

## **Smile - Laboratory for Sensitive machining of biological materials**

Initiative: Momentum - Förderung für Erstberufene

Bewilligung: 10.04.2023

Laufzeit: 4 Jahre

Machining of inhomogenous biological tissue is error-prone because measurement and adjusting of the machining procedure needs to be supervised by an experienced medical expert and does not happen simultaneously to the machining process. By realizing and applying an in-process multisensory measurement system and respective methods to fuse the data to meaningful simultaneous feedback mechanisms, this Momentum project aims to optimize machining in biological materials, thereby reducing the number of complications after such operations. Bone-drilling will be used as a test case. The applicant will set up a lab containing a bone drilling test rig with multiple sensors that allow for different sensory input during the drilling process. These inputs will be assessed using machine learning tools to model the inverse relation between the data and the unknown material and machining process parameters. With this concept the professorship is going away from the analysis of single process parameters and minimizing measurement uncertainty towards multisensory and smart machining processes. After the lab is set up and the machine learning tools are developed, the gained knowledge will be used in other manufacturing processes and additionally benefit new application-oriented studies at the University of Bremen.

### **Projektbeteiligte**

**Prof. Dr. Andreas Fischer**

Universität Bremen

Fachbereich Produktionstechnik

BIMAQ

Bremen