI-based radio resource allocation, and device testing related to the foot switch.



KliNet5G was part of the overarching BMWK-funded CampusOS framework. Over a period of three years, seven projects worked together to establish expertise in 5G campus networks in Germany, localize and validate prototypes, and increase the technological maturity of open and modular 5G campus network solutions. At the final event in March 2025, all projects came together to present and discuss their results.

► **QoE – DEVELOPMENT OF A SYSTEM FOR QUALITY OF EXPERIENCE IN TELE-MEDICAL DATA EXCHANGE**

The QoE system prioritizes and regulates medical data streams, such as video, vital signs, and ECG data, in real time based on the current network quality and the clinical treatment context. The aim is to maintain telemedical care at a medically meaningful level even under unstable connectivity conditions, for example in ambulances or remote areas.

In 2025, key system components were further developed. A generic video adapter was completed, SDC interfaces for vital signs data were conceptually prepared, and initial compression methods for ECG and pulse data were implemented. The basic framework of the expert system for decision logic is now available. In preparation for medical validation, observerships at tele-emergency physician dispatch centers were planned, and a standardized questionnaire was developed. A hardware demonstrator makes differences in video transmission quality tangible for end users.

► SUSTAINET-GUARDIAN: SUSTAINABLE TECHNOLOGIES FOR ADVANCED RESILIENT AND ENERGY-EFFICIENT NETWORKS – GUIDED UTILITIES FOR AUTOMATION, RESILIENCE, AND DIGITAL INNOVATION IN ADVANCED NETWORKS

SUSTAINET-guarDian addresses the growing dependence of healthcare institutions on reliable digital infrastructure. As clinical IT systems, medical devices, and mobile devices (IoT, wearables) become increasingly networked, system complexity and the risk of failures increase substantially. The project develops secure, resilient, and energy-efficient telecommunications systems, with a particular focus on AI-supported network monitoring, automated fault detection, and demand-driven network orchestration for clinical applications. ICCAS at Leipzig University Medical Center is responsible for the medical demonstrator and for investigating network-side requirements from a clinical perspective.

In the first project year, the clinical use cases for the demonstrator were specified together with experts from hospital IT and medical engineering. The focus is on the reliable transmission of biosignals, high-resolution video streams for telemedical applications, and wireless real-time communication in clinical environments. In parallel, initial requirements for network resilience and security were systematically collected, and first concepts for demand-driven network orchestration were developed.



► DIGITAL PATIENT MODEL

The “Digital Twins” research group develops methods for digital images of patients to enable AI-supported healthcare. Digitization and interoperability for location- and device-independent access to clinical data play a central role in this. Many AI-based methods require structured patient data, but the biggest challenges lie in the lack of standardization of interoperable interfaces, the high complexity of clinical IT ecosystems and the requirements for data protection and security. The aim of the research group is to overcome these technical and methodological hurdles and support networked, patient-centered healthcare through the use of virtual twins.

The MediNET project is creating the basis for a comprehensive network between clinics, research institutions and companies. To this end, the team operates a transfer office that supports regional healthcare providers and companies in particular with organizational and technical challenges in order to integrate new medical technology products into the clinical environment. In addition, the research group is developing a technical platform for virtual twins, which serves as a digital basis for clinical studies and innovative treatment strategies with networked medical devices. By using established international standards and the latest technologies, mobile point-of-care devices can be integrated as well as complex clinical information systems, enabling broad application in modern healthcare.

The work of the research group in the EU project CERTAINTY concentrates on the development of infrastructure, interfaces and mathematical models for personalized cancer therapy. The current focus is on the creation of a modular virtual twin to support the treatment of multiple myeloma. This twin maps the individual pathophysiology of each patient and is continuously updated during therapy. Correspondingly integrated analysis methods enable personalized case analyses and predictions to optimize data-driven decision-making processes and improve the effectiveness of personalized therapies.

TEAM LEAD

Stefan Franke
Stefan.Franke@medizin.uni-leipzig.de



PROJECTS

- Medi.NET
- CERTAINTY
- NFDI4DS
- DaDriv-StAC

TEAM MEMBERS

- | | | |
|-----------------------|--------------------|--------------------|
| • Max Schreiber | • Nora Grieb | • Tim Schwarzbrunn |
| • Jean-Baptiste Tylcz | • Johannes Keller | • Mika Katalinic |
| • Daniel Schneider | • Malte Blattmann | |
| • Adrian Lindenmeyer | • Richard Steinert | |
| • Erik Schreiber | • Jan Hilbert | |

► MEDI.NET - INTELLIGENT DIGITAL PLATFORM FOR LOCATION- AND TIME-INDEPENDENT MEDICINE OF THE FUTURE

Medi.NET establishes a digital and interoperable infrastructure for connected, location- and device-independent access to clinical data and medical technologies. The project addresses key barriers in today's healthcare IT landscape, including fragmented interfaces, complex clinical system environments, and strict requirements for data protection and cybersecurity. Coordinated by ICCAS, Medi.NET connects clinics, research institutions and companies through a transfer-oriented framework that supports the introduction, integration and evaluation of innovative medical products in clinical and clinical-adjacent environments.

