Flow (2021), **1** E1
doi:10.1017/flo.2021.2

FLOW CAMBRIDGE UNIVERSITY PRESS

EDITORIAL

Flow forth

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Received: 2 December 2020; **Accepted:** 16 March 2021

Abstract

The study of fluid flow has enabled milestones in technology and a deeper understanding of the natural world. Existing journals cover fundamental aspects of fluid mechanics very well and other journals target specific application fields. We here introduce a new journal titled *Flow* that is dedicated to covering and highlighting the application of fluid mechanics to concrete problems across all fields. *Flow* benefits from the roster of reviewers of its sister publication, the *Journal of Fluid Mechanics*, and offers rapid reviews and an open-access format. For its readers, *Flow* offers accessible introductions to new application areas and an introduction to the varied tools of fluid mechanics. For authors, *Flow* offers a venue to reach a broad audience, a focus on enabling translational research, and a way to disseminate the tools of fluid mechanics.

Impact Statement

Flow is an open-access, peer-reviewed journal designed to promote and exemplify leveraging of the principles of fluid mechanics for concrete applications. Applications are defined broadly, encompassing technology that benefits humankind and insights that offer a greater understanding of nature. For more details see https://www.cambridge.org/core/journals/flow.

The study of fluid flow has established a strong foundation for a great many technological innovations and insights into biology and the physical world. This knowledge has enabled hallmarks of civilization, including the production of energy, the distribution of fresh water for irrigation and consumption, flight and transportation, biomedical devices and the exploration of space. At the same time, fluid mechanics plays a critical role in discerning how organisms interact with the biosphere, from bacterial locomotion, to bird flight, to the impact of human technology on the Earth's climate. Indeed, it serves to provide a more detailed and quantitative understanding of the world across a vast range of length and time scales from galaxy formation to Brownian dynamics.

Based on this success and ubiquity, and contributing substantially to it, several scientific journals have covered well the fundamental aspects and others are focused on important application fields. An excellent example of the former is the *Journal of Fluid Mechanics* (*JFM*) published by Cambridge University Press (CUP). Examples of the latter include journals on biomedical sciences, aerodynamics and propulsion, microfluidics and chemical assays, oceanography and climate.

We strongly believe that there is a niche for a new type of journal dedicated to the application of fluid mechanics to concrete problems across all fields, that is, a journal focused on translational efforts that originate from fluid mechanics. Our journal was created by strong support from the *JFM* Editorial Board, including *JFM* Editor-in-Chief Grae Worster, and Kathleen Too, Executive Publisher at CUP.

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https://doi.org/10.1017/flo.2021.2 Published online by Cambridge University Press

The full name of the journal is *Flow: Applications of Fluid Mechanics* and the journal title will appear simply as '*Flow*' in the citation of each paper. Importantly, *Flow* is as a companion journal to *JFM*. It will encompass broadly all applications of fluid mechanics to new technology, biology and descriptions of the physical world. You can read *Flow*'s scope here: https://www.cambridge.org/core/journals/flow/information.

Flow's launch coincides with the 100th anniversary of the birth of George K. Batchelor (1920–2000) (Linden, 2021). More relevantly, it coincides with the 65th year since Batchelor founded *JFM* in 1956. Batchelor's vision was that *JFM* would bring together three important aspects of fluid mechanics: theoretical and mathematical treatments, experimental contributions to basic research and applications (Batchelor, 1981). Batchelor wrote the latter editorial 25 years after founding *JFM* and lamented that *JFM* embraced the first two aspects more completely than applications. I believe this emphasis remains true of *JFM* today and, hence, one aspiration of *Flow* as a companion journal to *JFM* is to embrace and emphasize applications more directly and explicitly. *Flow*'s goal is not to compete with *JFM* but to provide a complementary venue.

> 'Our invention relates to that class of flying-machines in which the weight is sustained by the reactions resulting when one or more aeroplanes are moved through the air edge wise at a small angle of incidence, either by the application of mechanical power or by the utilization of the force of gravity.' (Wright & Wright, 1906)

I was greatly honoured to be asked to serve as founding Editor-in-Chief of *Flow*. I have great respect for the reputation that *JFM* and CUP uphold. My own field is micro-scale transport phenomena and electrokinetic flows with applications to microfluidic devices for biological analyses. I have found that most of what I consider to be my best contributions have been rooted in principles of the field of fluid mechanics. I have also faced the dilemma of where to publish such applied work, and this perspective has made me a strong believer for this new journal.

A central hypothesis of *Flow* is that it can serve the scientific community as a mechanism to proliferate the powerful and versatile tools of fluid mechanics across many, if not most, applied fields of study. Each paper of *Flow* should have one hand grasped firmly on a fundamental concept of fluid mechanics and a second hand grasping, or at least reaching directly toward, a concrete application. *Flow*'s papers should highlight how fluid mechanics is leveraged to enable new technologies and new understanding of nature.

