

NATURE-INSPIRED MICRO-FLUIDIC MANIPULATION USING ARTIFICIAL CILIA (ARTIC)

PROJECT AIM

The main objective of the project is to explore and develop a novel, nature inspired technology for manipulation of complex fluids on a microscopic scale. Our main objective is to mimic the cilia microfluidics mechanism by polymer microscopic actuators developed by Philips and IMTEK of which the movement can be actively controlled, preferably using a magnetic field or an electrical field, and integrating these into a microfluidic channel. To validate the effectiveness of fluid manipulation using artificial cilia, we will design and set up a basic experiment. The flow will be characterized using special flow velocity measurement techniques. The aim is to create a liquid pumping effect with typical flow rates in the order of 10 pL/min to 1 micro l/min, which is a suitable range required by biosensor-applications.

PROGRESS

Within the last year a prototype and an actuation system have been designed and partially verified. To investigate typical cilia induced flow rates and profiles Micro-PIV measurements have been performed on natural cilia.

DISSERTATIONS

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SCIENTIFIC PUBLICATIONS

1. Hussong J., Faulhammer P., Noreikat K., Kummer W., Sharp K., Lindken R., Westerweel J.; EX-VIVO PIV MEASUREMENTS OF THE FLOW INDUCED BY CILIA IN MOUSE TRACHEA; Proceedings of the 1st European Conference on Microfluidics - Microfluidics 2008 - Bologna, December 10-12, 2008.

PROJECT LEADERS

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RESEARCH THEME

Complex dynamics of fluids

PARTICIPANTS

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COOPERATIONS

Philips Electronics Nederland
University of Freiburg, Institute for
Microsystem Technology
Liquids Research Ltd.
University of Groningen, Department
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"Politehnica" University of Bucharest
Centre for Biomimetics and Natural
Technologies, University of Bath
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FUNDED

Sixth framework programme priority
3 NMP specific targeted research
project
1st 50% 2nd - 3rd 50%

START OF THE PROJECT

2006

INFORMATION

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