OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

MED MEDIZINISCHE FAKULTÄT

Forschungsbericht 2022

Innovation Laboratory for Image Guided Therapy

INNOVATION LABORATORY FOR IMAGE GUIDED THERAPY

Leipziger Str. 44
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Kontakt:
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1. LEITUNG

Dr. Axel Boese
Dr. Alfredo Illanes
Prof. Dr. Michael Friebe

2. FORSCHUNGSPROFIL

Upcoming challenges in healthcare delivery and regional/global unmet clinical needs require new concepts for related purpose-driven research and development to ensure a quick translation back to clinical use.
With the HealthTEC Innovation lab (INNOLAB:IGT) we have established an interdisciplinary development environment with close ties to several clinical users, international partners (Australia, India, Portugal, Italy, Spain, UK, Switzerland, Turkey, USA, Chile), and translation networks.
Our primary focus is on workflow-, and device- innovation for image-guided and minimally invasive therapies, as well as on novel health monitoring approaches.
We are able to IDENTIFY Unmet Clinical Needs, define problem statements and provide IDEAS/INVENTIONS, can validate the prototypes, and have shown to be able to work with partners on IMPLEMENTATION and TRANSLATION. With that approach, we have generated over 40 patents, identified more than 100 needs and created just as many prototypes in the last 5 years.

For that, we provide a fully equipped clinical development environment (diagnostic and minimally invasive therapy systems, robots, 3D printers, electronics / mechanical lab, comprehensive machine learning expertise) and empathetic and knowledgeable development staff.
Engineering students (biomedical, electrical, computer science, and mechanical) and clinical students learn to work in a focused and interdisciplinary innovation environment from identification all the way to a potential technology transfer with the clinical user and at the same time stimulate start-up activities in this area.
We also know the regulatory environment and the economic realities of bringing innovation to the clinical markets.

3. SERVICEANGEBOT

The INKA Innovation Lab supports innovators in the realization of their ideas.
We provide application-driven research close to medical needs. Our strengths are ideation, innovation, prototyping and testing of new solutions and products with medical professionals involved. With our interdisciplinary and international team, we operate a fully equipped clinical development environment including diagnostic and minimally invasive therapy systems, robots, 3D printers, phantoms / electronics / mechanical lab, engineering, machine learning and data processing expertise and empathetic and knowledgeable development staff. We can show expertise in regulatory affairs and the economic realities supporting you to bring innovation to the clinical markets. We look forward to working with you! Please check: www.inka-md.de or contact inka@ovgu.de

4. METHODIK

We work based on an adapted Stanford Biodesign approach to **Identify** clinical needs, **Ideate** solutions and **Implement** these solutions for transfer to the market.

5. FORSCHUNGSPROJEKTE

Projektleitung:	Dr.-Ing. Axel Boese
Projektbearbeitung:	Prof. Dr. Michael Friebe, Nazila Esmaeili, Moritz Spiller, M.Sc. Thomas Sühn, Alfredo Illanes
Kooperationen:	Prof. Roland Croner, OVGU FME KCHI; Prof. Patrick Schuler, KHNO Ulm; Prof. Christoph Arens, OVGU, FME, KHNO; Prof. Christoph Lohmann, OVGU, FME, KORT; Prof. Jessica Bertrand, OVGU, FME, Experimentelle Orthopädie
Förderer:	BMWi/AIF - 01.03.2020 - 31.03.2022

SURAG Surgical Audio Guidance (INKA Healthtec Innolab @ UMMD)

Establish audio guidance as an easy add-on support for therapy device navigation, tissue characterization, low-cost hybrid imaging, implant sensoring, intravascular monitoring, and palpation/haptic sensation in robotic surgeries.

Projektleitung:	Dr.-Ing. Axel Boese
Projektbearbeitung:	Holger Fritzsche, Prof. Dr. Michael Friebe
Förderer:	EU - EFRE Sachsen-Anhalt - 01.03.2019 - 30.06.2022

ego.-INKUBATOR "InnoLab IGT - Innovationslabor - Image Guided Therapy (INKA Healthtec Innolab @ UMMD)

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For that we provide a fully equipped clinical development environment (diagnostic and minimal invasive therapy systems, robots, 3D printers, electronics / mechanical lab, comprehensive machine learning expertise) and empathetic and knowledgeable development staff.
Engineering students (biomedical, electrical, computer science, and mechanical) and clinical students learn to work in a focused and interdisciplinary innovation environment from identification all the way to a potential technology transfer with the clinical user and at the same time stimulate start-up activities in this area.
We also know the regulatory environment and the economic realities of bringing innovation to the clinical markets.
We look forward working with you!

