Special Issue

Advances in Biological Flows and Biomimetics

Message from the Guest Editors

The biological world is replete with countless examples of fluid dynamics problems including pumping of blood by the heart, swimming in water and mucus, flying on scales from tiny insects to large birds, filtering through bristled appendages and other porous structures, and drag reduction through reconfiguration. Recent advancements in computational and experimental fluid dynamics have enabled researchers to efficiently explore biological problems that involve moving elastic boundaries across orders of magnitude in scale. Efforts to understand the dynamics of these types of problems through mathematical analysis, laboratory experiments, and numerical modeling is a rapidly expanding area of fluid mechanics. Simplified mathematical and physical models of these systems also have the potential to inform the design of robots and autonomous underwater and aerial vehicles. This Special Issue of Fluids is dedicated to the recent advances in the mathematical, numerical and physical modeling of problems in biological fluid dynamics with applications to bio-inspired design.

Guest Editors

Prof. Dr. Laura A. Miller

Departments of Biology and Mathematics, University of North Carolina, Chapel Hill, NC 27599, USA

Prof. Dr. Arvind Santhanakrishnan

School of Mechanical & Aerospace Engineering, Oklahoma State University, 201 General Academic Building, Stillwater, OK 74078, USA

Deadline for manuscript submissions

closed (31 March 2020)

Fluids

an Open Access Journal by MDPI

Impact Factor 1.8
CiteScore 4.0

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Fluids
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
fluids@mdpi.com

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Editor-in-Chief

Prof. Dr. D. Andrew S. Rees
Department of Mechanical Engineering, University of Bath, Bath BA2 7AY, UK

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