Medi.NET developed a technical platform based on international standards such as IEEE 11073 SDC and HL7 FHIR, enabling the networking of medical devices, mobile point-of-care systems, wearables and clinical information systems. The project has established and expanded demonstrator and test environments for various medical scenarios, including clinical workflows, mobile medical devices, digital documentation, device connectivity and data-driven support functions. In close cooperation with regional companies, novel medical technologies have been integrated into realistic application contexts, strengthening the link between industrial development and healthcare needs and initiating further innovation projects. Building on a partner network of more than 80 actors from research, healthcare, medical technology, IT and telecommunications, Medi.NET provides a foundation that will continue to be used and further developed for mobile, ambulatory and decentralized healthcare solutions beyond the project period.

► CERTAINTY - A CELLULAR IMMUNOTHERAPY VIRTUAL TWIN FOR PERSONALIZED CANCER TREATMENT



CERTAINTY develops a clinical Virtual Twin (VT) framework to support individualized, transparent, and evidence-informed decision-making in oncology. A central use case is Multiple Myeloma, with particular attention to complex therapeutic pathways such as CAR-T cell therapy. Multiple Myeloma is a type of blood cancer with many possible courses and treatment options, and CAR-T cell therapy is a highly specialized treatment that can be effective but also requires careful decision-making because eligibility, expected benefit, timing, side effects, and patient preferences all need to be weighed together. The VT is intended to bring together patient-specific clinical information, medical knowledge, predictive models, and interactive software components in order to make treatment options, expected outcomes, risks, and uncertainties more accessible and understandable.

The project aims to support clinicians in assessing possible treatment pathways and communicating relevant information in a structured and traceable way. At the same time, the VT concept considers how patients may be involved more actively, for example through comprehensible visualizations of treatment options and the reporting of symptoms, experiences, and outcomes.

ICCAS contributes to CERTAINTY by implementing the Virtual Twin backend and frontend components. This includes the technical foundation required to connect data, models, user interfaces, and clinical workflows into an integrated VT environment. Through this work, ICCAS supports the transformation of the CERTAINTY concept into a usable software system for clinical and patient-related applications.

The work has advanced from conceptual development towards the realization of the Virtual Twin environment. The Multiple Myeloma use case and the CAR-T treatment context provide the clinical focus for shaping the VT's functionality and user interaction. Based on this focus, ICCAS is developing the backend and frontend infrastructure needed to present patient-specific information, treatment-related insights, and model-based results in a coherent and clinically meaningful way.

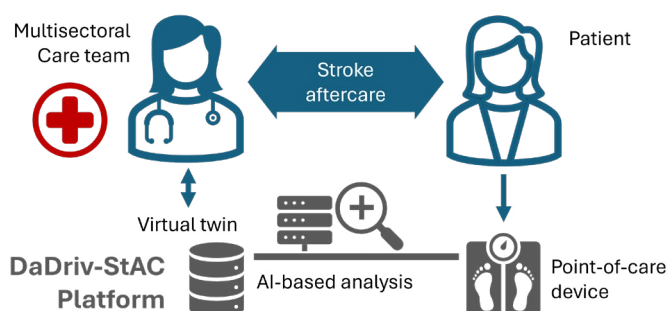
Current results include an increasingly defined VT architecture, initial frontend concepts for clinician-facing and patient-facing interaction, and backend structures that enable the integration of relevant information and computational components. The emerging system is designed to support clear presentation of therapeutic alternatives, CAR-T-related decision factors, expected benefits, possible adverse events, and uncertainties.

Overall, ICCAS provides a central technical contribution to CERTAINTY by building the software basis for the Virtual Twin. This work supports the project's broader objective of making complex oncological decision-making more transparent, individualized, and usable in realistic clinical settings.

► NFDI4DS: NFDI FOR DATA SCIENCE

NFDI4DataScience (NFDI4DS) develops a national research data infrastructure for Data Science and Artificial Intelligence in Germany. Its goal is to make research processes more transparent, reproducible, and fair by supporting the full data lifecycle: from collecting, processing, and analyzing data to publishing, archiving, and reusing results. NFDI4DS connects key digital research objects such as datasets, code, models, metadata, and publications, and provides tools and services that make them easier to find, understand, link, and reuse. The project addresses the needs of the academic Data Science and AI community while also supporting other disciplines that rely on data-driven methods. NFDI4DS focuses on language technology, biomedical sciences, information sciences, and social sciences. ICCAS leads the biomedical use cases within the consortium.

► DaDriv-StAC - DIGITAL PLATFORM FOR DATA-DRIVEN DECISION SUPPORT IN POST-STROKE CARE



DaDriv-StAC develops and tests a digital platform for data-driven decision support in post-stroke care. A stroke is often not a single acute event, but the beginning of a long-term care process. Many patients need continuous treatment, rehabilitation and monitoring to reduce the risk of another stroke. Care needs to also address long-term impairments such as mobility limitations, speech problems, depression, anxiety or spasticity. This involves several sec-

tors, including acute hospitals, rehabilitation centres, general practitioners, specialist practices among others.

Today, relevant information is often distributed across different providers and IT systems. As a result, deviations from the recommended care pathway may not always be detected early enough. DaDriv-StAC addresses this gap by combining patient data, clinical recommendations and AI-based analysis in a virtual medical twin. This twin represents the individual patient journey and helps compare the planned care pathway with the actual course of treatment.

Work has focused on defining clinical and technical requirements, outlining the system architecture and preparing the concept for virtual medical twins in stroke aftercare. Initial work also covers data models, synthetic data, analysis methods and decision-support functions. In parallel, ethical, regulatory and practical questions for later testing are being clarified. The main expected results are a functional platform prototype, decision-support components for clinicians, suitable user interfaces and a feasibility study to assess the concept in a real care setting.

