Medical Technology Test and Application Center (METEAN) of the Fraunhofer Institute for Integrated Circuits IIS

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**Research**
Intention and main focus of METEAN, located at the Faculty of Medicine inside facilities of UK Erlangen, is to combine the research competence in biomedical engineering of the Fraunhofer IIS with the clinical expertise of regional partners from industry, research institutes, and specifically the UK Erlangen, in a synergistic way to exchange ideas for technical solutions considering the medical and clinical needs and hence providing and opening perspectives for innovative and market-oriented products.

**Vital parameter study**
Pt: C. Sauter
A study for the measurement of vital parameters with subjects was conducted by METEAN. During the study, employees of METEAN undertook the tasks of study manager and study monitor and were responsible for the general set-up like the vote of the ethics committee and insurance. The study focused on the evaluation of wearables in comparison to medical reference devices during everyday life movements.

**MedTech Business Design Bootcamp**
Pt: N. Chrobok-Pensky
The goals of the annual MedTech Business Design Bootcamp are to elaborate a project idea in the field of medical engineering within a team and to gain feedback of experts, entrepreneurs and investors. In 2015, the experts of METEAN undertook the coaching concerning regulatory affairs and gave an insight into Medical Device Legislation.

**Med-Hackathon**
Pt: N. Chrobok-Pensky
A different approach to current challenges in medical engineering was chosen during the first Med-Hackathon. This event was hosted in the METEAN facilities in cooperation with the Department of Medicine 3, Spirit Link Medical and the Medical Valley. For 24 hours, electronic engineers, programmers and doctors dedicated themselves to the measurement of physical activity of patients with inflammatory joint disease by using activity trackers. Within the focus of the event was the longtime data logging.

**Ambient assisted living**
Pt: N. Chrobok-Pensky
In several projects with care facilities, METEAN researches on useful application scenarios of available assistance devices and the consequent best possible combination of different application fields. Within the focus is checking the range of functions, safety and technical viability of new systems.

**INSYDE**
Pt: C. Sauter
The project develops a nursing bed with industrial partners and FAU that varies the distribution of pressure across the patient’s body using sensors and actuators to prevent the development of pressure ulcers. METEAN is advising the project consortium on regulatory questions that arise during the development process, is training the consortium and providing it with standardized documentation tools.

**Computer assisted microscopy**
Pt: PD Dr.-Ing. T. Wittenberg
The analysis of cells and tissues by means of microscopy has been established as a standard within microbiology, virology, and immunology and is the diagnostic reference method for histopathology. The research goal of subproject A4 within the SFB 796 (compare own report) is the conception and development of generic image analysis methods that are capable to provide solutions for many similar applications in analysis of fluorescent micrographs.

In cooperation with the Institutes of Pathology and Anatomy, a web based education system using digital virtual slides of histopathological samples has been established. This platform is also used for multi-center studies in cooperation with the Institute of Neuropathology. For such projects, digital slide scanners for bright-field and fluorescent scanning are available in the METEAN facilities. The scanning of different samples as well as scientific counseling with respect to automated image analysis are part of the cooperation and service possibilities for the UK Erlangen as well as for external partners.

**Decision support systems**
Pt: PD Dr.-Ing. T. Wittenberg
The research and development tasks in the field of “Computer-assisted Diagnosis” (CAD) are focused on the development of “intelligent” systems for computer based detection, analysis, and interpretation of lesions depicted in various medical imaging modalities (endoscopy, colposcopy, mammography). Improved early detection of dysplastic tissue within screening programs as well as an objective differential diagnosis are the main functional purposes of the developed CAD-technology. Within the context of the BMBF-funded project “KoloPol”, image processing methods are developed for the automated detection of polyps in colonoscopic sequences. In cooperation with the UK Erlangen and the Bayreuth Medical Center, a reference image data collection is generated. Based on these images, data algorithms for detection and classification of malignant lesions are developed and evaluated. First promising tests in the clinic were performed with the developed software.

**Teaching**
Employees of METEAN contribute to various lecture courses of the Faculties of Medicine and Engineering, e.g. the certificate of the Advanced Studies in Medical Device Law and hands-on courses for students. METEAN employees supervise Bachelor’s and Master’s theses as well as MD theses.