Roadmap for optofluidics

Optofluidics, nominally the research area where optics and fluidics merge, is a relatively new research field and it is only in the last decade that there has been a large increase in the number of optofluidic applications, as well as in the number of research groups, devoted to the topic. Nowadays optofluidics applications include, without being limited to, lab-on-a-chip devices, fluid-based and controlled lenses, optical sensors for fluids and for suspended particles, biosensors, imaging tools, etc. The long list of potential optofluidics applications, which have been recently demonstrated, suggests that optofluidic technologies will become more and more common in everyday life in the future, causing a significant impact on many aspects of our society. A characteristic of this research field, deriving from both its interdisciplinary origin and applications, is that in order to develop suitable solutions a combination of a deep knowledge in different fields, ranging from materials science to photonics, from microfluidics to molecular biology and biophysics, is often required. As a direct consequence, also being able to understand the long-term evolution of optofluidics research is not easy. In this article, we report several expert contributions on different topics so as to provide guidance for young scientists. At the same time, we hope that this document will also prove useful for funding institutions and stakeholders to better understand the perspectives and opportunities offered by this research field.