▶ SMART CLINICAL ASSISTANCE: DECISION SUPPORT

Our research team focuses on the analysis and modeling of blood cancers such as multiple myeloma (MM) and related diseases such as myelodysplastic syndrome (MDS) and acute myeloid leukemia (AML). In close cooperation with the Polyclinic for Hematology, Cell Therapy, Hemostaseology and Infectiology at Leipzig University Hospital, we are developing data science and machine learning methods that allow us to make precise predictions about disease progression and therapy success. The aim of our work is to provide treating physicians with data-driven decision support and thus optimize individual therapy decisions for the benefit of patients.

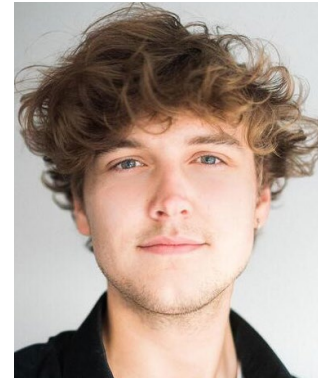


TEAM LEAD

Max Ferle
maximilian.ferle@medizin.uni-leipzig.de

PROJECTS

- VOLTA
- GenoMed4all
- ScaDS.AI - Seedfunding LENS



TEAM MEMBERS

- Nora Grieb
- Thees Burfeind
- Christian Schulz
- Hyeon Ung Kim
- Jonas Ader (Guest)

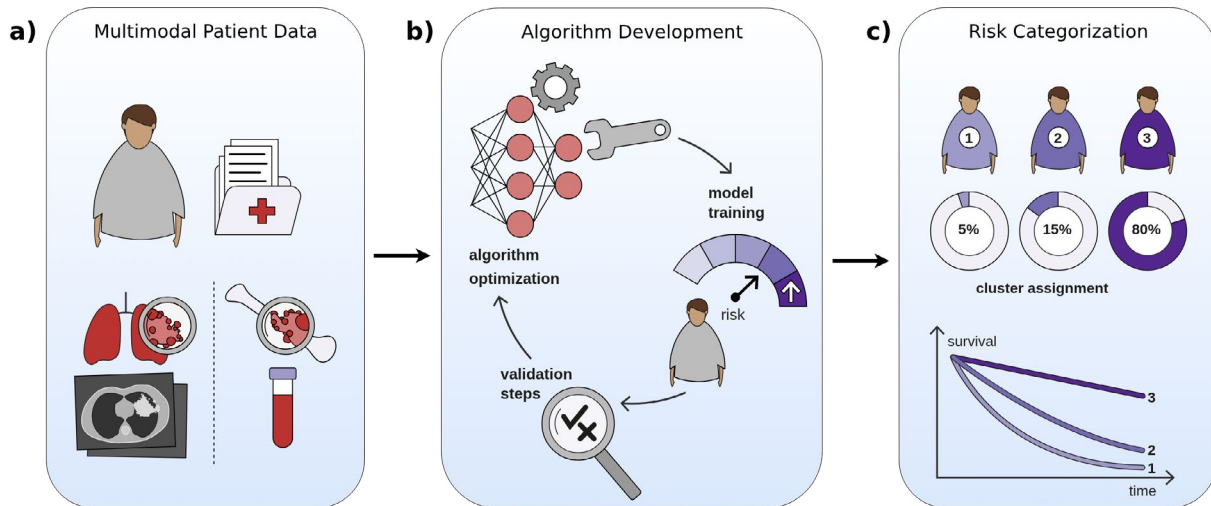
▶ VOLTA: VALIDATION OF MODEL-BASED THERAPY DECISION SUPPORT IN HEMATOLOGY

Thanks to advances in medical research, physicians now have more effective cancer treatments but increasingly personalized drugs create challenges in integrating complex diagnostic and therapeutic data. Since 2020, ICCAS at University Medicine Leipzig, together with the Department of Hematology, Cell Therapy, and Hemostaseology at University Hospital Leipzig, has developed „KAIT“ an IT platform to analyze medical information and support therapeutic decisions for multiple myeloma. KAIT aims to give physicians up-to-date treatment insights so decisions are based on current knowledge, improving care for myeloma patients across Germany. Under the VOLTA project, KAIT is being expanded, tested, and optimized with clinical experts to become a reliable, secure tool in routine practice.

▶ GENOMED4ALL

The GenoMed4All project is an EU-wide initiative aimed at establishing a network infrastructure designed to facilitate the exchange of clinical data within a „Federated Learning Framework“, extending even to multi-omics levels. The project aims to enhance quantitative analysis through the application of machine learning (ML) and artificial intelligence (AI) methods. GenoMed4All focuses on a range of hematological diseases, which are becoming increasingly complex due to the advanced application of precision diagnostics and personalized therapies. In partnership with the Department of Hematology, Cell Therapy, and Hemostaseology at Leipzig University Hospital, ICCAS contributes to the implementation of data integration mechanisms as well as advanced data standardization based on HL7 FHIR.

► LENS: LEARNING ENGINE FOR NOVEL SURVIVAL-CLUSTERING



Risk stratification is vital for clinical decisions, but existing methods often don't convert advanced survival analysis into actionable criteria. LENS aims to introduce a model-agnostic method that can train any neural network on any data modality to find prognostically distinct patient groups by directly optimizing survival heterogeneity across clusters. The approach is pioneered on real-world cancer datasets from multiple myeloma and CT images from non small cell lung cancer. External and institutional validations support the method's reliability. The pan-cancer, modality-independent framework facilitates discovery of prognostic signatures and produces interpretable outputs aimed at supporting personalized treatment and clinical decision-making.



