



BIONIC SURFACE TECHNOLOGIES

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho u) = 0$$

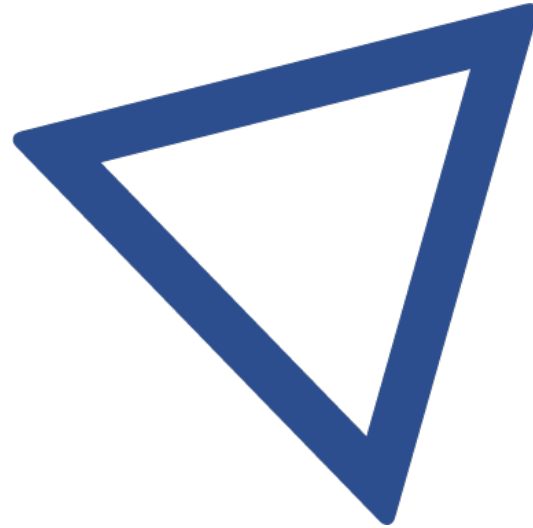
We simulate reality

$$\frac{\partial(\rho u)}{\partial t} + \nabla \cdot (\rho u u) = \nabla \cdot \bar{\sigma} + \rho f$$

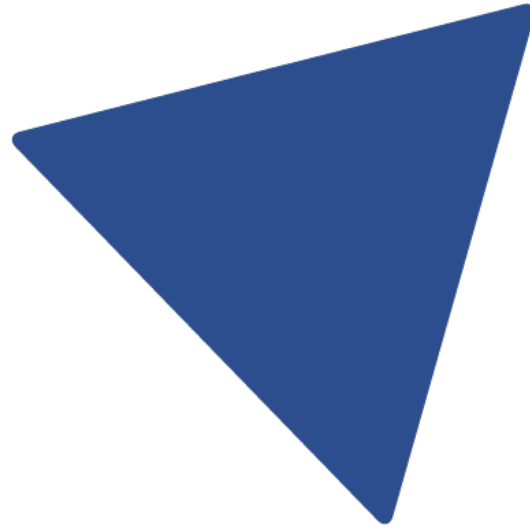
$$\frac{\partial \rho(e + \frac{1}{2}u^2)}{\partial t} + \nabla \cdot [\rho u(e + \frac{1}{2}u^2)] = u \cdot [\nabla \cdot \bar{\sigma} + \rho f] + \nabla \cdot q + r$$



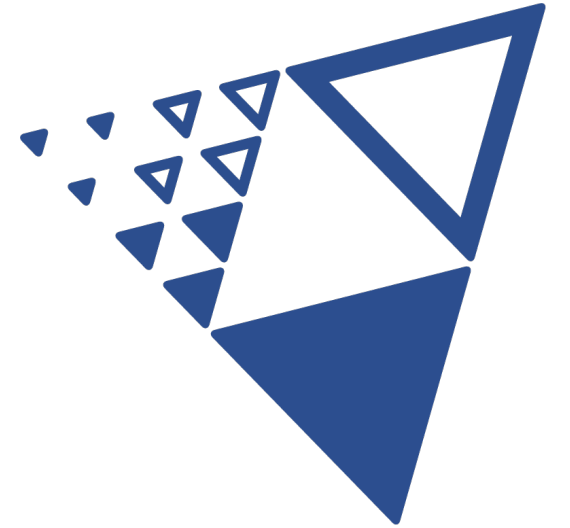
Founded
2009



Location
Graz - AUSTRIA



Branche
High Tech R&D



21
employees

More than 1000 projects worldwide in several industries...





