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**Project:** Microfluidics assisted  
synthesis of Janus particles  
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**Fields of  
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microfluidics, emulsification,  
electrophoresis  
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## Introduction

Janus particles are particles that have an anisotropy in the core or in the shell. Janus was a Roman God with two faces. Janus particles rapidly gain interest from industry as well as from a scientific point of view.

## Goal

The goal of this project is to synthesise Janus particles assisted by microfluidic devices. Hydrophobic solution is emulsified from a capillary in a aqueous solution and solidified by means of polymerisation. Anisotropy in the core of the particle is obtained by de-mixing a polymer solution during droplet formation in an electric field.

## Electrophoresis of polymers

Electrophoresis is the movement of molecules or particles in an electric field. Here we separate fluorescent dyes, covalently attached to polymers, in an external electric field. In this capacitor like setup the amount of polymers that can be separated is dependent on charge in the polymers and the electric field strength.

## Droplet and particle formation

Emulsification can be performed from a capillary in a channel with continuous phase. Highly mono-dispersed droplets are formed via auto breakup process in which no shear forces are applied from the continuous phase. These droplets formed can easily be solidified by means of UV initiated polymerisation within 30 seconds.

## Combination of polymer electrophoresis and particle synthesis: Janus particles

Electrophoresis of fluorescent dyes can be done in a microfluidic device. The polymers will enter the droplet separated. After solidification by means of UV initiated polymerisation a droplet is formed with internal anisotropy: a Janus particle.

## **Acknowledgement**

Graduate school VLAG and the Dutch MicroNed program are thanked for generous funding.