► SMART CLINICAL ASSISTANCE: EMERGENCY MANAGEMENT

The Smart Clinical Assistance: Emergency Management project group at ICCAS focuses on innovative technologies to support emergency and intensive care processes, in particular through digital tools and process assistance. It works on an interdisciplinary basis and combines technical expertise with medical know-how to develop application-oriented solutions for challenges in emergency and disaster medicine. The approach includes the analysis of complex requirements, iterative development and evaluation of prototypes as well as close collaboration with end users to ensure practical applications.

One example of the group's work is the development of the EOS (EMT Operating System) software as part of the RescEU EMT project. This EU-supported project aims to strengthen civil protection capacities in Europe, in particular by providing mobile medical teams (Emergency Medical Teams, EMTs). EOS provides digital support for EMTs and improves mission coordination, patient management and data analysis in crisis situations. By using EOS, emergency teams can respond quickly and efficiently to disasters by using real-time data and optimizing operational procedures.

The Smart Clinical Assistance: Emergency Management project group uses modern software development methods, such as agile and user-centered design, to continuously adapt EOS to the needs of the emergency services. The close involvement of partners and users, such as aid organizations and authorities, ensures the practical relevance and high acceptance of the solutions developed.



TEAM LEAD

Jan Gaebel
jan.gaebel@medizin.uni-leipzig.de



PROJECTS

- RescEU EOS
- Tele-KAI

TEAM MEMBERS

- Hector Condori Alagon
- Alexander Holzenleiter
- Marcel Zill (Guest)

► RESCEU EOS: EMERGENCY MEDICAL TEAM OPERATING SYSTEM

The “EMT Operating System” (EOS) is a field hospital information system, which is tailored to the requirements of EMT on disaster relief missions. Its idea was created and designed during the EUMFH-Project. The system supports the whole patient treatment process from triage to discharge and is highly configurable to adapt to the needs of the EMT. Despite EOS being primarily designed as an electronic patient record, it also includes essential functions for EMT mission and field hospital management. Besides patient management and treatment documentation, EOS enables quick department configuration, visualization of important hospital key performance indicators (patient admissions, triage category count, department workload, etc.) and reporting functionalities (e.g., to local government or WHO).

► TELE-KAI: CREATION OF A VIRTUAL INTENSIVE CARE TREATMENT CENTER THROUGH IMPLEMENTATION OF A TELE-INTENSIVE CARE INFRASTRUCTURE

The aim of the project is to set up a tele-intensive care infrastructure at the Clinic and Polyclinic for Anaesthesiology and Intensive Care (KAI) of the University Hospital Leipzig (UKL). The UKL is one of three maximum care providers in Saxony and the central contact for a wide range of intensive care issues in northern and western Saxony. Telemedicine is a way of making high levels of medical expertise available across geographical distances and providing patients with prompt care in line with guidelines. At the same time, it enables critically ill patients to be transferred in a targeted and resource-adapted manner in order to relieve the burden on strained structures as best as possible.

► CLINICAL WORKFLOWS AND INTEGRATED ASSISTANCE SYSTEMS

The “Clinical Workflows and Integrated Assistance Systems” team researches and develops innovative concepts, methods and digital tools to improve the efficiency, safety and quality of healthcare services, reduce costs and risks, improve the quality of treatment and reduce the workload of medical staff.

A central aspect of the work is the modelling, analysis and optimization of clinical workflows. The aim is to make healthcare processes transparent, identify inefficiencies and design processes in such a way that they meet both medical standards and the individual needs of patients and patients undergoing treatment. Modern approaches such as business process modeling, data analysis and simulation techniques are used.

In addition, the team develops integrated assistance systems that provide intelligent support in everyday clinical practice. These systems combine technologies such as artificial intelligence, machine learning and sensor-based applications to provide relevant information and support decision-making processes. Examples include tools for identifying and assessing shortcomings of digital systems in everyday clinical practice, support systems for aggregating and visualizing study data from various digital and paper-based data sources, sensor-based gait analysis for predicting falls and real-time decision support for improved guideline-based decision-making in complex and critical situations.

Another research focus is the integration of the developed systems into everyday clinical practice. This includes both the integration into existing workflows and the integration into existing system and data structures. In addition, the team is driving forward the digitalization of existing processes in order to promote the transformation towards a digitalized healthcare system.

The team’s comprehensive approach makes a significant contribution to the digitalization and transformation of healthcare by developing innovative solutions that strive for an optimal connection between people and technology.

TEAM LEAD

Juliane Neumann
juliane.neumann@medizin.uni-leipzig.de
Erik Schreiber
erik.schreiber@medizin.uni-leipzig.de



PROJECTS

- SurgiTrace

TEAM MEMBERS

- Tim Stelzner

► SURGITRACE: AI-BASED SYSTEM FOR OPTIMIZING SURGICAL PLANNING AND ENHANCING PERIOPERATIVE SAFETY THROUGH INTELLIGENT TRACKING OF INSTRUMENTS AND IMPLANTS.

