

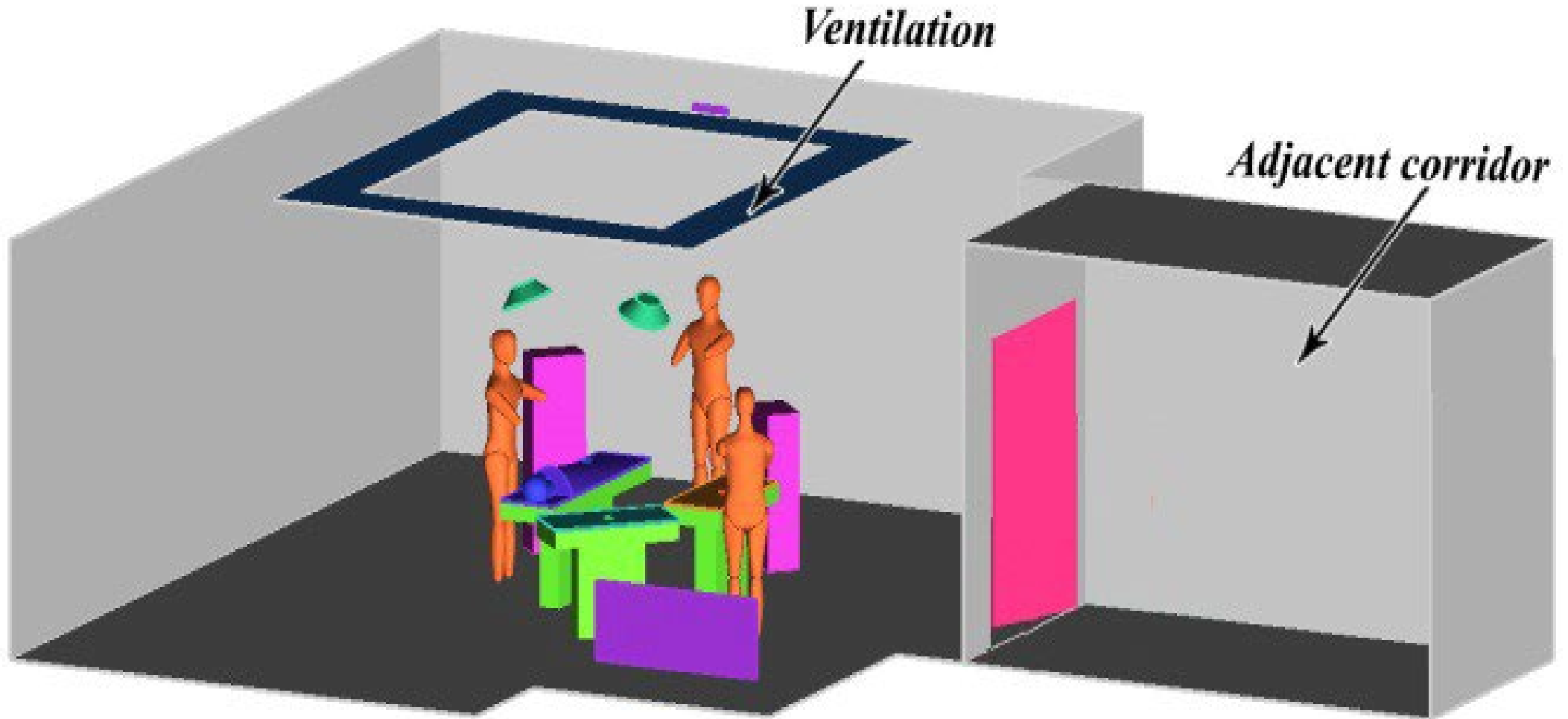


KTH Architectural Engineering

Airflow Control and Contaminant Spread in Built Environment

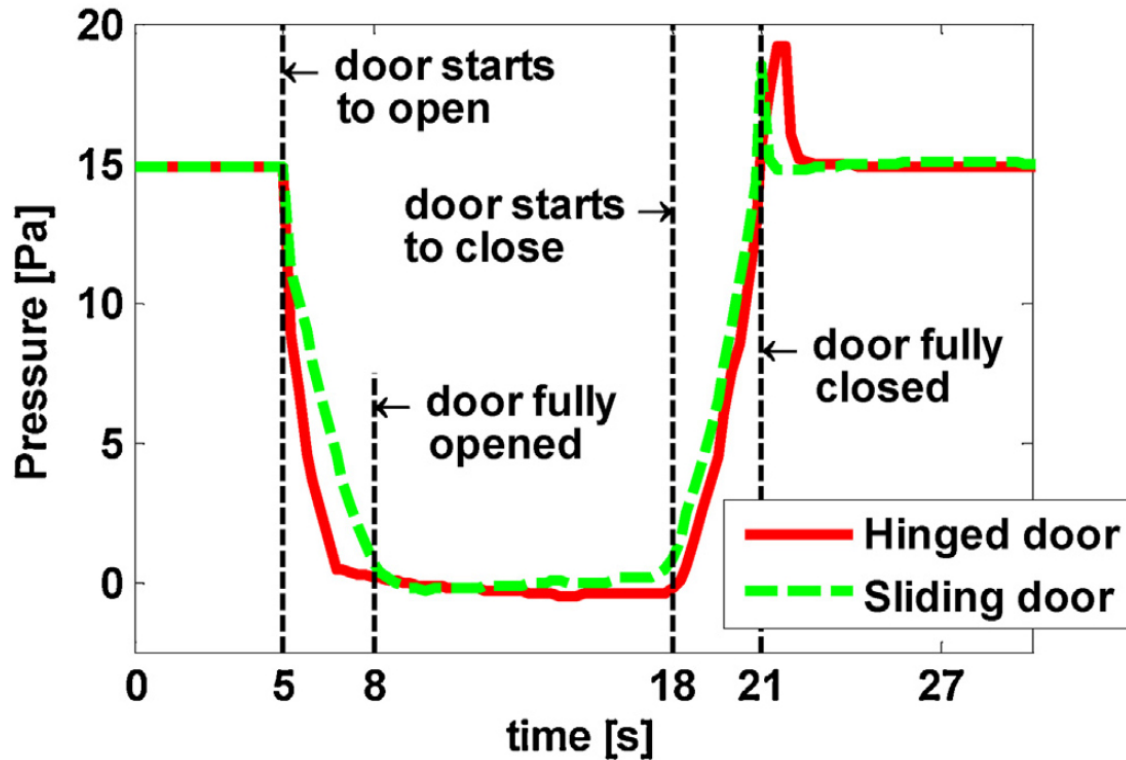
Sasan Sadrizadeh ssad@kth.se
Christophe Duwig duwig@kth.se

