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A modular and lowcost 3D-printed microfluidic device with assembly of capillaries for droplet mass production A. A. AGUIRRE-PABLO, J. M. ZHANG, E. Q. LI, S. T. THORODDSEN, King Abdullah University of Science and Technology — We report a new 3D-printed microfluidic system with assembly of capillaries for droplet generation. The system consists of the following parts: 3Dprinted Droplet Generation Units (DGUs) with embedded capillaries and two 3D-printed pyramid distributors for supplying two different fluid phases into every DGU. A single DGU consists of four independent parts: a top channel, a bottom channel, a capillary and a sealing gasket. All components are produced by 3dprinting except the capillaries, which are formed in a glass-puller. DGUs are independent of the distributor and from each other; they can easily be assembled, replaced and modified due to its modular design which is an advantage in case of a faulty part or clogging, eliminating the need to fabricate a complete new system which is cost and time demanding. We assessed the feasibility of producing droplets in this device varying different fluid parameters, such as liquid viscosity and flow rate, which affect droplet size and generation frequency. The design and fabrication of this device is simple and low-cost with the 3D printing technology. Due to the modular design of independent parts, low-cost fabrication and easy parallelization of multiple DGUs, this system provides great flexibility for industrial applications.

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