Balgrist
University Hospital

Press release

Balgrist University Hospital part of new EU Horizon project

Surgical robotics that scan, hear, feel and act

Zurich, January 21st, 2021 – Surgeons make optimal use of all their senses to master difficult operations. When visibility on the anatomy is poor, they locate anatomy by palpation or they hear the optimal moment to stop drilling. Who would, today, entrust the own body to a surgeon that uses only direct vision, neglecting all the other information? Yet this is what the most advanced, semi-autonomous surgical robots of today focus on. Similar to autopilots, the robots follow a pre-defined path solely based on medical image data. But when things get difficult, they lack non-visual sensing capabilities and the human expert has to take over.

An international research collaboration now aims to develop surgical robots that access a broad range of sensing capabilities to master complex surgical tasks autonomously. To this end these robots will incorporate senses comparable or even superior to humans. The robots learn to sense through the tissue, they feel, listen, interpret and act. Overall, the ambition is to provide superior «functional» accuracy. The «FAROS» research project brings together the best in their field: Balgrist University Hospital, KU Leuven in Belgium, Sorbonne University in France and King's College London in England. «FAROS» is supported by Horizon 2020 ICT. Professor Philipp Fürnstahl points out: «We are excited to be part of designing a new genre of intelligent robotic systems that will fundamentally change orthopedic surgery». Professor Mazda Farshad adds: «We collaborate with the leading universities in Europe to bring the next generation of artificial intelligence to surgery».

Surgeons rely on their experience and on their senses to master difficult surgeries. That is why, they are far superior to any surgical robot until today. The «FAROS» project heralds a turnaround in conventional robotics: The robots navigation systems will be equipped with widefield mapping, auditory and haptic sensors. Surgeon-like autonomous behavior with physical and cognitive intelligence will be enabled. The international research project foresees the following key elements: non-visual sensors that form a multifaceted representation of the surgical task; functional models that relate signals to functional parameters and controllers, that produce sensible autonomous robot actions optimizing functional performance. This new concept, which is referred as Functionally Accurate RObotic Surgery (FAROS), will be showcased and validated on complex spine surgeries.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016985

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«FAROS» a consortium of four universities: KU Leuven in Belgium, which is coordinating the project and driving the work in non-visual sensing, Sorbonne University in France, with a strong role in robotics, King's College London in England, which will lead the development of artificial intelligence, and Balgrist University Hospital / University of Zurich, which will work clinically, experimentally and interdisciplinary to ridge robotics, computer science and clinical research. The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016985. «FAROS» will start with a three-year term on January 1, 2021. Horizon 2020 is the largest EU research and innovation program with almost €80B in funding and a term of 7 years.

Link: https://h2020faros.eu/

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About Balgrist University Hospital, University Zurich
Balgrist University Hospital is a highly specialized center of excellence for the diagnostic work-up, treatment, and follow-up care of damage to the musculoskeletal system. Interdisciplinary services combine the fields of orthopedics, paraplegiology, rheumatology and physical medicine, sports medicine, neuro-urology, chiropractic, radiology, and anesthesiology.
The broad spectrum of interlinked medical treatment is complemented by nursing care, social, insurance-legal and psychological counselling as well as integrated measures for rehabilitation and return to work. All these activities aim to provide our patients with the best possible support.
Balgrist University Hospital and the Balgrist Campus set internationally recognized standards in orthopedic research and education. The privately owned Balgrist University Hospital is operated by the Balgrist Association.

www.balgrist.ch

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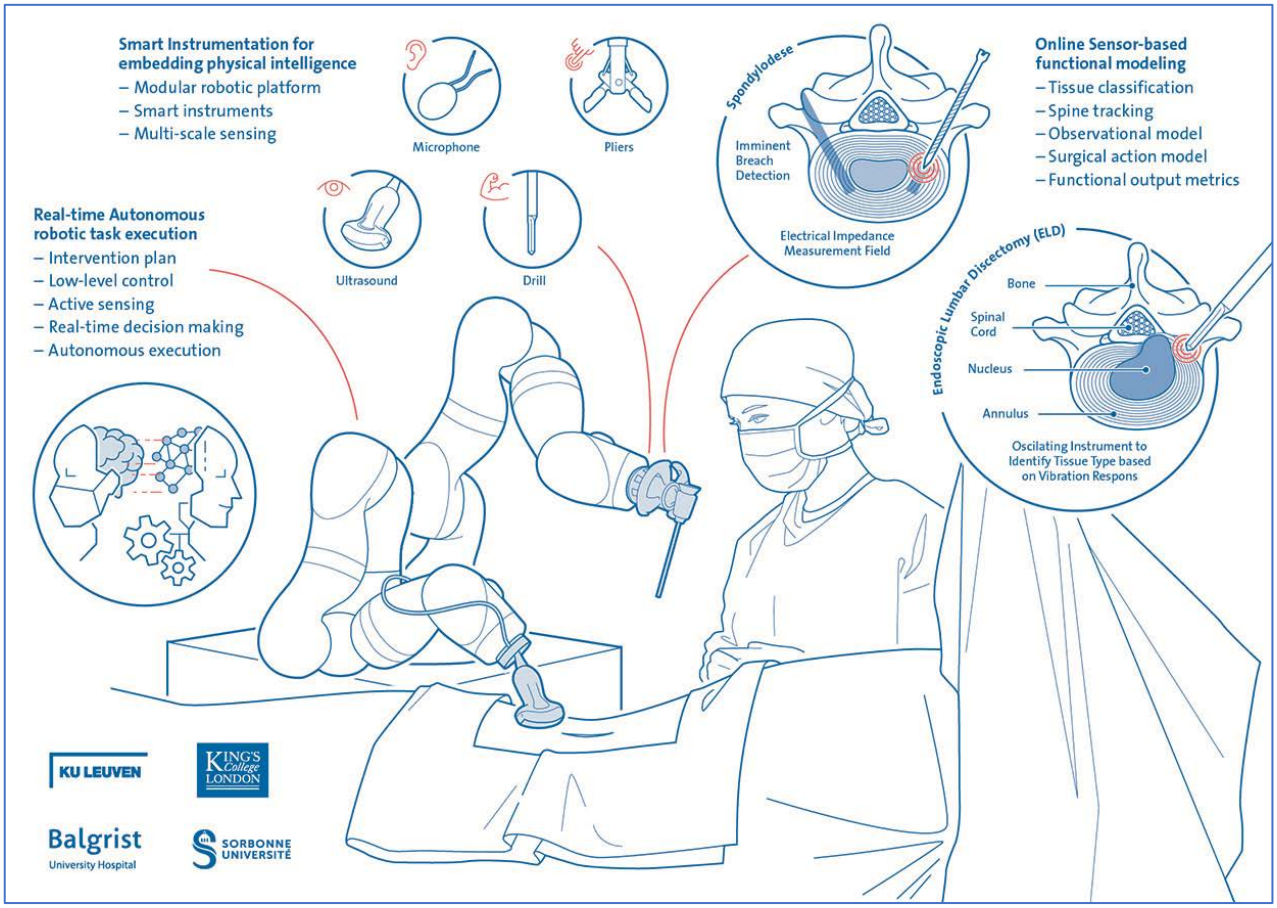
Illustration (University of Zurich, Tanja von Grebel)



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