

Breakup of Salt Water Liquid Bridges on Solid surfaces



TECHNISCHE
UNIVERSITÄT
DARMSTADT



**Nano- and
Microfluidics**

Master Thesis

Liquid bridge breakup is a fascinating process with applications in microfluidics, printing, and wetting. While the classical problem involves a liquid bridge surrounded by another fluid (like air or oil), in this project we focus on a different case: liquid bridges on **solid surfaces**. These systems introduce new physics, particularly at the interface between the liquid and the solid.

In previous work, we've looked into how **viscosity** affects the breakup of these bridges. We also know that the **surface properties** of the solid play a role. But now we want to go a step further: what happens when the liquid contains **salt**?

We suspect that salt may affect the **friction or interaction** between the liquid and the solid surface, and that could influence how the bridge breaks apart. Your job will be to explore this through **experiments** using an existing **high-speed imaging** setup that looks at drops inside a **microfluidic chip**.

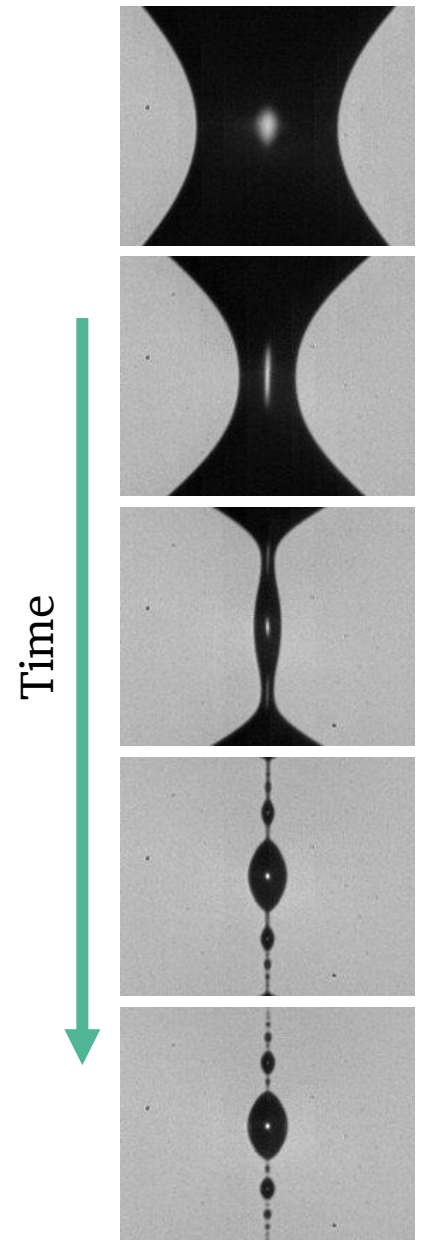
You'll also **process the images** using an existing codebase (which may need some tweaking or improvements based on your observations).

What you'll learn:

This thesis is great for anyone interested in experimental fluid mechanics or microfluidics. You'll gain experience in:

- Designing and fabricating microfluidic chips
- Using 3D printing to make experimental components
- Capturing high-speed drop dynamics with a camera system
- Image processing and data analysis
- Understanding wetting, breakup dynamics, and salt effects in small-scale fluid systems

*You are more than welcome to contact me
for more information or a visit to our labs!*



Snapshots of the breakup of water/glycerol mixture on a solid surface



Salar Farrokhi, M.Sc.
Farrokhi@nmf.tu-darmstadt.de