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SMART MedTech Forum

Starting the Continuum: Fast Track to Diagnostics with Semiconductors

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BOSCH

Abstract
Starting the Continuum: Fast Track to Diagnostics with Semiconductors
Molecular Diagnostics opens deep insight into the root-causes of many diseases. However, it imposes a huge effort on medical staff and is both time-consuming and expensive. The Bosch “VIVALYTIC” system is an open platform for the automation of complex molecular diagnostics workflows. It has proven its ability to take molecular diagnostics to the “point of need”. Miniaturization, microsystems and microfluidics technologies as well as microelectronics are the keys to success. The SARS-CoV-2 pandemics has clearly demonstrated the power of the platform to integrate several rapid tests for the detection of SARS-CoV-2 infections within a rather short development time. The first new Corona-test could be made available by Bosch in April this year as an important step to fight the global pandemics and restrict the spread of the disease. Even faster tests are on our development path and close to market entry.
In future, apart from infectious disease diagnostics, our solutions will enable a paradigm shift in medical treatment, away from the "one drug fits all"-approach towards personalized therapies in a "the right drug for the right patient"-strategy. This especially holds for targeted cancer therapies.

Biography
Dr. Franz Laermer joined the Corporate Research and Technology Center of Robert Bosch GmbH, Stuttgart, Germany, in 1990, where he started the development of new key technologies and sensor functions for the upcoming field of Micro-Electro-Mechanical Systems (MEMS) at Bosch. His activities were mainly focused on new microstructuring, surface-micromachining and sacrificial layer etching technologies, as well as micro-accelerometers, gyroscopes and pressure sensors for the automotive area.

Dr. Franz Laermer managed a number of projects which were essential for many generations of microsensors at Bosch. He worked as Project Director for TOP-level innovation projects covering new application fields beyond automotive, including the biomedical area. Today he is working as **Bosch Research Fellow**/Senior Chief Expert for Microsystems, Microfluidics and Molecular Diagnostics. His work laid the foundation for the VIVALYTIC Diagnostics Platform of the newly founded Bosch Healthcare Solutions (BHCS) Business Division and the SARS-CoV-2 rapid tests from Bosch.

Dr. Franz Laermer is the co-inventor of the "**Bosch Deep Reactive Ion Etching Process**" (“BOSCH-DRIE”)

for microstructuring silicon. This key microstructuring technology revolutionized MEMS and is the root of all of today's silicon based MEMS. He holds more than 200 patents.

Dr. Franz Laermer was awarded with the prize "**European Inventor of the Year 2007 – Category Industry**" by the European Commission and the European Patent Office (together with co-inventor Andrea Urban), for the invention, development and sustainable success of the "BOSCH-DRIE"-process. In 2014 he received the "**2014 IEEE Jun-ichi Nishizawa Medal Award**" from the Institute of Electrical and Electronics Engineers (IEEE), USA. In 2019 he was awarded with the "**2019 Technology Prize**" of the Eduard-Rhein-Foundation, Germany.

Artificial Intelligence in Healthcare Delivery

H. Huisman
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Abstract
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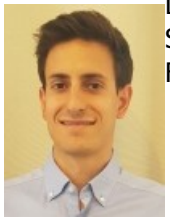
Biography
Henkjan Huisman is an associate professor of radiology on AI for medical imaging at the Radboud University Medical Center, The Netherlands. He has over 30 years of experience in scientific research, prototyping, and clinical validation of medical imaging AI. His research team explores and uses AI to better understand disease, diagnosis, and therapy in the field of abdominal ultrasound and MRI aiming to improve healthcare.

Early Diagnosis and Prevention of Pressure Induced Wounds (Ulcer) at Vulnerable Patients



L. Grünerbel
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Abstract
Pressure induced wounds (Ulcer) lead to high stress and pain for all sufferers. There are two main types of ulcer, which are decubitus with more than 400.000 cases annually [2] and the diabetic foot syndrome resulting in around 40.000 feet amputations every year only in Germany [1]. The therapy is very long lasting, painful for patients and expensive for the health care system. However, according to many experts most of these wounds could be avoided by proper prophylaxis [1]. One part of a promising prophylaxis system is the accurate observation of especially endangered body positions. Therefore, we develop a sensor system that is tracking the pressure load on those endangered positions. In combination with other body parameters such as blood oxygen saturation, heart rate and skin temperature, we use modern machine learning algorithms (AI) to determine parameters that allow forecasting the probability of wound formation. The findings will lead to a smart and handy forecasting system that warns patients if the wound probability increases significantly.

Biography
Lorenz Gruenerbel, M.Sc. (m) successfully graduated at the Technical University of Munich. His topmost degree is a Master in Electrical Engineering and Information Technology. Additionally, he received a Bachelor in Management and Technology at the Technical University of Munich. During his Master's he already focused on subjects of medical technology at Fraunhofer EMFT. Since March 2018, he is working there within the field of system development focusing on medical applications. As a Ph.D. student, he is doing research on modelling and high flow optimization of Fraunhofer EMFT micro pumps.

References:
[1] Deutsches Ärzteblatt, (2020), Diabetisches Fußsyndrom: Risikopass soll unnötige Amputationen vermeiden, Website, https://www.aerzteblatt.de/nachrichten/114949/Diabetisches-Fusssyndrom-Risikopass-soll-unnoetige-Amputationen-vermeiden, 2020-07-30
[2] IQTIG, (2018), Pflege: Dekubitusprophylaxe, Website, https://iqtig.org/downloads/auswertung/2017/dek/QSKH_DEK_2017_QIDB_V02_2018-04-25.pdf, 2020-07-30

From Sensing to Action

G. Olivadoti
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Abstract
The coronavirus pandemic has caused immeasurable impact on both human and economic levels. It has shown the fragility of healthcare systems and accelerated adoption of telehealth solutions, including remote patient monitoring and testing technology. Reliable wearable and remote patient monitoring systems depend on precision measurements. This session will explore trends in sensing and measurement technologies that enable and empower remote patient monitoring systems of the future.

Biography
Giuseppe Olivadoti joined Analog Devices in 2000. During his time at ADI he has held a number of positions across engineering, sales, and business leadership. Giuseppe is currently the Director of Marketing and Applications for the Digital Healthcare business at Analog Devices. Prior to this role, he has held sales leadership positions in Europe and the Americas.
Giuseppe holds a Bachelor of Science degree in Electrical Engineering from Northeastern University and a Master of Business Administration from University of Phoenix. Giuseppe currently resides in the Boston area.