UNIVERSITÄT LEIPZIG

Medizinische Fakultät

iccas

ICCAS NEWSLETTER Q3/2025

Dear readers,

How do we shape the medicine of the future—connected, intelligent, responsible? This is the question we deal with every day at ICCAS. In the third quarter of 2025, we once again have many exciting events in store and a particularly rich insight into our current research activities.
We take you on a tour of our projects, introduce new applications of digital technologies, and provide insights into our work. Compact, understandable, and practical. Enjoy reading!

Best regards

Andreas Melzer & Thomas Neumuth

TOPICS IN Q3

Research Compact

- HSI enables intraoperative identification of the vagus nerve
- New AI approaches make medical prognoses more reliable
- eACI Virtual Twins: Digital simulations for more precise cancer therapies
- Young immune cells increase chances of successful CAR-T therapy
- Digital twins optimize the planning and application of CAR-T cells

Cooperations & Projects

- Final meeting of the project MIRACLE-5
- Project start NEO-TAPI
- Project start AID4HER2

Beyond Research

- ICCAS at the futureSAX Innovation Forum "Life Sciences & Healthcare"
- Visit by Prof. Dr. Getu Abraham to ICCAS

ICCAS on the Move

- IEEE EBMC 2025, Copenhagen
- DGU-Congress, Hamburg

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.

Clemens Möllenhoff (ICCAS), Ralf Irmer (Vodafone Tech Innovation Center Dresden) and Rolf-Dieter Jungk (Federal Ministry of Research, Technology, and Space) discuss the possibilities of the new 6G technology.

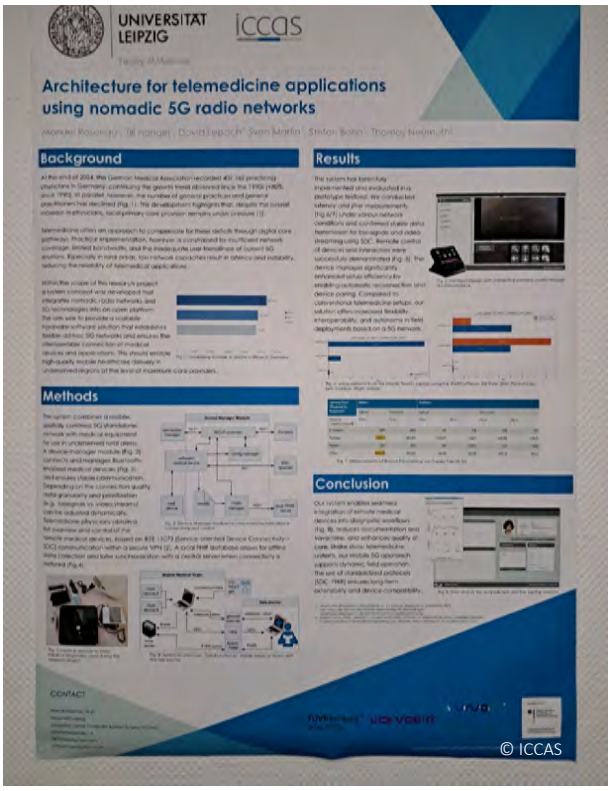
Demonstration of the patient room of the future.

At the 6G Conference in Berlin, the consortium behind the 6G-Health research project presented its findings to date and provided insights into future developments in networked medical technology.

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.



As part of BMT 2025, Manuel Rosenau presented a scientific poster on the topic of "Architecture for Telemedicine Applications Using Nomadic 5G Radio Networks." The work was created in the context of the TeleNoma research project and showcases new approaches for flexible, networked telemedicine solutions.

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 (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.

Maximilian Ferle at the 2nd Annual Meeting of the International Myeloma Society (IMS) in Toronto, Canada, shortly before presenting his latest research findings.

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.

Research Compact

- The study examined the use of hyperspectral imaging (HSI) in 19 patients during an Ivor Lewis esophagectomy, a minimally invasive esophageal surgery. The vagus nerve could be clearly distinguished from surrounding tissue such as the lungs, esophagus, or blood vessels. The results show that HSI enables reliable real-time detection of the nerve during surgery and could therefore increase patient safety.

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

  doi: 10.1007/s00464-025-12028-1

- AI models should not only make accurate predictions for medical decisions, but also make it clear how reliable these predictions are. Approaches that reliably identify uncertainties and novel data, thereby providing more realistic assessments, are particularly suitable for trustworthy digital decision-making aids.

  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.

  doi: 10.1371/journal.pdig.0000801

- Virtual twins (VTs) can provide patient-specific decision support in oncology, but do not yet take into account the specific characteristics of novel adoptive cell therapies (eACIs). This publication therefore describes the basic requirements for specially developed eACI VTs that simulate the complex interaction between cell product and patient. In addition to clinical application, eACI-VTs also have the potential to make the development and conduct of clinical trials more efficient, cost-effective, and ethically responsible by generating virtual patient cohorts, improving predictions of efficacy and side effects, and thus contributing to the accelerated availability of eACIs.

