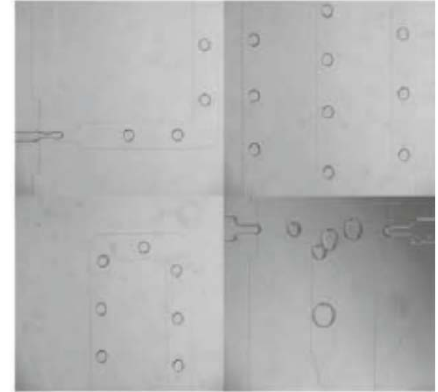


# Microfluidic Device

This new device allows for the use of droplet microfluidics in sequential biochemical reactions, permitting continuous sample concentration and extraction for use in genetic analyses.

## Background

Droplet microfluidics allows chemical reactions to form by fusing droplets; timing is controlled by flow-rate and traveling distance. Because droplets are separated, sequential chemical reactions, as in our case, are more difficult to achieve. For example, in order to perform several biochemical reactions using enzymes one needs to deactivate the currently present enzymes before performing the next step. It is also much more difficult to concentrate target molecules, especially since every reaction step adds volume to the droplets.



Microscopy pictures of droplet microfluidics chips. Top Left: droplet formation, Top Right and Lower Left: timing, Lower Right; droplet coalescence.

## Technology

Dr. Strey's invention allows one to extract and concentrate biological samples inside droplets in a continuous fashion, thus enabling processing steps such as sample concentration and buffer changes. This technology is necessary to carry out multi-step biochemical reactions inside a droplet microfluidics device. The technology achieves concentration steps by introducing functionalized micro particles into the droplets that can be manipulated by either electric (dielectrophoresis) or magnetic fields and concentrating them is achieved by splitting droplets to separate the part of the droplet that contains microparticles from the part that is devoid of particles.

### Patent number/Publication:

- US Utility 12/875,914

### Advantages

- Enables the use of droplet microfluidics for multi-step biochemical reactions allowing for sample concentration and extraction

### Applications

- Research tools: microfluidics, lab on a chip, cell sorting

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