The SurgiTrace project aims to develop an intelligent, AI-driven system to optimize resource planning in surgical procedures. To minimize errors caused by time constraints during the preparation of endoprosthesis operations, the system automates and verifies the completeness, product type, and size of required materials. Key achievements of the project include the development of a smart implant cabinet featuring automated dispensing of endoprostheses, paired with a dedicated SurgiTrace tablet application that instantly verifies prosthesis compatibility. Additionally, an integrated navigation function guides staff efficiently through the process. By combining advanced tracking and machine learning, SurgiTrace ensures an independent, quality-assured workflow, significantly enhancing both operational efficiency and patient safety.



#UNIVERSITY COURSES

LEIPZIG UNIVERSITY

COMPUTER ASSISTED SURGERY

Faculty of Mathematics and Computer Science

Introduction to computer-assisted surgery for medical professionals

Lecture and practical course

STRUCTURED SYSTEMS INNOVATION FOR MEDICINE

Faculty of Mathematics and Computer Science

Lecture

INTRODUCTION TO COMPUTER-ASSISTED SURGERY MODULE FOR MEDICAL PROFESSIONALS

Faculty of Mathematics and Computer Science

Lecture and seminar

DEVELOPMENT OF MEDICAL DEVICES

Overview of regulatory and professional requirements for the development and market launch of medical devices in Germany and Europe

Lecture

DISASTER MEDICINE

Faculty of Medicine

Elective course on medical action in crisis and disaster situations

Lecture and practical training

LEIPZIG UNIVERSITY OF APPLIED SCIENCES (HTWK)

DEVELOPMENT OF MEDICAL DEVICES

Overview of regulatory and professional requirements for the development and market launch of medical devices in Germany and Europe

Lecture

SYSTEMS ENGINEERING

Faculty of Electrical Engineering and Information Technology

Lecture

STUDIUM GENERALE: ENGINEERING TECHNOLOGY FOR THE MEDICINE OF THE FUTURE

Faculty of Electrical Engineering and Information Technology, Mechanical and Energy

Engineering

Lecture

ANHALT UNIVERSITY OF APPLIED SCIENCES

DEVELOPMENT OF MEDICAL DEVICES

Overview of regulatory and professional requirements for the development and market launch of medical devices in Germany and Europe

Lecture

DOCTORAL DEGREES

JAN GAEBEL, Development and Assessment of Methodologies for Integrated Model-Based Oncological Decision Support.

MASTER DEGREES

ANDRES EDUARDO GONZALEZ RIVERA, Tiny Gesture recognition (TGRT) for a High-Density Electromyography (HD-EMG) and Inertial Measurement Unit (IMU) powered control system

JONAS HEINE, Techniken der nachvollziehbaren künstlichen Intelligenz im klinischen Umfeld

ABTAHI ISHMAM, Gastric Cancer Detection from Hyperspectral Images Using Machine Learning

FRANZ KLEBER, Towards Autonomous Surgical Documentation - Deep Learning for Arthroscopic Tool Recognition and Surgical Report Generation

TIL PHÖNITZSCH, Entwurf und Implementierung einer Anwendung für strukturierte Fallpräsentationen und kollaborative Exploration in Tumorboards

KATHARINA LEMKE, Vergleich und Bewertung verschiedener Methoden zur Unsicherheitsquantifizierung von neuronalen Netzwerken

ANES REDŽEPAGIĆ, Entwicklung von Methoden für die Korrektur der Lagedaten der HoloLens 2

CHRISTIAN SCHULZ, Implementation of a tool for exchange of clinical data in a health care environment using a prevailing standard

TIM SCHWARZBRUNN, Image-based Correction of Non-rigid Motion Artifacts in Line-Scanning Hyperspectral Imaging

RICHARD STEINERT, Entwicklung und Evaluierung neuer Funktionalitäten eines kollaborativen Roboters zur Erschließung von Einsatzmöglichkeiten für die minimalinvasive Chirurgie.

BACHELOR DEGREES

MOHAMED ELSAYED AWAD, Investigation of asynchronous ventilation using time constant analysis of regional EIT curves.

MISHA JUSTEN, Entwurf und Implementierung eines Priorisierungs- und Optimierungssystems zur Verteilung von Datenflüssen im Kontext von notfallmedizinischen Einsätzen unter volatilen Mobilfunkbedingungen.

ANTONINI ANGELA BELEN MARTINEZ, Development of a Framework for Video Stabilization.

SOPHIE WIECZOREK, Vergleich regelbasierter und lernbasierter Methoden zur Kategorisierung wissenschaftlicher Arbeiten.

FIRST/SENIOR AUTORSHIP

Abdulbaki Alshirbaji T, Jalal NA, Arabian H, Battistel A, Docherty PD, ElMoaqet H, Neumuth T, Moeller K., 2025. Cholec80-Boxes: Bounding Box Labelling Data for Surgical Tools in Cholecystectomy Images. Data. 8. Januar 2025;10(1):7. JIF 2.0

Bieck R, Sorge M, Heuermann K, Kunz V, Pirlich M, Neumuth T. Using deep vision-language models improves multi-task performance in assistance applications for endoscopic ENT surgery. Int J Comput Assist Radiol Surg. 22. Dezember 2025; JIF 2.3

Blattmann M, Lindenmeyer A, Franke S, Neumuth T, Schneider D. Implicit versus explicit Bayesian priors for epistemic uncertainty estimation in clinical decision support. PLOS Digit Health. Juli 2025;4(7):e0000801. JIF 7.7

Ferle M, Grieb N, Kreuz M, Ader J, Goldschmidt H, Mai E.K, Bertsch U., Platzbecker U., Neumuth T., Reiche K., Oeser A., Merz M., 2025b. Predicting progression events in multiple myeloma from routine blood work. NPJ Digit Med. 30. April 2025;8(1):231. JIF 15.1