Contaminant spread to the operating room

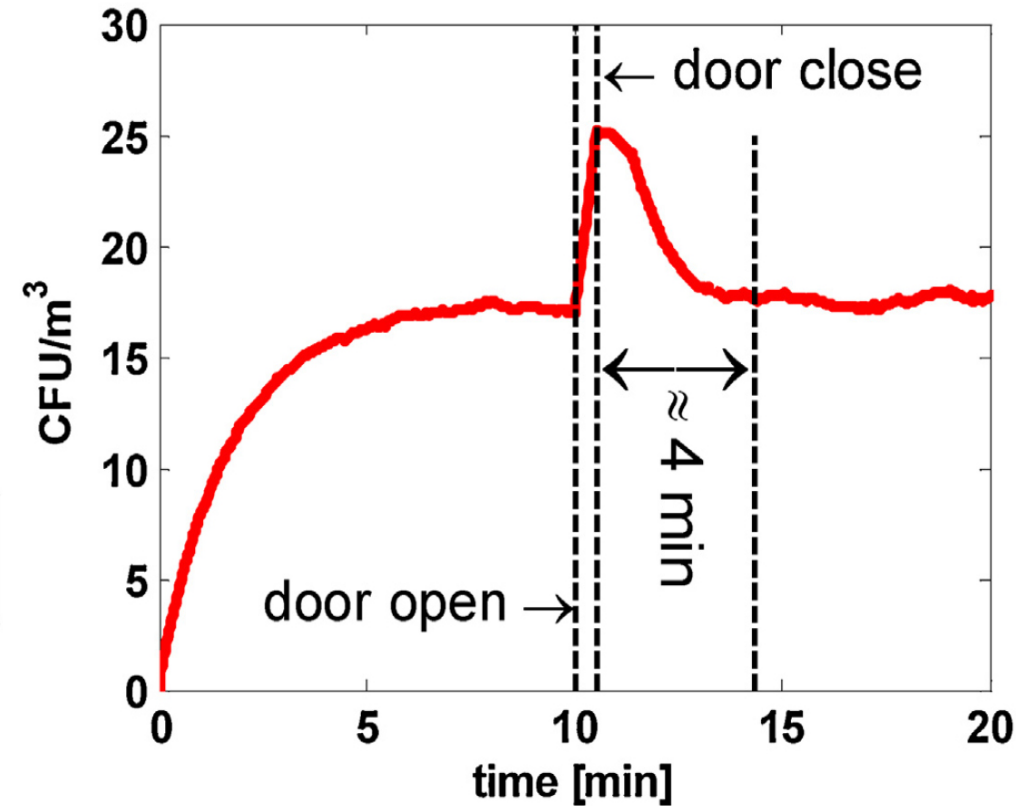


An OR with airflow rate of $2.5 \text{ m}^3/\text{s}$ results in $\text{ACH} = 70 \text{ h}^{-1}$

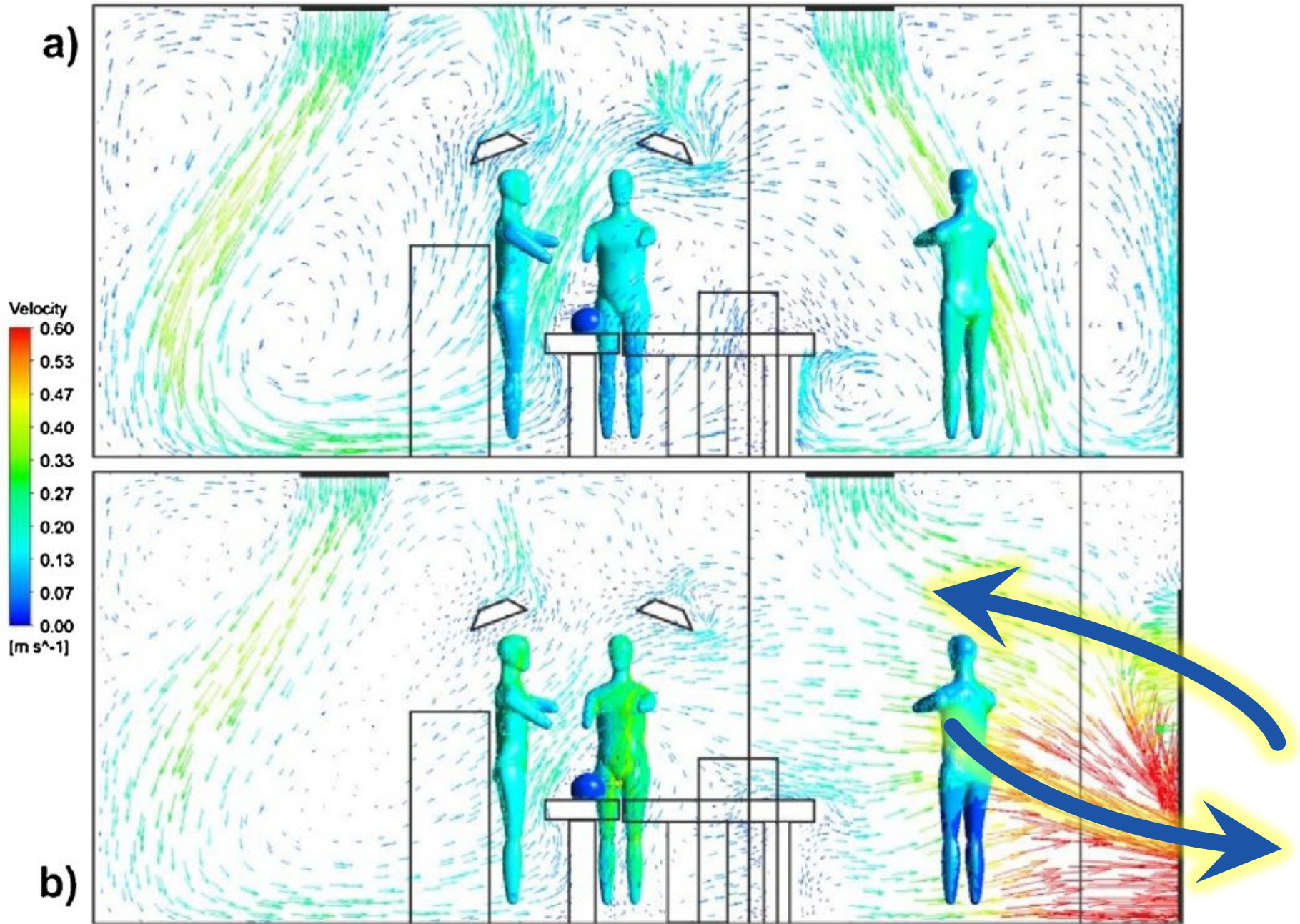
Door Opening: Pressure and Contaminant Concentration



