

CFD of a reusable face mask

Background

Most current face masks are disposable and significantly burden landfilling and littering. This project aims to develop a new generation of reusable face masks that are both high quality and provide a good balance between efficiency and user comfort.

Tasks

Compute the flow around a realistic face for various face mask configurations using Computational Fluid Dynamics (CFD). Droplet transport will be modeled using Lagrangian Particle Tracking (LPT); the mask is modeled by porous regions. Both coughing and sneezing events will be investigated. A brief list of assignments for the MSc thesis work includes

- Literature survey
- Perform CFD simulation of different facemask configuration
- Report

Prerequisites

Numerical Fluid Dynamics and Heat Transfer (MMVN05) or equivalent.

Students in the final year of their M.Sc. studies in Mechanical engineering or engineering physics with an interest in fluid mechanics and computation. It is advantageous to have previous experience using CFD and mesh generation software and programming experience using Matlab or Python.

Connection to Research Project

FORMAS Project: Next generation face-masks. https://www.vr.se/english/swecris.html#/project/2022-01116_Formas

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