

OpenFluidics：開源微流體晶片設計生態系統

OpenFluidics: An Open-Source Microfluidic Design Ecosystem

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The microfluidics market is expected to reach USD 13.3 Billion by 2023 from an estimated USD 4.7 Billion in 2018, at a CAGR of 18.8%. To support the growth of the market during the forecast period, growing investments, favorable regulatory policies, and growth in healthcare and biotechnology industries in emerging Asian markets are expected to provide potential growth opportunities for players operating in the microfluidics market. Furthermore, growing application of microfluidic technology in personalized medicine, organ-on-a-chip, and liquid biopsies; expanding application of microfluidics in drug delivery systems such as insulin pumps and inhalers is further expected to drive the market during the forecast period. However, despite the impressive research progress of microfluidics over the last decades and recent market booming and commercialization, the microfluidic community is still rather small. We suspect two main bottlenecks have been preventing many potential researchers from joining the field: technical barriers and reliability issues. Technical barriers refer to the manufacturing of microfluidic chips or platform, which often requires special facilities and knowledge, and the building of control electronics and software to operate them. Reliability issues refer to the major failure mechanisms of the chips or platforms during usage. Meanwhile within the community, the development of microfluidics products today is of low efficiency and high cost. First, lacking of standardized rule and computer-aided design (CAD) specialized for microfluidic chip, one has to draw the layout on a device manually which may take weeks; second, due to small number of microfluidic chips that a lab normally requires, making small amount microfluidic chips is much more expensive than mass production; third, people are using non-standardized components and application-specific layout. There is almost no ability to connect disparate parts to synergize breakthroughs or to create economic development via specialization.

To widen the above bottlenecks and make research labs equally competitive in microfluidic research and to keep microfluidic community grow efficiently, our team conceived OpenFluidics: a first-ever open-source microfluidic design ecosystem which can provide services including an online CAD tool, a selection of foundry services, a ready to use microfluidic control and operation system, and an online portal for design sharing. OpenFluidics will cultivate an ecosystem where a wide range of users (e.g., researchers, entrepreneurs, students, hobbyists) can focus on their own ideas and applications without worrying about the engineering and manufacturing side of microfluidic technology.

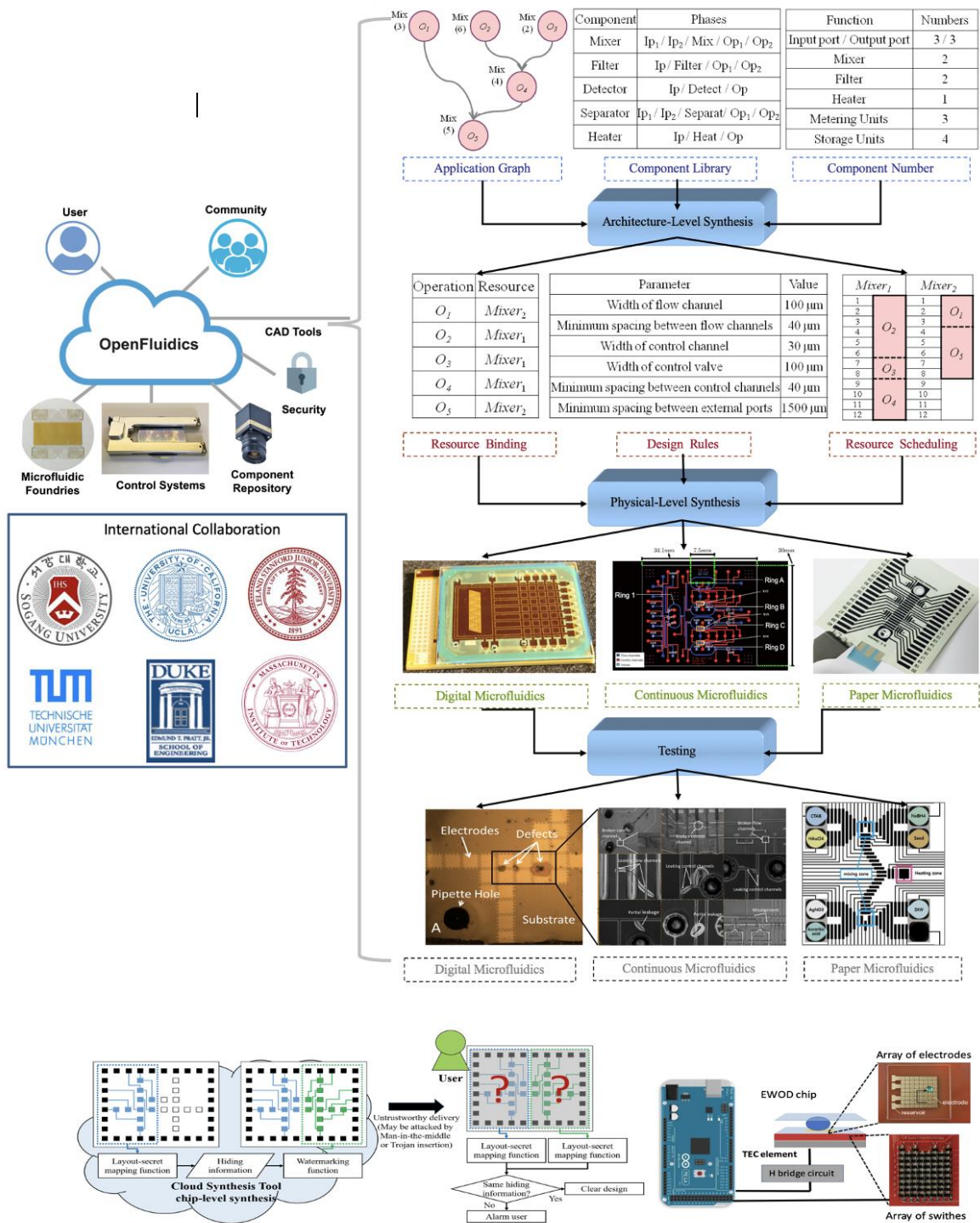


Figure 1: Overview of OpenFluidics Design Ecosystem

References

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