Pressure variation as a function of time during a door opening cycle (in steady state situation).

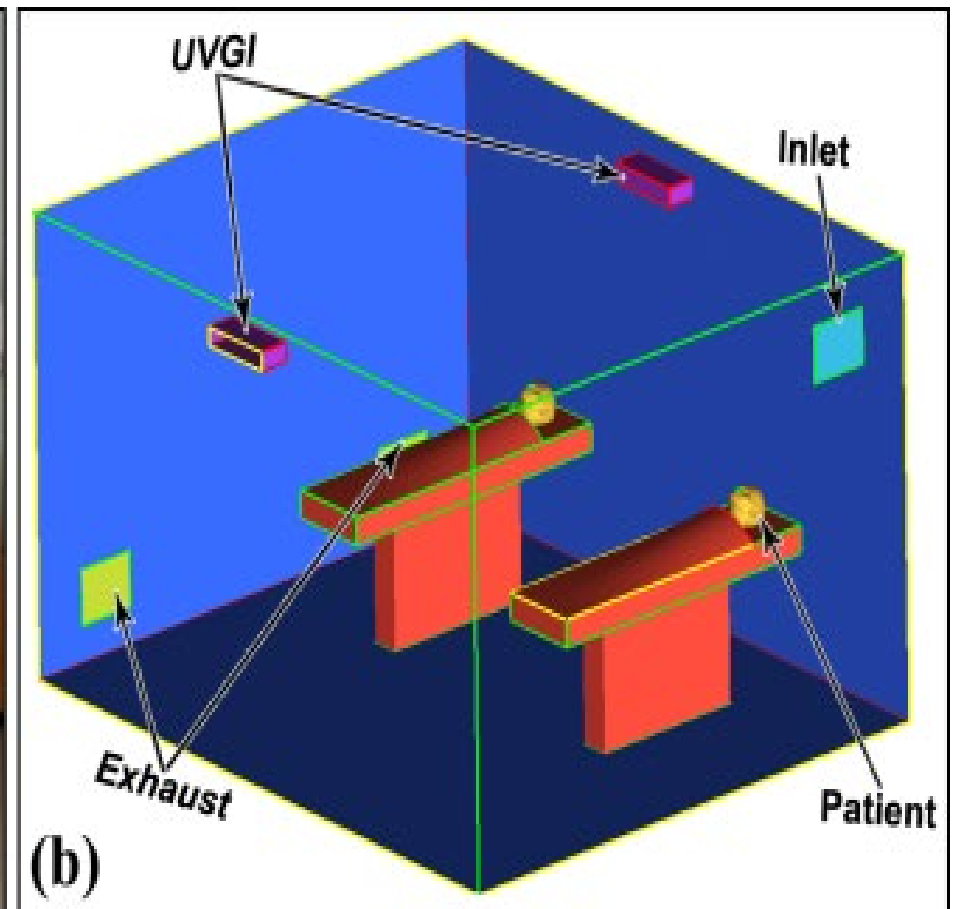


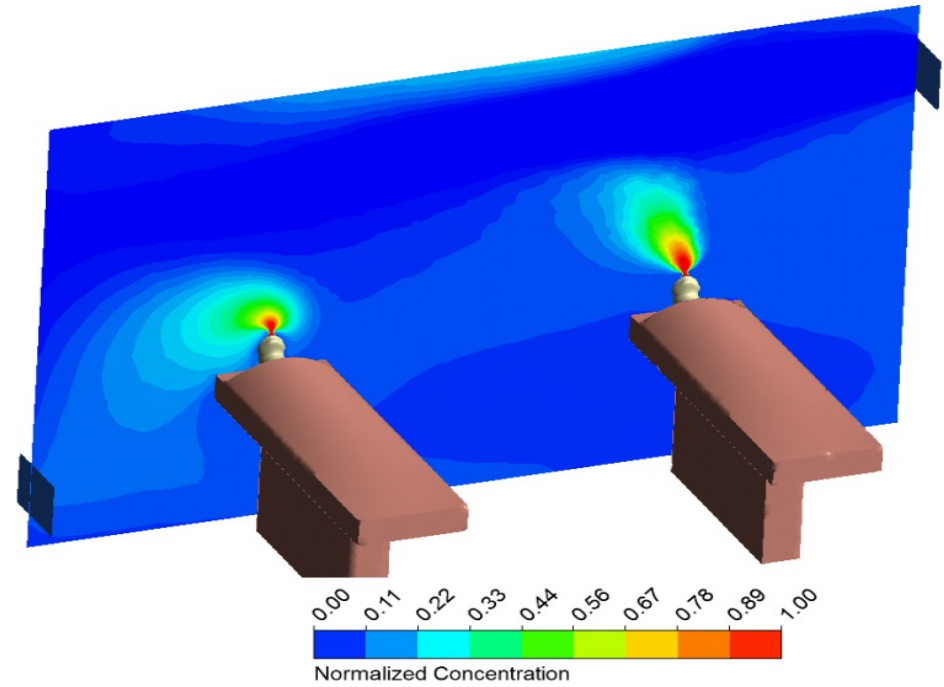