Drag Reduction:
Implementation of Riblets and
further Technologies

Product Development:
Solutions with
Computational Fluid
Dynamics

Test & Evaluation:
Demonstration of Improvements

Product Development: Solutions with Computational Fluid Dynamics

Fluid Mechanics

Heat Transfer

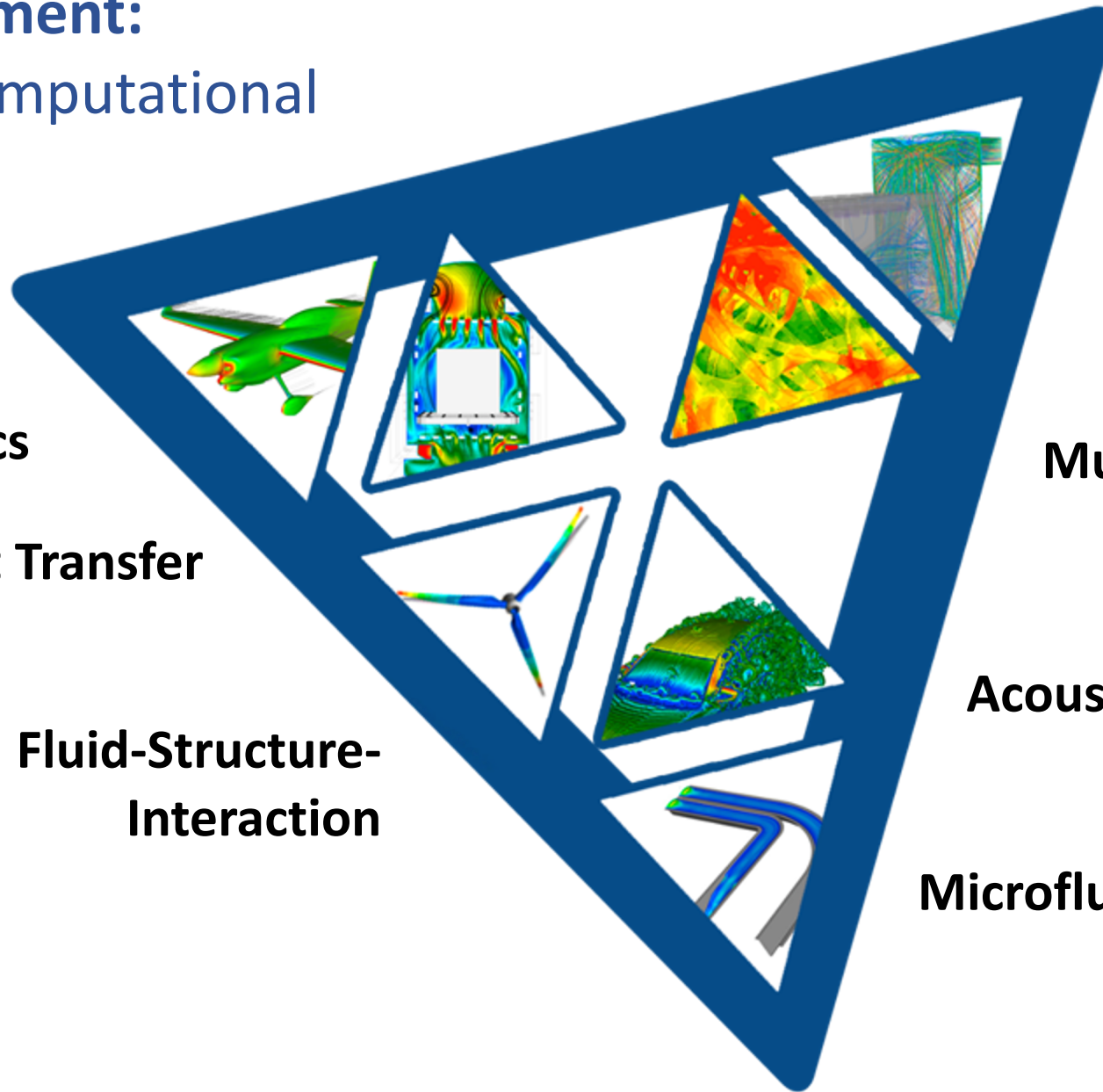
**Fluid-Structure-
Interaction**

Particle Simulations

Multiphase Flows

