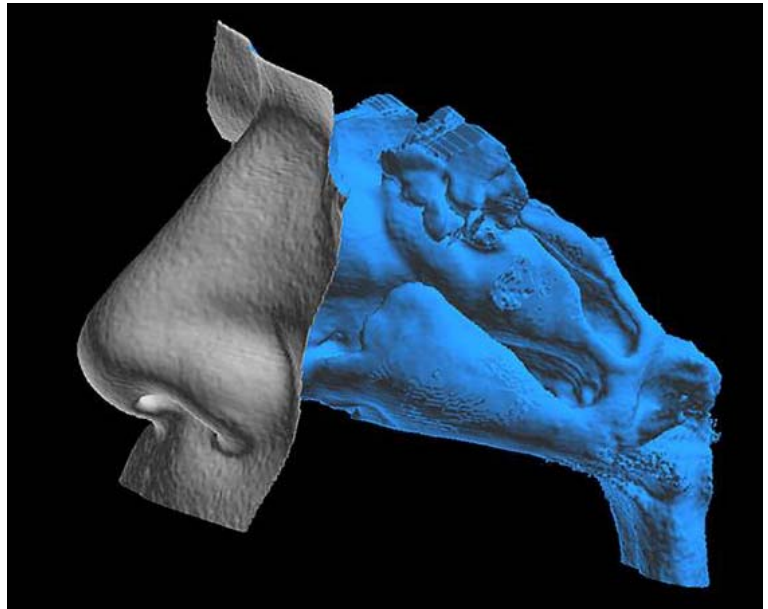


Bachelor's / Master's thesis in cooperation with the University of Belgrade / Serbia

Numerical investigation of anomalies of the airflow in the human nose

The aim of the present project is to investigate the airflow in combination with the transport and separation of particles such as dispersed drug particles or dust in the humans upper respiratory tract . Numerical calculations are to be carried out in this thesis. Parallel to this, an experiment is being prepared by our cooperation partner, the University of Belgrade, in which optical measurements of the flow are realized in a model system. The nasal septum, a supporting partition in the nasal cavity, which is oriented vertically in the median sagittal plane, plays an important role in the observation of the airflow in the uppermost airways of man. It



essentially determines the shape of the through-flowed areas of the nasal cavity. Malformations or changes caused by accidents often lead to a considerable obstruction of the airflow and must be treated surgically. In order to provide a decision-making aid when and to what extent such interventions are necessary, quantitative criteria should be derived in this study.

For this purpose, various geometries are obtained by means of X-ray computer tomography, geometrically characterized, and finally converted into a calculation area for the determination of the flow. The pressure losses in the flow should thus be quantified as a function of geometric parameters. The candidate is expected to have experience in numerical calculations and in the field of flow mechanics. **Knowledge of the English language is also essential. Results will be presented at a workshop at the University of Belgrade. We are looking forward to a one week stay in Belgrade (travel expenses will be taken over).**

The following work packages are specified:

- Incorporation into the calculation program LBM
- Preparation of the geometry of the flow area from CT images
- Calculation and evaluation of flow fields
- Reporting and presentation of results in Clausthal and Belgrade

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