  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, u. a. Design specifications for biomedical virtual twins in engineered adoptive cellular immunotherapies. NPJ Digit Med. 1. August 2025;8(1):493.

  doi: 10.1038/s41746-025-01809-6

  Engineered adoptive cellular immunotherapies (eACIs) are special cancer immunotherapies in which the body's own immune cells are genetically modified and then returned to the patient. The aim is to equip the immune cells so that they can recognize and fight cancer cells particularly effectively. A well-known example of this are CAR-T cells, in which T cells are equipped with an artificial receptor that specifically recognizes tumor cells.

- The study investigated which factors influence the successful production of CAR-T cells. It showed that it is not the number of previous therapies or certain pre-existing conditions that are decisive, but rather the amount of "young" or non-aged T cells. Such cells are classified using so-called CD markers ("cluster of differentiation"), i.e., surface characteristics on immune cells that identify different cell types and their functional states. In particular, the markers CD3+CD27+CD28+, which indicate functional T cells that are still capable of division, were directly associated with a significantly higher success rate in CAR-T production.

  Vučinić V, Tumewu T, Brückner M, Kirchberg J, Jentzsch M, Buhmann R, u. a. 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;

  doi: 10.1111/trf.18354

- The CERTAINTY project is developing a virtual twin for patients with relapsed or refractory multiple myeloma who are eligible for CAR-T cell therapy. This digital twin integrates patient-specific clinical data, multi-omics analyses, and various computer models to realistically simulate disease progression and therapy effects before, during, and after treatment. The aim is to optimize personalized treatment planning, production, and application of CAR-T cells, detect side effects at an early stage, reduce costs, and expand access to this innovative form of therapy.

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, CERTAINTY Consortium, Virtual twins for personalised CAR T-cell therapy in myeloma. Lancet Haematol. Juli 2025;12(7):e490–1.

doi: 10.1016/S2352-3026(25)00170-X

ICCAS on the Move

In the third quarter of 2025, we were once again on the road at conferences and trade fairs across Germany and the world. Here is a brief overview of our topics on site:

- **IEEE EBMC 2025, Copenhagen (July 14th–17th, 2025)**
  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.

Poster Area of the IEEE EMBC Conference in Copenhagen.

- **DGU-Congress, Hamburg (September 17th–20th, 2025)**
  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 limited to assisting roles in the long term.

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.

Sebtember 04th, 2025 - Leipzig
ICCAS at the futureSAX 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.

At the futureSAX Innovation Forum, visitors gained exciting insights into new developments and trends in the fields of life sciences and healthcare—from research to application.

August 22th, 2025 - Leipzig
Visit by Prof. Dr. Getu Abraham to ICCAS

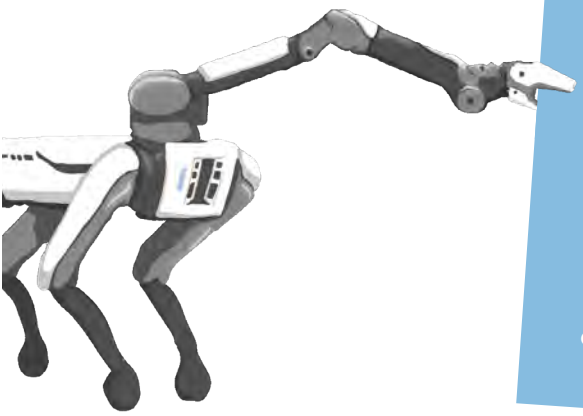
On August 22th, 2025, we welcomed Getu Abraham to ICCAS. As a renowned scientist in the field of veterinary pharmacology and clinical pharmacology at the University of Leipzig, he showed great interest in our current areas of research.

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.

As part of the demonstration of the "ambulance of the future," Alexander Prull shows Gedu Abraham how modern communication and sensor technologies are opening up new possibilities for mobile patient care.

COMING NEXT IN Q4



- iSMIT (October 10th - 11th, 2025 - Washington, DC)
- Final meeting 3MP-FUS (October 16th, 2025 - Leipzig)
- Polnisch-Sächsisches Wirtschaftsforum (October 21st - 22nd, 2025 - Wroclaw, Poland)
- Thinknet 6G Summit (October 28th - 29th, 2025 - Nuremberg)
- Medica (November 17th - 20th, 2025 - Dusseldorf)
- DIVI25 (December 04th - 05th, 2025 Hamburg)

Further events during the quarter can be found on our website or our LinkedIn channel.

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