

Contents

Part I: Flow Control in Single Cell Organisms

Theoretical and Experimental Investigations of Amoeboid Movement and First Steps of Technical Realisation	3
<i>Wolfgang Alt, Valter Böhm, Tobias Kaufhold, Elka Lobutova, Christian Resagk, Danja Voges, Klaus Zimmermann</i>	
Swimming at Low Reynolds Number: From Sheets to the African Trypanosome	25
<i>Sujin B. Babu, Christian Schmeltzer, Holger Stark</i>	
African Trypanosomes as Model System for Functional Analyses of Microbial Motility	43
<i>Markus Engstler, Niko Heddergott, Tim Krüger, Eric Stellamanns, Sravanti Uppaluri, Thomas Pfohl</i>	

Part II: Flow Control in Insects and Birds

Wake Structure and Vortex Development in Flight of Fruit Flies Using High-Speed Particle Image Velocimetry	65
<i>Fritz-Olaf Lehmann</i>	
Experimental Quantification and Numerical Simulation of Unsteady Flow Conditions during Free Flight Maneuvers of Insects	81
<i>Andrei Shishkin, Peter Schützner, Claus Wagner, Fritz-Olaf Lehmann</i>	
Barn Owl Flight	101
<i>Thomas Bachmann, S. Blazek, T. Erlinghagen, W. Baumgartner, H. Wagner</i>	
Flow Field Analysis and Contour Detection of a Natural Owl Wing Using PIV Measurements	119
<i>Andrea Winzen, Stephan Klän, Michael Klaas, Wolfgang Schröder</i>	

Shape and Deformation Measurement of Free Flying Birds in Flapping Flight	135
<i>Wolf Thomas, Konrath Robert, Erlinghagen Thomas, Wagner Hermann</i>	

A Discussion on Vortex Growth and Saturation in Dragonfly-Inspired Flight	149
<i>David E. Rival, Alex Widmann, Cameron Tropea</i>	

Part III: Flow Control in Fish, Dolphins and Seals

Station Holding of Trout: Behavior, Physiology and Hydrodynamics	161
<i>Horst Bleckmann, A. Przybilla, A. Klein, A. Schmitz, S. Kunze, Christoph Brücker</i>	

Learning from Dolphin Skin – Active Transition Delay by Distributed Surface Actuation	179
<i>Andreas Pätzold, Inken Peltzer, Wolfgang Nitsche</i>	

Development and Fabrication of Active Microstructures for Wave Control on Airfoils	193
<i>Daniel Haller, Sebastian Neiss, Michael Kroener, Peter Woias</i>	

Learning from Dolphin Skin – Drag Reduction by Active Delay of Transition: Flow Control by Distributed Wall Actuation	207
<i>Nikolas Goldin, Rudibert King</i>	

Linear-Stability Investigations for Flow-Control Experiments Related to Flow over Compliant Walls	223
<i>Marcus Zengl, Ulrich Rist</i>	

Analysis of the Relation between Skin Morphology and Local Flow Conditions for a Fast-Swimming Dolphin	239
<i>Vadim Pavlov, Donald Riedeberger, Ulrich Rist, Ursula Siebert</i>	

Hydrodynamic Perception in Pinnipeds	255
<i>Wolf Hanke, Sven Wieskotten, Benedikt Niesterek, Lars Miersch, Matthias Witte, Martin Brede, Alfred Leder, Guido Dehnhardt</i>	

On the Wake Flow Dynamics Behind Harbor Seal Vibrissae – A Fluid Mechanical Explanation for an Extraordinary Capability	271
<i>Matthias Witte, Wolf Hanke, Sven Wieskotten, Lars Miersch, Martin Brede, Guido Dehnhardt, Alfred Leder</i>	

Part IV: Flow Control in Human Swimmers

Experimental and Numerical Investigation of the Unsteady Flow around a Human Underwater Undulating Swimmer	293
<i>Stefan Hochstein, Steffen Pacholak, Christoph Brücker, Reinhard Blickhan</i>	

**Part V: Flow Control with Aid of Compliant Walls,
Airfoils, Wave-Like Riblets**

Influence of Wave-Like Riblets on Turbulent Friction Drag 311
*René Grüneberger, Felix Kramer, Erik Wassen, Wolfram Hage,
Robert Meyer, Frank Thiele*

**Aerodynamics and Structural Mechanics of Flapping Flight with
Elastic and Stiff Wings** 331
*Stephan Bansmer, Nadine Buchmann, Rolf Radespiel, Ralf Unger,
Matthias Haupt, Peter Horst, Ralf Heinrich*

Nature-Inspired Porous Airfoils for Sound Reduction 355
Thomas Geyer, Ennes Sarradj, Christoph Fritzsche

Author Index 371