Ferle M, Grieb N, Kreuz M, Ader J, Goldschmidt H, Mai EK, Bertsch U, Platzbecker U, Neumuth T, Reiche K, Oeser A, Merz M. Publisher Correction: Predicting progression events in multiple myeloma from routine blood work. NPJ Digit Med. 28. Mai 2025;8(1):316. JIF 15.1

Grieb N, Oeser A, Ferle M, Hanke F, Flossdorf S, Sauer S, Goldschmidt H., Müller-Tidow C., Salwender H.-J., Fenk R., Engelhardt M., Zeiser R., Vucinic V., Franke G.-N., Blau I.W., Teschner D., Einsele H., Kimmich C., Kull M., Besemer B., Gagelmann N., Kröger N., Neumuth T., Platzbecker U., Merz M., Single versus tandem autologous stem cell transplantation in newly diagnosed multiple myeloma. Bone Marrow Transplant. März 2025;60(3):335–45. JIF 5.2

Köhler H, Ilgen A, Pfahl A, Stelzner S, Mehdorn M, Jansen-Winkel B, Melzer A., Gockel I., Moulla Y., 2025. Laparoscopic hyperspectral imaging for in vivo detection of the vagal nerve in upper gastrointestinal surgery. Surg Endosc. 11. August 2025; JIF 2.7

Lindenmeyer A, Blattmann M, Franke S, Neumuth T, Schneider D. Towards Trustworthy AI in Healthcare: Epistemic Uncertainty Estimation for Clinical Decision Support. J Pers Med. 31. Januar 2025;15(2):58. JIF 3.0

Lindenmeyer A, Veeranki S, Franke S, Neumuth T, Kramer D, Schneider D. Knowledge Uncertainty Estimation for Reliable Clinical Decision Support: A Delirium Risk Prognosis Case Study. Stud Health Technol Inform. 24. April 2025;324:221–7. JIF 1.0

Maktabi M, Hain C, Köhler H, Huber B, Thieme R, Schierle K, Jansen-Winkel B., Gockel I., 2025a. Classification of esophageal cancer by using hyperspectral data. Int J Comput Assist Radiol Surg. 23. September 2025; JIF 2.3

Maktabi M, Huber B, Pfeiffer T, Schulz T. Detection of flap malperfusion after microsurgical tissue reconstruction using hyperspectral imaging and machine learning. Sci Rep. 5. Mai 2025;15(1):15637. JIF 3.9
Manfredi L, Sánchez-Margallo JA, Wurdemann HA, Melzer A. Editorial: Smart endorobots for endoluminal procedures: design, ethics and future trends. Front Robot AI. 2025;12:1581829. JIF 3.0

Michalski D, Classen J, Geisler D, Urban D, Schreiber M, Tylcz JB, Schmidt, R., Prost, A., Handel, T., Schneider, A., Lippmann, S., Bleckwenn, M., Ivanova, G., 2025. First experience in employing a complex digital support system accompanied by personal assistance to improve aftercare in patients with stroke or transient ischemic attack - results of the PostStroke-Manager feasibility study. *Sci Rep.* 17. Februar 2025;15(1):5804. JIF 3.9

Mollenhoff C, Agarwal B, Herbst J, Rub M, Petzold T, Pabst T, Irmer, R., Lipps, C., Schotten, H.D., Neumuth, T., Rockstroh, M., 2025. Towards 6G-Connected Healthcare: Perspectives, Risks and Real-World Applications for Smart Hospitals. *Annu Int Conf IEEE Eng Med Biol Soc.* Juli 2025;2025:1–7. JIF 2.9

Schatz A, Osterhoff G, Georgi C, Joeres F, Neumuth T, Rockstroh M. Improving preparation in the emergency trauma room: the development and impact of real-time data transfer and dashboard visualization system. *Int J Comput Assist Radiol Surg.* Februar 2025;20(2):301–10. JIF 2.3

Tkachenko M, Huber B, Hamotskyi S, Jansen-Winkel B, Gockel I, Neumuth T, Köhler, H., Maktabi, M., 2025. Exploring the role of preprocessing combinations in hyperspectral imaging for deep learning colorectal cancer detection. *Sci Rep.* 23. September 2025;15(1):32685. JIF 3.9

Tretbar SH, Fournelle M, Risser C, Hewener H, Degel C, Bost W, Weber, P., Mohammadjavadi, M., Glover, G.H., Butts Pauly, K., Melzer, A., 2025. A New Versatile System for 3D Steered LIFU Based on 2D Matrix Arrays. *Brain Connect.* 28. Juli 2025; JIF 2.5

Trifone CT, Maktabi M, Bischoff P, Schierle K, Niebisch S, Moulla Y, Plum, P.S., Jansen-Winkel, B., Gockel, I., Thieme, R., 2025. Artificial neural networks as a prognostic tool using hyperspectral imaging on pretherapeutic histopathological specimens of esophageal adenocarcinoma. *J Cancer Res Clin Oncol.* 4. Oktober 2025;151(10):274. JIF 2.8

von Braun MS, Pfahl A, Melzer A, Chalopin C, Köhler H. Image stitching for real-time laparoscopic hyperspectral imaging. *Sci Rep.* 31. Juli 2025;15(1):28010. JIF 3.9

