

# Mathematical modelling of the acid-base balance in the context of ventilation

## Project Summary

In this project, the mathematical modelling of the human acid-base balance system will be investigated. One component of the project is the literature research and selection of a suitable model. The second step is the implementation and connection with existing models in MATLAB.

## Project Type

- BA Thesis (3-6 months)
- MA Thesis (6 months)
- Praktikum (3 months)

## Required Qualifications

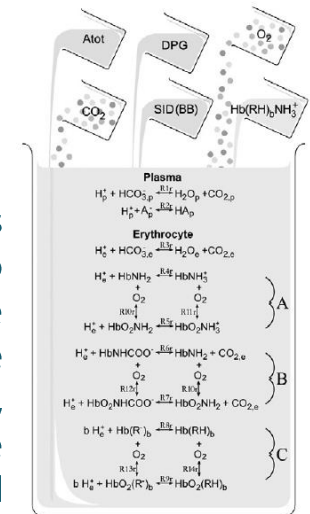
- Interest in physiological modelling
- Programming skills in MATLAB

## Contact

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## Detailed Description

Mechanical ventilation ensures the supply of sufficient oxygen to the patient in the event of acute lung failure. In order to realise safe ventilation for the patient, many different aspects must be considered, including the individual lung mechanics but also the entire cardiovascular system. If the ventilator setting is too high, the lungs may be damaged or the heart impaired, which could lead to the patient's death. The aim is to create a digital twin of the patient in order to be able to predict possible influences or therapy results and to better understand the influences of the different systems on each other.



## References

- Rees et al., „Mathematical modelling of the acid–base chemistry and oxygenation of blood - A mass-balance, mass-action approach including plasma and red blood cells“, 2010