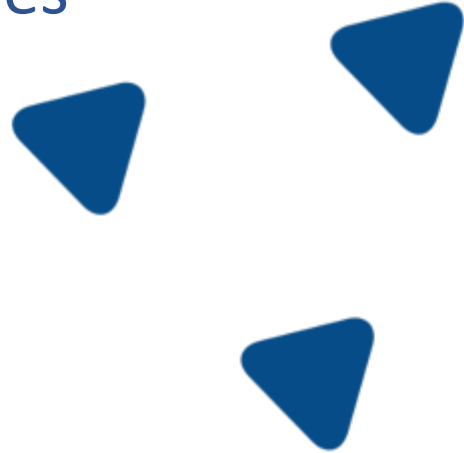
Acoustic Simulations

Microfluidics



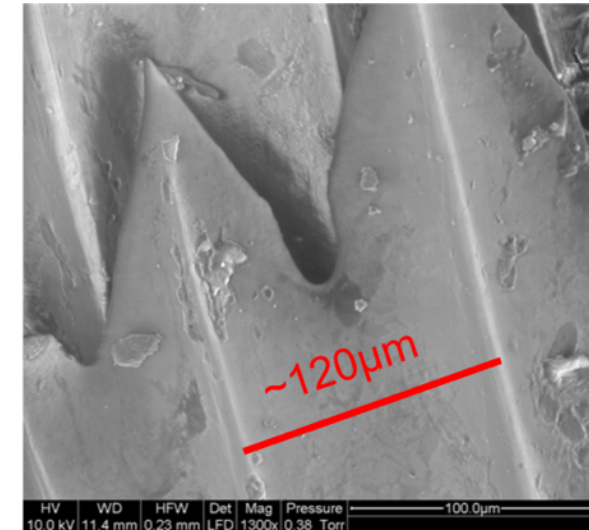
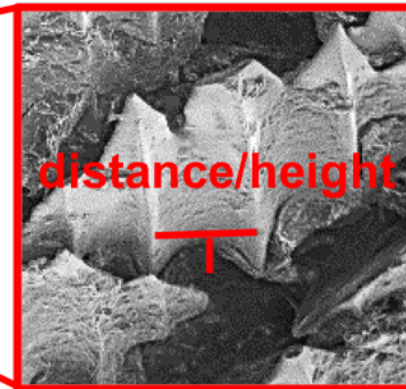
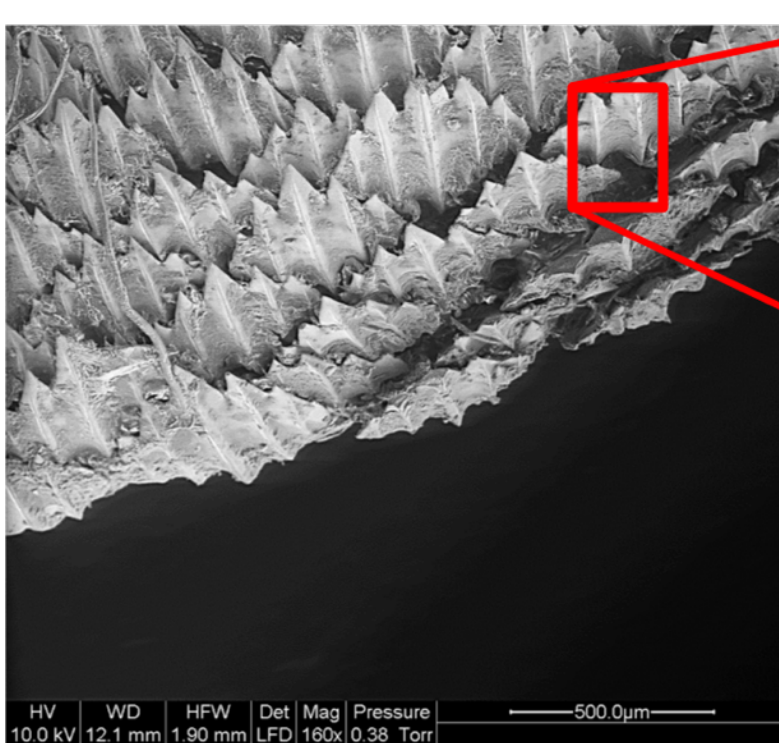
Drag Reduction:

Implementation of Riblets and further Technologies



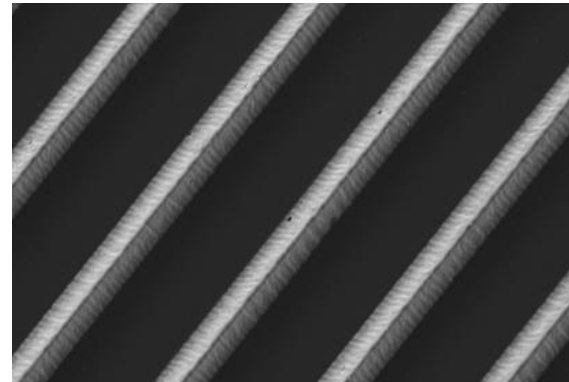
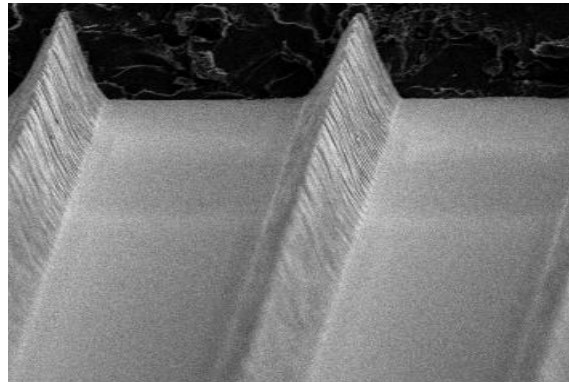
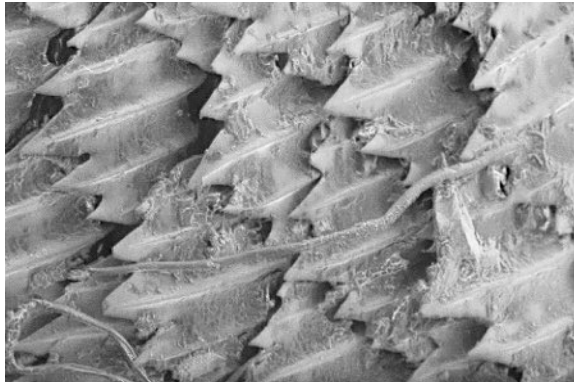
Let's take a closer look at a shark!

