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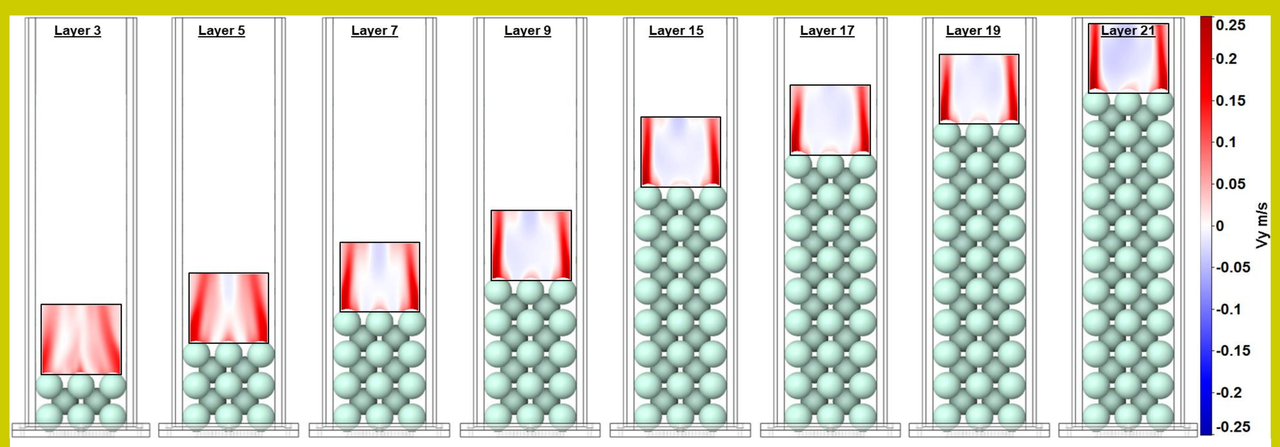
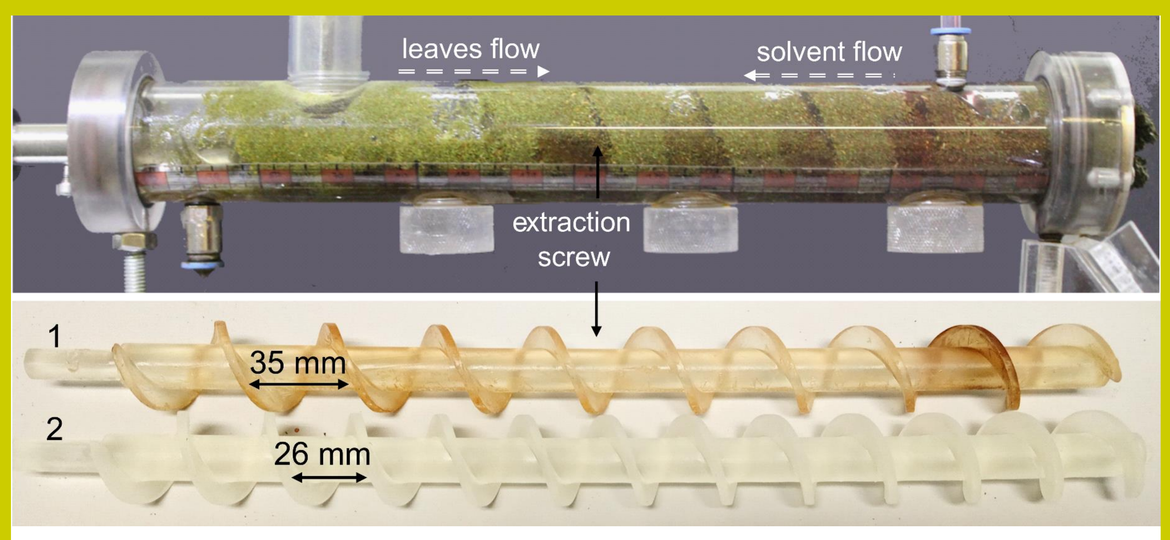
Fascinating experiments in fluid mechanics from 2023



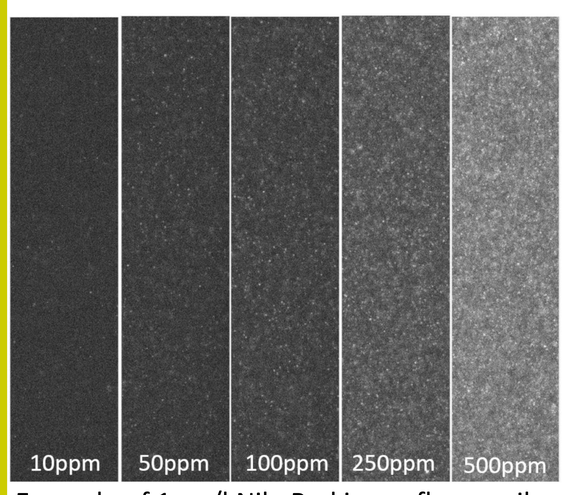
Application of **Particle Image Velocimetry (PIV) to the gas flow above the surface of a packed bed**. Bed height independent flow is reached after nine layers of spheres.