> 'This subject is important in relation to many practical questions, e.g. the propulsion of ships, the flight of projectiles, and the effect of wind on structures. Although it has recently been studied with renewed energy, owing to its bearing on the problems of artificial flight, our knowledge of it is still largely empirical.' (Lamb, 1916)

I chose the quotes above to highlight the historical importance of translational fluid mechanics. The first quote is from the Wright brothers' application for a US patent on their Flying Machine, filed in 1903. The second quote is from the classic theoretical treatment of fluid mechanics by Sir Horace Lamb in his book *Hydrodynamics*. Interestingly, Lamb's quote and its associated chapter on the resistance of fluids (i.e. drag force) appears for the first time in his 4th edition (1916), so the new material was hard upon the then recent advances in 'artificial flight' by applied practitioners. The two quotes exemplify the necessity of a healthy interdependence between the fundamental and the applied.

Flow's format is designed to reach a wide audience. Each paper will be relatively short (e.g. approximately 12–15 pages for a typical research paper) with a data- and figure-centric single-column format. The main body of each paper should be self-contained and be intelligible widely. *Flow* will feature a variety of peer-reviewed article types which are summarized here: https://www.cambridge.org/core/journals/flow/information/instructions-for-authors#types.

In any of these paper types, the Supplementary Material section will offer ample additional space, if needed, to include details necessary to reproduce the work. There will be no issues; papers will be published online as soon as they are available. We instituted a requirement of an 'Impact Statement' which clearly articulates complementary fundamental and concrete aspects. The novelty of each work

https://doi.org/10.1017/flo.2021.2 Published online by Cambridge University Press

should be in addressing a new application or in a novel combination of a fluid mechanics principle and an application.

Importantly, the journal is also to be open access and online. This maximizes accessibility by readers worldwide to published papers. Authors who may have trouble affording the publishing fees or with no research funding for paying article processing charges (APC) should contact the *Flow* editorial office for potential discretionary waivers. We do not expect authors to pay APCs out of their own pocket. Cambridge University Press has demonstrated their intent, through concerted and ongoing actions, to make open-access publication accessible widely through their expanding Read and Publish (R&P) agreements. Read more about R&P deals here: https://www.cambridge.org/core/services/open-access-policies/read-and-publish-agreements. Under R&P, an institution would have paid for access to both read the full CUP collection and to publish Open Access at no extra cost to the researcher in terms of APCs. Other waivers are also available for low- or middle-income regions in the developing world as defined by Research4Life (see https://www.cambridge.org/core/services/open-access-policies/waivers-discounts).

We have formed an excellent initial group of Associate Editors who are all experts in highly diverse and broad aspects of fluid flow. They are also experienced at the hard work of defining and expanding new applications of fluid mechanics. I am excited and humbled by the opportunity to work with these great researchers. We have also formed a stellar Advisory Board of exceedingly well-respected leaders in the field of fluid mechanics. Please see the composition of our Editorial and Advisory Board here: https://www.cambridge.org/core/journals/flow/information/editorial-board/flow-editorial-board.

Why submit to *Flow*? Here are key reasons:

(i) *Flow*'s open access format offers greater reach with no barrier for those who wish to read, learn from and cite your work. *Flow*'s scope also helps you reach a wider audience than traditional fluids journals.
(ii) Our focus on applications aims to facilitate faster translation of your hard work to real world systems and applications.
(iii) *Flow* aims to disseminate new advancements in analysis methods and experimental tools developed for a specific set of problems to a wider audience.
(iv) *Flow* benefits from the excellent reputation of our sister publication *JFM*. *Flow*'s connection to *JFM* also facilitates our Editors with access to a large number of quality reviewers in the fluid mechanics field.
(v) *Flow* offers quality and quick turnaround reviews, including rapid initial feedback shortly after submission.

To readers who are fluid mechanicians, we hope to offer accessible introductions to new and varied applications. Indeed, we aspire to expose such researchers to areas far from their current field but to which they might make new and impactful contributions. To readers who are outside of fluid mechanics, we hope to provide an introduction to the powerful and varied tools offered by fluid mechanics. Of course, for all readers, we will strive to offer high-quality, succinct and insightful papers that demonstrate how the study of fluid flow can change our world.

References

Batchelor, G. K. (1981). Preoccupations of a journal editor. *Journal of Fluid Mechanics*, *106*, 1–25.
Lamb, H. (1916). *Hydrodynamics* (4th ed.). Cambridge: Cambridge University Press.
Linden, P. (2021). Special JFM volume in celebration of the George K. Batchelor centenary. *Journal of Fluid Mechanics*, *914*, E1.
Wright, O., & Wright, W. (1906). *U.S. Patent No. 821,393*. Washington, DC: U.S. Patent and Trademark Office.

Cite this article: Santiago, J. G. (2021). Flow forth. *Flow*, *1*, E1. doi:10.1017/flo.2021.2

https://doi.org/10.1017/flo.2021.2 Published online by Cambridge University Press