Wiemers T, Ferle M, Ader J, Sotikova V, Fandrei D, Grieb N, Fischer, L., Born, P., Weidner, H., Wang, S.Y., Jentzsch, M., Franke, G.-N., Herling, C., Metzeler, K., Herling, M., Heyn, S., Denecke, T., Reiche, K., Platzbecker, U., Vucinic, V., Neumuth, T., Meyer, H.-J., Merz, M., 2025. Prognostic Implications of Splenomegaly in BCMA-Directed CAR T-Cell Therapy for Relapsed Myeloma. *Transplant Cell Ther.* 16. Juli 2025;S2666-6367(25)01289-8. JIF 4.4

CO-AUTORSHIP

Arabian H, Alshirbaji TA, Bhave A, Wagner-Hartl V, Igel M, Chase JG, Moeller K. Feasibility study of emotion mimicry analysis in human-machine interaction. *Sci Rep.* 31. Januar 2025;15(1):3859. JIF 3.9

Baur D, Bieck R, Berger J, Schöfer P, Stelzner T, Neumann J, Neumuth T, Heyde CE, Voelker A. Automated Three-Dimensional Imaging and Pfirrmann Classification of Intervertebral Disc Using a Graphical Neural Network in Sagittal Magnetic Resonance Imaging of the Lumbar Spine. *J Imaging Inform Med.* April 2025;38(2):979–87. JIF N/A

Berrouschoot V, Sonntag M, Reimann K, Jäger C, Martin S, Holzer M, Stieler JT, Morawski M. Neurons ensheathed by perineuronal nets are prone to hyperphosphorylation of tau protein in the hibernating Syrian hamster brain. *Sci Rep.* 1. September 2025;15(1):32253. JIF 3.9

ElMoaqet H, Janini R, Ryalat M, Al-Refai G, Abdulbaki Alshirbaji T, Jalal NA, Neumuth T, Moeller K, Navab N. Using Masked Image Modelling Transformer Architecture for Laparoscopic Surgical Tool Classification and Localization. *Sensors (Basel)*. 10. Mai 2025;25(10):3017. JIF 3.5

Grunwald IQ, Tekieli L, Podlasek A, Donald-Simpson H, Clark S, Voutsas C, Pillai S, Houston G, Knapik M, White L, Barr P, Melzer A, Musialek P. Endovascular treatment of tandem lesions in a novel cadaveric stroke model. *EuroIntervention*. 17. März 2025;21(6):e329–31. JIF 9.5

Künzel M, Kohler L, Köhler H, Schulz T, Nuwayhid R, Osterhoff G. Impact of umbilical fixation on perfusion in abdominoplasty: A hyperspectral imaging study. *JPRAS Open*. September 2025;45:337–44. JIF 1.8

Laufer B, Abdulbaki Alshirbaji T, Docherty PD, Jalal NA, Krueger-Ziolek S, Moeller K. Tidal Volume Monitoring via Surface Motions of the Upper Body-A Pilot Study of an Artificial Intelligence Approach. *Sensors (Basel)*. 10. April 2025;25(8):2401. JIF 3.5

Li H, Barnard I, Halliwell T, Zhang X, Melzer A, Huang Z. Effects of skull properties on continuous-wave transcranial focused ultrasound transmission. *J Acoust Soc Am*. 1. April 2025;157(4):2336–49. JIF 2.3

Reiche K, Weirauch U, Kreuz M, Fischer L, Gras L, Neumuth T, Platzbecker U, Köhl U, Demlova R, Kremer A, Fröhlich H, Franke S, Merz M. Virtual twins for personalised CAR T-cell therapy in myeloma. *Lancet Haematol*. Juli 2025;12(7):e490–1. JIF 17.7

Vučinić V, Tumewu T, Brückner M, Kirchberg J, Jentzsch M, Buhmann R, Remane Y, Hoffmann S, Ramdohr F, Merz M, Metzeler KH, Schwind S, Herling C, Krauß SM, Herling M, Franke GN, Grieb N, Stachel G, Janz M, Penack O, Bullinger L, Keller U, Cross M, Henschler R, Bach E, Platzbecker U. Impact of cellular composition and T-cell senescence of mononuclear cell concentrates on the manufacturing process of chimeric antigen receptor (CAR) T-cells. *Transfusion*. 29. Juli 2025; JIF 2.0

Wach J, Weber F, Pfahl A, Köhler H, Güresir E. Shaping the Future of Neuro-Oncologic Surgery: Emerging Imaging Tools and Their Impact on Surgical Precision. *World Neurosurg*. 11. Februar 2025;196:123708. JIF 2.1

Wach J, Weber F, Wende T, Vychopen M, Barrantes-Freer A, Pfahl A, Köhler H, Güresir E. GLIMMER: an interim subgroup analysis from an ongoing prospective study evaluating hyperspectral imaging for MGMT promoter methylation in gliomas. *J Neurooncol*. 17. November 2025;176(1):86. JIF 3.1

Weber F, Pfahl A, Köhler H, Vychopen M, Güresir E, Wach J. Hyperspectral imaging and FLAIR signal intensity: a step toward improved detection of nonenhancing glioma tissue. *Neurosurg Focus*. 1. August 2025;59(2):E5. JIF 3.0