Velten, Zähringer

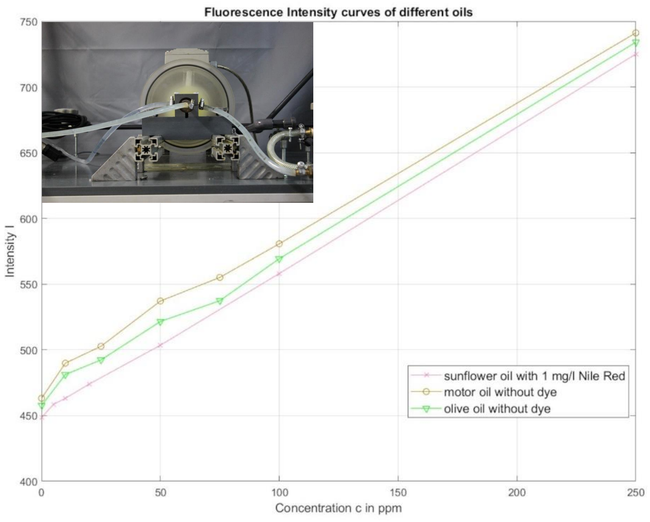


Various screw designs were implemented in a **continuous counter-current extraction process involving Artemisia Annua L. leaves**. The screw transport of the leaves is enhanced by reducing the pitch length, resulting in a sharper residence time distribution behaviour of the leaves that benefits high extraction efficiencies.