- Detailed analysis of skin of a blacktip reef shark (*Carcharhinus melanopterus*) show a riblet distance of $120\mu\text{m}$ and height of $\sim 50\mu\text{m}$.
- Along flow direction of the shark's body the tip distance and the aspect ratio changes with the near wall Reynolds number.



What are Riblets?

- Specifically developed microstructured surfaces, also called Riblets or shark skin, reduce the drag up to 8% in the turbulent boundary layer of different flows. Riblets have, similarly to the skin of a shark, tiny grooves arranged longitudinally along the flow.
- Furthermore, the use of Riblets has additional advantages like the reduction of noise emission and vibration.



Summary of Benefits

General Aviation:

4% less fuel consumption

4% range extension / 1,7% faster

1.58%
more speed



Engines - Turbomachinery:

1% higher efficiency

1% less fuel consumption / noise reduction

1%
more
efficiency



Commercial aviation:

4% less fuel consumption / 4% range extension

1,7% faster / noise reduction

4%
fuel saving



Summary of Benefits

Motorsport:

2% faster

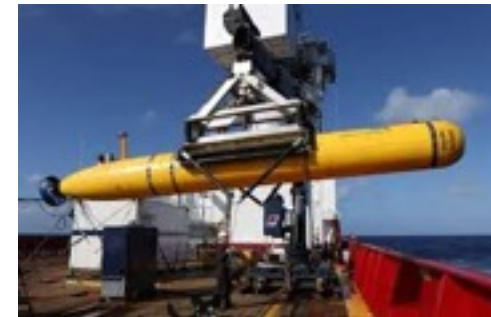


2%
faster

Ships, underwater drones, submarines:

5% less fuel consumption/
5% range extension/
1,7% faster

5%
more
efficiency



Wind Energy (Off and Onshore)

6% more energy / up to 5 dB noise reduction

6%
More
energy



5dB
Noise
reduction

- **Studentische/er Mitarbeiter/in im Bereich Messtechnik**
 - **Studentische/er Mitarbeiter/in im Bereich CFD**
- 1.) Interesse an Aerodynamik, Fluidodynamik und Akustik
 - 2.) Interesse/Erfahrung im Aufbau, Durchführung und Dokumentation von messtechnischen Versuchen

- **Studentische/er Mitarbeiter/in im Bereich Messtechnik**
- **Studentische/er Mitarbeiter/in im Bereich CFD**

3.) Fortgeschrittenes technisches Studium (z.B. Maschinenbau, Mechatronik, Elektrotechnik, Verfahrenstechnik)

4.) Leute die gefordert werden wollen und selbständig etwas auf die Beine stellen wollen

Keine All-Inklusive Verträge mit fixen Überstunden!

Rücksicht auf das Studium bzw. dessen Fertigstellung!

Fixe Bakk. – Masterarbeit!



$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho u) = 0$$

$$\frac{\partial(\rho u)}{\partial t} + \nabla \cdot (\rho u u) = \nabla \cdot \bar{\sigma} + \rho f$$

$$\frac{\partial \rho(e + \frac{1}{2}u^2)}{\partial t} + \nabla \cdot [\rho u(e + \frac{1}{2}u^2)] = u \cdot [\nabla \cdot \bar{\sigma} + \rho f] + \nabla \cdot q + r$$

LIEBENAUER HAUPTSTRASSE 2-6

8041 GRAZ | AUSTRIA

PHONE +43 650 9222 907

INFO@BIONICSURFACE.COM

WWW.BIONICSURFACE.COM