Weirauch U, Kreuz M, Birkenbihl C, Alb M, Quaranta M, Calzone L, Orozco-Ruiz S, Binder S, Fischer L, Clavreul S, Maguri M, Ferle M, Rade M, Azarias G, Hydren JR, Jamarik J, Schwarz D, Sebestyen Z, Kuball J, Popp G, Antoine C, Knockaert M, Schoeder CT, Fandrei D, Sanges C, Radvilas V, Gagelmann, Rückert M, Penack O, Fricke S, Schmidt A, Ward C, Steinbeisser C, Van Gyseghem JM, Niarakis A, Garderet L, Hudecek M, Neumuth T, Platzbecker U, Köhl U, Demlova R, Kremer A, Franke S, Fröhlich H, Merz M, Reiche K, CERTAINTY Consortium. Design specifications for biomedical virtual twins in engineered adoptive cellular immunotherapies. *NPJ Digit Med*. 1. August 2025;8(1):493. JIF 15.1

Winther B, Branzan D, Etz CD, Geisler AA, Steiner S, Winther H, Meixner R, Jiménez-Munoz M, Köhler H, Scheinert D, Schmidt A. Evaluation of Spinal Cord Blood Supply with Hyperspectral Imaging of the Paraspinal Musculature During Staged Endovascular Repair of Thoracoabdominal Aortic Aneurysm: A Sub-Study of the Prospective Multicenter PAPA-ARTiS Trial. *J Clin Med*. 5. Mai 2025;14(9):3188. JIF 2.0

CONFERENCE PROCEEDINGS

Grieb N, Wiemers T, Born P, Fandrei D, Fischer L, Ferle M, Wang SY, Jentzsch M, Herling C, Metzeler K, Herling M, Heyn S, Platzbecker U, Vucinic V, Neumuth T, Franke GN, Merz M. Impact of renal impairment and lymphodepletion regimen on outcomes after CAR T-cell therapy in relapsed/refractory multiple myeloma. *Blood*. 3. November 2025;146(Supplement 1):5853–5853.

Möllenhoff C. „Alexa, hilf mir beim Notfalleinsatz!“. Europäische Befragungsergebnisse zur Nutzung KI-gestützter Sprachassistenten im Notarzt- und Rettungsdienst. *DIVI Mitgliederzeitschrift der Deutschen Interdisziplinären Vereinigung für Intensiv- und Notfallmedizin (DIVI)*. 26. November 2025;16(5):291–291.

Möllenhoff C, Agarwal B, Herbst J, Rüb M, Petzold T, Pabst T, Irmer R, Lipps C, Schotten HD, Neumuth T, Rockstroh M. Towards 6G-Connected Healthcare: Perspectives, Risks and Real-World Applications for Smart Hospitals. In: 2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). Copenhagen, Denmark: IEEE; 2025.S. 1–7.

Pfahl A. Hyperspektrale und multispektrale endoskopische Bildgebung - State of the Art. Vortrag gehalten auf der: 54. Kongress der Deutschen Gesellschaft für Endoskopie und Bildgebende Verfahren. 20. März 2025; Würzburg.

Pfahl A. Präklinische nicht-invasive Perfusionsmessung an der Zunge mittels videofähiger multispektraler Bildgebung [Vortrag]. Vortrag gehalten auf der: 54. Kongress der Deutschen Gesellschaft für Endoskopie und Bildgebende Verfahren. 20. März 2025; Würzburg.

Pfahl A, Köhler H, Melzer A. Optimal Wavelength Selection for Laparoscopic Multispectral Imaging to Visualize Tissue Oxygenation. In: European Conferences on Biomedical Optics 2025 (2025), paper Tu2A.9 [Internet]. Optica Publishing Group; 2025 [zitiert 22. September 2025]. S. Tu2A.9.

Rüb M, Herbst J, Rother B, Kummer F, Golatowski F, Eid A, Möllenhoff C, Herrmann F, Salzmann D, Neumuth T, Schotten HD. Interoperability and AI-Driven Enhancements of BLE-Based Localization in Upcoming 6G Subnetworks. In: 2025 8th International Conference on Information and Communications Technology (ICOIAC). Yogyakarta, Indonesia: IEEE; 2025 [zitiert 27. Januar 2026]. S. 316–21.

Schuelert L, Eger A, Kokorin D, Schaefer G, Melzer A. Application of an IEC 62464-1 MR Image Quality System for Standard Quality Assurance in Fat-Suppressed MRI near Metallic Implants. In: Honolulu, Hawaii, USA; [zitiert 10. Februar 2026]. S. 5428.

Weber F, Pfahl A, Köhler H, Güresir E, Wach J. Depictability of non-enhancing FLAIR abnormal regions in gliomas using intraoperative in-vivo Hyperspectral Imaging – Interim results from a prospective feasibility study. In: *Brain and Spine* [Internet]. 2025. S. 105245. (Abstracts of the EANS2025).

Weber F, Pfahl A, Köhler H, Güresir E, Wach J. Intraoperative visualization of glioblastomas using in-vivo Hyperspectral Imaging for tissue classification – Interim results from a prospective feasibility study. In: *Brain and Spine* [Internet]. 2025. S. 105371. (Abstracts of the EANS2025).

Weber F, Pfahl A, Köhler H, Güresir E, Wach J. Intraoperative visualization of meningiomas using in-vivo Hyperspectral Imaging for tissue classification – Interim results from a prospective feasibility study. In: *Brain and Spine* [Internet]. 2025. S. 105247. (Abstracts of the EANS2025).



UNIVERSITÄT
LEIPZIG

Medizinische Fakultät

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung

Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie



Diese Maßnahme wird mitfinanziert
durch Steuermittel auf der Grundlage des
vom Sächsischen Landtag beschlossenen
Haushalts.