Al-Hamadi, Lehr

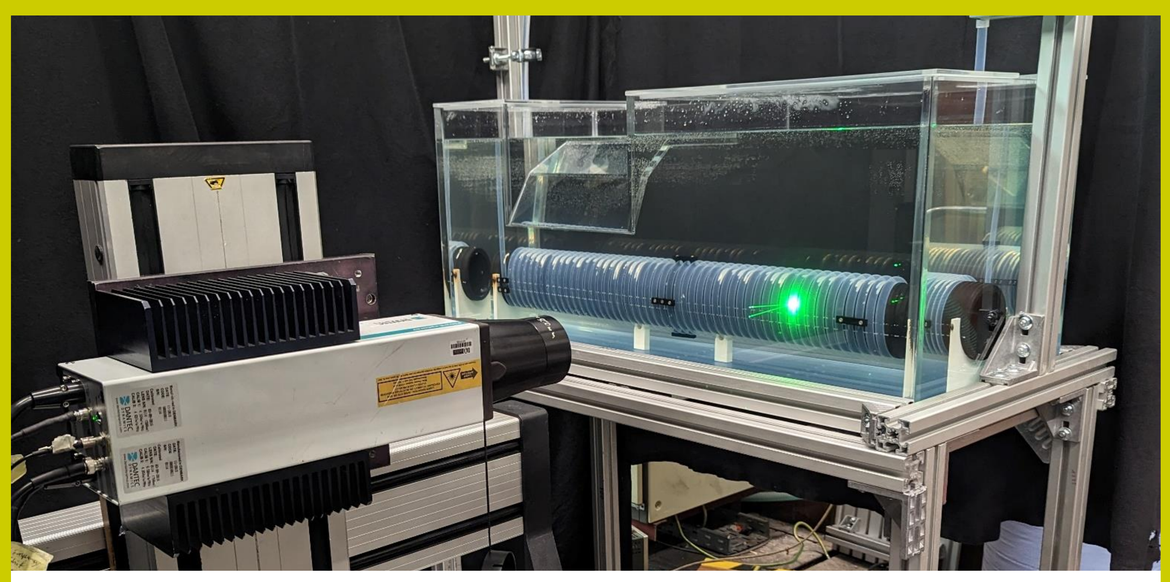


Example of 1mg/l Nile Red in sunflower oil



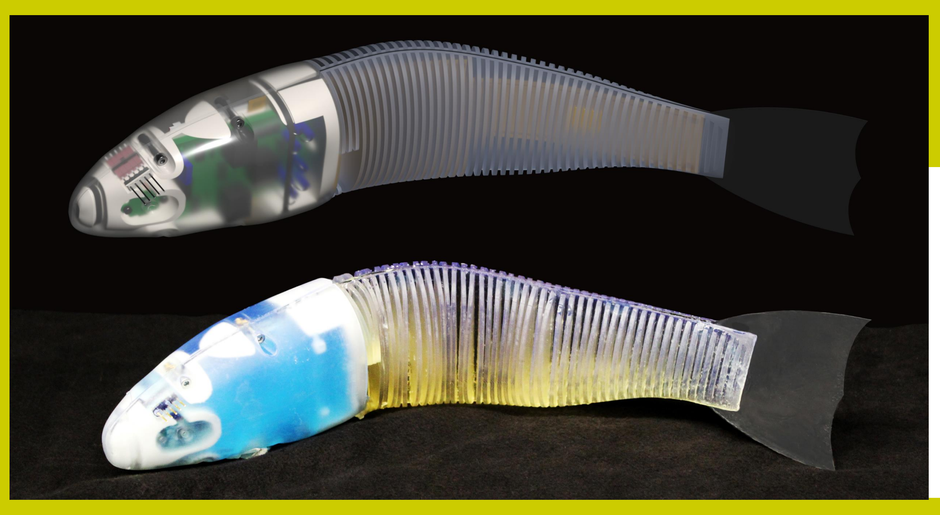
The **quantification of even the smallest amounts of oil in water** is achieved by using a sample analysis method based on the **fluorescence of oils**. Calibration curves represent the correlation between the fluorescence intensity and the oil concentration in water. Application for oil-water separation in a Pitot-pump.

Zhang, Köpplin



Horizontal **helically coiled reactor for the detection of the laminar-turbulent transition** with LDA measurement for the axial velocity. The very long helix permits flow conditions independent from the inlet and outlet flow fields.

Müller, Zähringer



The RETERO project develops a **fish mimicking self propelled device** for the assessment of the injury risk for fish in the passage of hydraulic structures. The fish robot is equipped with a propulsion system as well as pressure and acceleration sensors accounting for the hydraulic parameters and collisions during the passage.

