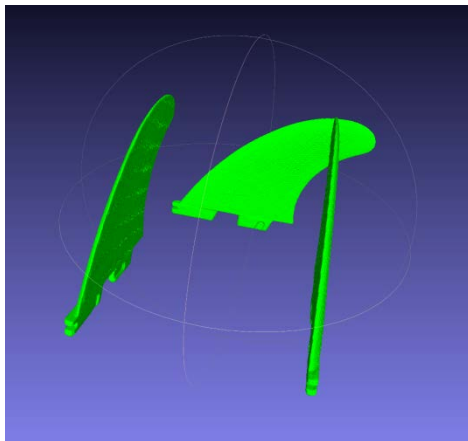**To students at the Technical Faculty**

Master thesis

Title: CFD simulation and influence of fin shape in surfboard design

Although surfing (Wellenreiten) is widespread around the world, surfboard design is still a trial and error process, since only rudimentary studies on the fluid dynamical characteristics of surfboard and fin shape have been performed.

In this project, we want to study the fluid dynamics for surfboards in the four fin configuration. In this configuration, the fin arrangement is that two fins are backward arranged and two fins are placed slightly shifted in front of those. The **questions to answer** are (1) how the flow is deflected from the two frontal fins and how this fact influences the fluid dynamics for the two backward fins and (2) how does the size of the fins influence this behavior.

The CFD model will be implemented in STAR-CCM+. Steady and unsteady simulations will be performed. It is assumed that the surfboard is on a flat water surface – the water does have a predefined and constant flow velocity. As surfboard model, a 3D CT-Scan of a real surfboard will be used: The left figure shows exemplarily three 3D reconstructed surfboard fins from a CT-Scan performed at the UKE.

The work will be done in cooperation between **Prof. Dr.-Ing. Stefan Becker** of IPAT and **Prof. Dr.-Ing. Michael Döllinger** (UKE).

We search for a dedicated and motivated student with

- experience in CFD modeling and simulation

- knowledge and experience in scientific programming in the field of fluid dynamics

Tasks:

- Enhancement of the existing CFD model in STAR-CCM+

- Numerical parameter study on different fin sizes and angles and effect on the fluid

Contact persons:

Prof. Dr.-Ing. Michael Döllinger (michael.doellinger@uk-erlangen.de / Tel. 09131-85 33814)

Prof. Dr.-Ing. Stefan Becker (sb@ipat.uni-erlangen.de / Tel. 09131-85 29455)

Dr.-Ing. Stefan Kniesburges (stefan.kniesburges@uk-erlangen.de / Tel. 09131-85 32616)