
PhD project: Modeling of complex acoustofluidic devices

A Data Management Plan created using DMPonline

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Project abstract:

In this PhD project by Nils Refstrup Skov (2016-19, supervisor Prof. Henrik Bruus) we document the gradual development of a numerical model intended to accurately model complex acoustofluidic microdevices consisting of a piezoelectric transducer attached to an elastic solid containing a microchannel filled with a microparticle suspension. The model grows from a simple 2D model containing few elements to a 3D model capable of modeling microdevices to scale. Along the development we verify the model predictions using analytical and experimental results on the acoustophoretic motion of the microparticles including the effects of acoustic radiation forces and streaming. We use the predictive powers of the model as a design tool to improve on existing microdevices and even creating an entirely new one.

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Data Collection

Data consists of computer scripts written in COMSOL, MATLAB, and Mathematica, and peer reviewed papers describing the use and results of running the scripts.

No ethical or legal issues pertain to these data.

Data Storage

The scripts are developed on PC work stations situated at DTU Physics. The scripts are either run on the same work stations or on the DTU HPC system. Following the DTU Physics Data Policy, the scripts are stored and backed-up on DTU servers, the local work stations, as well as on USB disks. Access to the files at DTU Physics are limited to members of the Theoretical Microfluidics Group, headed by Prof. Henrik Bruus. The scripts are shared freely among the group members. Key scripts are published in our peer reviewed papers and BSc, MSc as well as PhD theses from the group available online at www.fysik.dtu.dk/microfluidics. No sensitive data is involved in this project.

Documentation

The metadata associated with our scripts consist of the governing equations of the numerical models and a description of how this is interpreted and implemented. The metadata are available in our peer reviewed papers and BSc, MSc as well as PhD theses from the group available online at www.fysik.dtu.dk/microfluidics.

The documentation consist of plain text describing the scripts, the key script code, and some examples of full scripts. The documentation is available in our peer reviewed papers and BSc, MSc as well as PhD theses from the group available online at www.fysik.dtu.dk/microfluidics.

Data Sharing

Key scripts are published in our peer reviewed papers and BSc, MSc as well as PhD theses from the group available online at www.fysik.dtu.dk/microfluidics.

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Long-term Preservation

Following the DTU Physics Data Policy, the scripts are stored and backed-up on DTU servers.