Abbaszadeh, Leidhold, Hoerner

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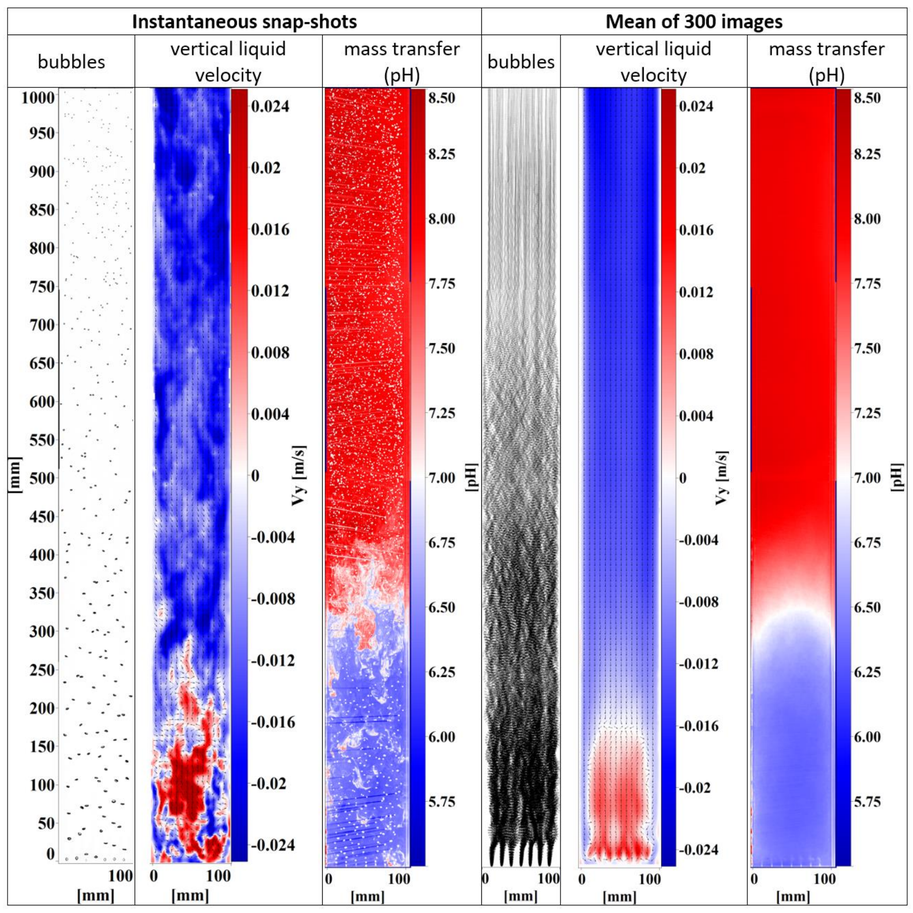
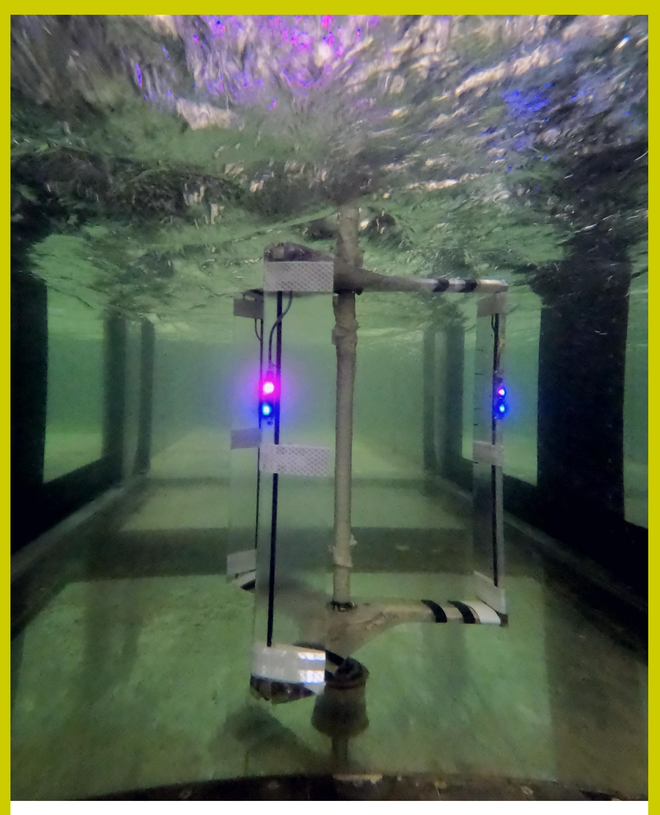
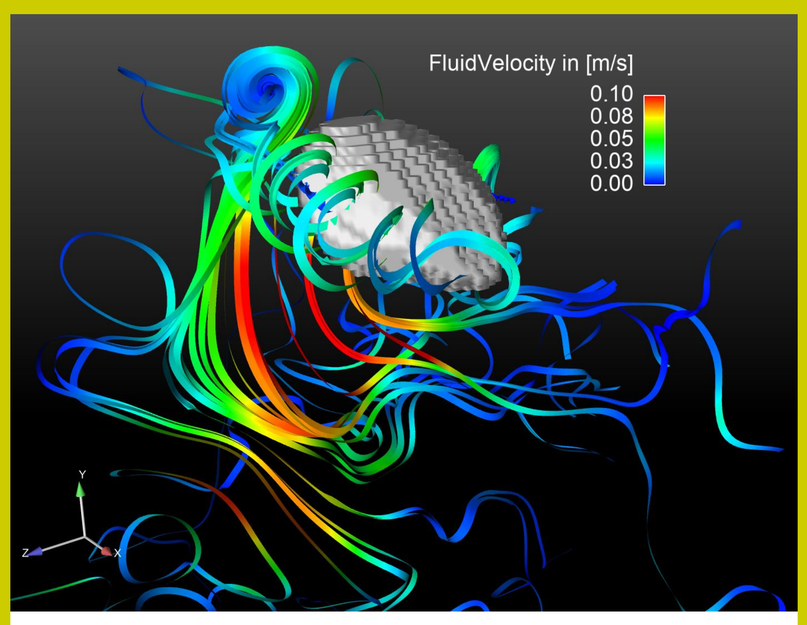
Mass transfer in a laboratory-scale bubble column with CO_2 bubbles. The gas phase was characterized with shadow imaging, the liquid flow field with Particle Image Velocimetry and the mass transfer/pH change with Laser-Induced Fluorescence. **Kováts, Zähringer**





The scaled **model of a cross-flow tidal turbine** is equipped with acceleration and pressure sensors in each blade. Additionally, the experimental setup provides the turbine torque and forces acting on one blade, allowing for calibration and validation of numerical models.

Bennecke, Ruiz-Hussmann, Kösters, Hoerner



3D Vortex structures around single rising bubbles (grey) investigated with time-resolved tomographic shadow imaging and simultaneous high-speed PTV (Shake-the-Box). The vortex structures are visualized with ribbon streamlines starting at a single vortex core around the bubble.

Müller, Chang, Kováts, Zähringer