

Western University

Scholarship@Western

---

Inspiring Minds – Showcasing Western’s Graduate Research, Scholarship and Creative Activity

---

September 2021

## Energy Efficient Chaotic Mixing

Shoyon Panday

*Western University*, [spanday2@uwo.ca](mailto:spanday2@uwo.ca)

Follow this and additional works at: <https://ir.lib.uwo.ca/inspiringminds>

---

### Citation of this paper:

Panday, Shoyon, "Energy Efficient Chaotic Mixing" (2021). *Inspiring Minds – Showcasing Western’s Graduate Research, Scholarship and Creative Activity*. 41.

<https://ir.lib.uwo.ca/inspiringminds/41>

## **Energy Efficient Chaotic Mixing**

In recent years, microfluidic devices (at least one dimension is less than 1 mm) have undergone intensive and rapid development due to their considerable impact in biomedical diagnostics, DNA analysis, drug development, and chemical engineering. The potential benefits of these devices include shorter analysis time as well as less sample consumption, among numerous others. Mixing enhancement in microfluidic devices has always been a challenge since the extremely small geometry restricts natural mixing and makes reactions harder to achieve. Over the last decade, many mixing concepts have been proposed, but they predominantly suffer from complex fabrication processes and installation difficulties. The present research focuses on developing a novel mixing technique with a view to circumventing the existing complexities. A combination of non-uniform heating and surface roughness leads to an energy-efficient chaotic mixing in the system. Thus, surface roughness, a well-known fabrication limitation, is used favourably in this proposed technique.