Projektleitung: Prof. Dr. Michael Friebe, Dr.-Ing. Axel Boese, Rutuja Salvi
Kooperationen: Brainlab AG; Fraunhofer ISST; Universitätsklinikum Essen, Kardiologie
Förderer: Industrie - 01.09.2020 - 31.03.2022

Auscultation of Carotid Sounds

Development of an external device that measures the emitted sounds of flow, cardiac pulsation, heart valves, coughing, swallowing ... with the goal to segment and classify these sounds to create a personal profile.

Projektleitung: Dr.-Ing. Axel Boese
Projektbearbeitung: Dr.-Ing. Axel Boese, Dr.-Ing. Alfredo Illanes, Nazila Esmaeili
Kooperationen: Prof. Christoph Arens, OVGU, FME, KHNO; Prof. Dr. Nassir Navab, TU München, CAMP
Förderer: Stiftungen - Sonstige - 01.01.2017 - 31.03.2022

Automatic Classification of Laryngeal Lesions based on Vascular Patterns in Contact Endoscopy (INKA Healthtec Innolab @ UMMD)

INKA Healthtec Innolab @ UMMD: Contact endoscopy (CE) is a minimally invasive procedure providing real-time information about the cellular and vascular structure of the superficial layer of laryngeal mucosa. This method can be combined with optical enhancement methods such as narrow band imaging (NBI). However, these techniques have some problems like subjective interpretation of vascular patterns and difficulty in differentiation between benign and malignant lesions. We propose a novel automated approach for vessel pattern characterization of larynx CE + NBI images in order to solve these problems.

Projektleitung: Dr.-Ing. Axel Boese
Projektbearbeitung: Prof. Dr. Dr. h.c. Roland S. Croner, Dr. Cora Wex
Förderer: Land (Sachsen-Anhalt) - 01.07.2021 - 30.06.2024

InnoMedTec - "Nachhaltige Etablierung einer Arbeitsgruppe "Innovationen in der Medizintechnik" an der Medizinischen Fakultät Magdeburg zur Digitalisierung der Medizintechnik"

Ziel von InnoMedTec ist es, klinisch relevante regionale und global verwertbare Ergebnisse zu generieren, die durch strategische Erarbeitung von Vorarbeiten sowohl den Wissenschaftsstandort,
sowie durch eine entsprechende digitale Produkt-/Marktorientierung und Transfer auch den

Wirtschaftsstandort stärken. Weiterhin dienen die zu erwarteten Ergebnisse zur Etablierung und Optimierung der flächendeckenden medizinischen Versorgung in Sachsen-Anhalt durch den Einsatz digitaler Diagnose- und Präventionsmethoden.

Projektleitung:	Dr.-Ing. Axel Boese
Projektbearbeitung:	Holger Fritzsche, Anna Schaufler, Prof. Dr. Michael Friebe
Kooperationen:	Prof. Jessica Bertrand, OVGU, FME, Experimentelle Orthopädie; Prof. Christoph Lohmann, OVGU, FME, KORT
Förderer:	EU - EFRE Sachsen-Anhalt - 01.10.2019 - 30.10.2022

OrthoBioSense -Orthopedic implants for assessing the individual biological response using sensors (INKA Healthtec Innolab @ UMMD)

Nichtinvasives Messkonzept für den Verschleis von künstlichen Gelenken

Orthopädische Implantate sollen mit Technologien ausgestattet werden, die den Verschleisszustand im Körper überwachen und dann extern - nach Möglichkeit vom Patienten selbst - auslesbar machen. Zur Lösung dieses Ansatzes sollen Sensoren entwickelt werden, die den Verschleiss einer Endoprothese einschätzen und die Implantatposition bewerten können. Der Patient wird dann diese Sensoren in bestimmten Abständen auslesen und dem Operateur übermitteln. So kann dann auch bei Auffälligkeiten ein schneller Vorstellungstermin vereinbart werden.

Projektleitung:	MSc. Holger Fritzsche, Prof. Dr. Michael Friebe
Kooperationen:	Siemens Healthineers, Innovation Think Tank, Prof. Haider
Förderer:	Industrie - 18.12.2020 - 31.12.2024

INNOVATION THINK TANK - Siemens Healthineers

We have been certified as a SIEMENS HEALTHINEERS INNOVATION THINK TANK offering healthcare innovation programs and being part of the global network of think tanks. Together with partners from HEALTHINEERS we are addressing workflow and dedicated innovation needs and supervise graduate and doctoral students.

6. VERÖFFENTLICHUNGEN

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ABSTRACTS

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