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Editorial

Biomechanics of swimming and flight

This special issue on *Biomechanics of Swimming and Flight* underpins the importance of biomechanics as one of the core disciplines of *The Journal of Experimental Biology*. It was inspired by a two-day symposium on swimming and flying at the 5th World Congress of Biomechanics 2006 in Munich, Germany. Organized by Charlie Ellington (Cambridge, UK) and Johan van Leeuwen (Wageningen, The Netherlands) as part of the theme on 'Biomechanics in Nature', with particular emphasis on fluid flow in relation to biological structure, the symposium covered motor systems, fluid dynamics of swimming and flight, and control.

The interdisciplinary field of biomechanics is developing at a very rapid pace, with exciting new experimental techniques, such as digital 2-D and 3-D flow visualization and robotics, advanced computational fluid and structural mechanics, and methods developed to assess biomechanical performance in living animals. Several fine examples of these developments can be found in this special issue.

As an interdisciplinary field, biomechanics benefits from experimental and conceptual integration across the fields of biology, physics and engineering science. Recent developments in bioengineering recognize the growing importance of 'bio-inspired design' in the development of novel mechanical, fluid and electrical devices. Such devices range from nano- to macro-technological applications. This is a natural outgrowth of biologists, engineers and physicists collaborating on common research interests, who appreciate the elegant designs that have been 'engineered' by natural selection to enable a remarkable diversity of organisms to contend with their physical environment. This special issue focuses in particular on the fluid environment of animals and the locomotive systems that animals have evolved to move in the water and air. Our goal was to emphasize this cross-disciplinary approach, building from the molecular and structural organization of muscle that powers movement to the complex and fascinating designs of swimming and flying animals. We hope that this special issue will prove to be of interest to experts and will also provide a stimulating overview for scientists new to this field.

We would like to extend our warmest thanks to all the contributors to the symposium and authors of this special issue. We thank the editors of *The Journal of Experimental Biology* for their support, and Charlie Ellington for his inspiring contributions to the symposium and the many ideas that helped shape this volume. We are very grateful to the editorial and production staff of *The Journal of Experimental Biology* for their efforts and patience.

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