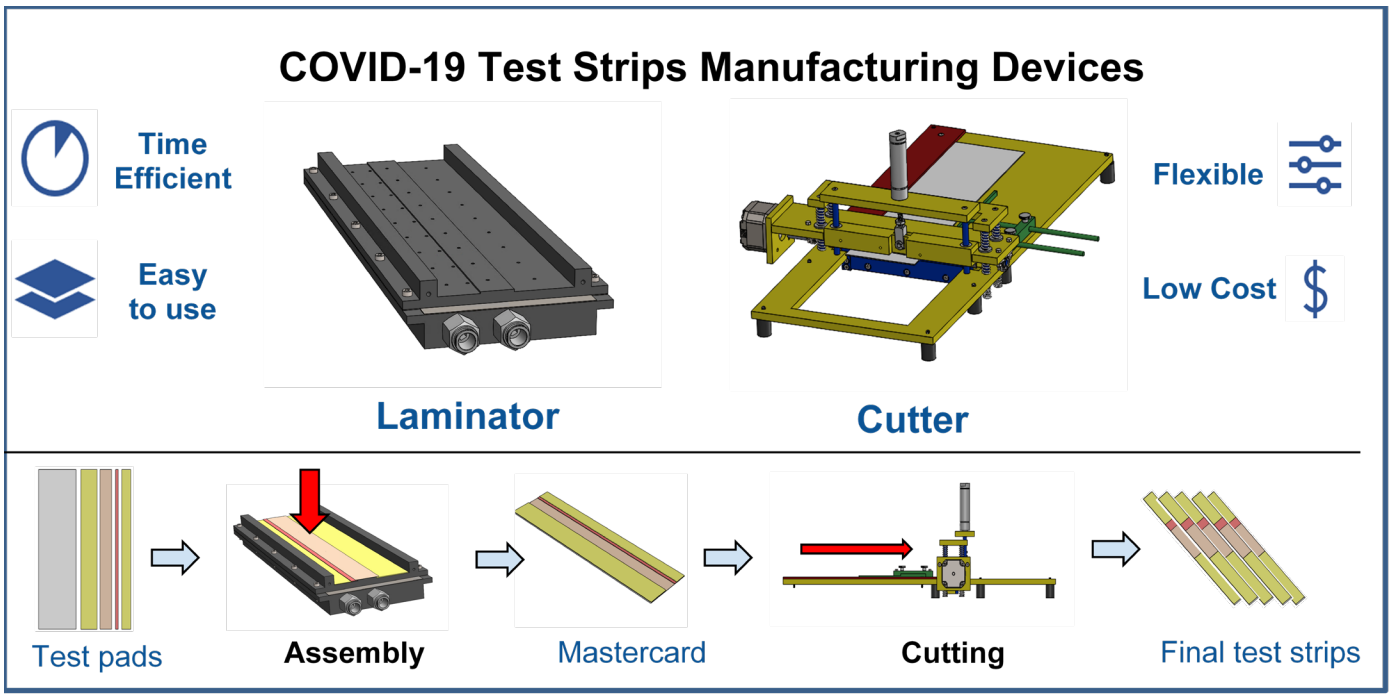

Efficient COVID-19 Test Strip Manufacturing Devices

Client: University of Toronto Bio-MEMS Lab
Team Members: Jungho J. Kim, Eason Ong, Jianfei Pan, Qiwei Zhao
Supervisor: Xinyu Liu

Need of an affordable and efficient machine to manufacture COVID-19 LFT

Lateral flow test strip (LFT) is a simple and economic point of care diagnostic device used to detect the presence of a target analyte in liquid samples. The client requires a continuous supply of LFT to aid their research regarding COVID-19 and other viruses diagnostics. Current LFT laminators and cutters in the market are costly (>10000 CAD combined), complex to operate and are more suited for industrial application. An affordable and efficient table top laminator and cutter would allow the continuous lab-scale production of LFT to facilitate the client's research. Such design could also be deployed in 3rd world countries to aid their COVID-19 mass screening efforts using LFT instead of Polymerase Chain Reaction (PCR) which requires advanced laboratory facilities and highly-trained healthcare workers.

Low cost and efficient laminator and cutter

Laminator: The complementary shape of the engraved top plate is customized to perfectly fit the thickness and width of each test pads for easy alignment. This simple and innovative design reduces operating steps of conventional laminators by half and ensures consistent overlapping between component pads on an adhesive backing card. A vacuum pump will provide suction force on the plate to hold the pads in their respective slots for easy handling of test pads. The overall cost of this design is 6 times cheaper than the market product.

Cutter: The cutter design utilizes a pneumatic cylinder to provide adjustable cutting rates and forces on a variety of materials to guarantee a clean cut across the mastercard. The feeder controlled by stepper motor allows the user to easily and accurately control the final cutting width of LFT strips through a touch screen interface. By utilizing standardized components and designing for manufacturability, the final cost of our design with exact same functionality is 5 times cheaper than the existing design.