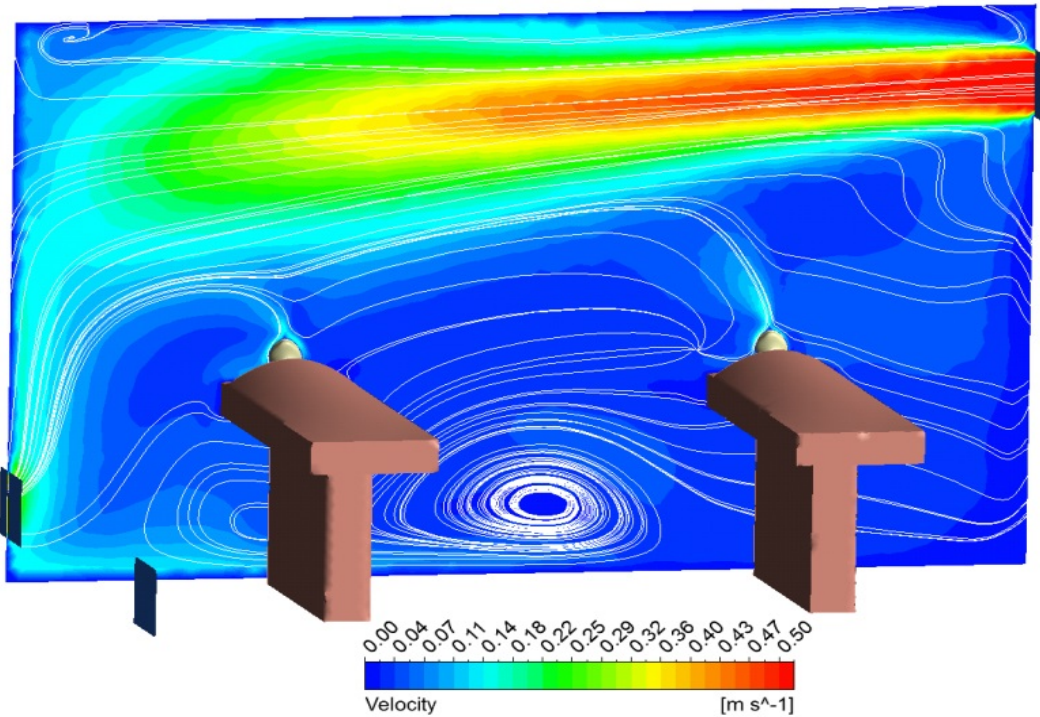
OR recovery time in a single cycle of door-opening.



Airflow vector plots on a plane passed through the door (a) door close; (b) door open.

Cross contamination in Hospital wards

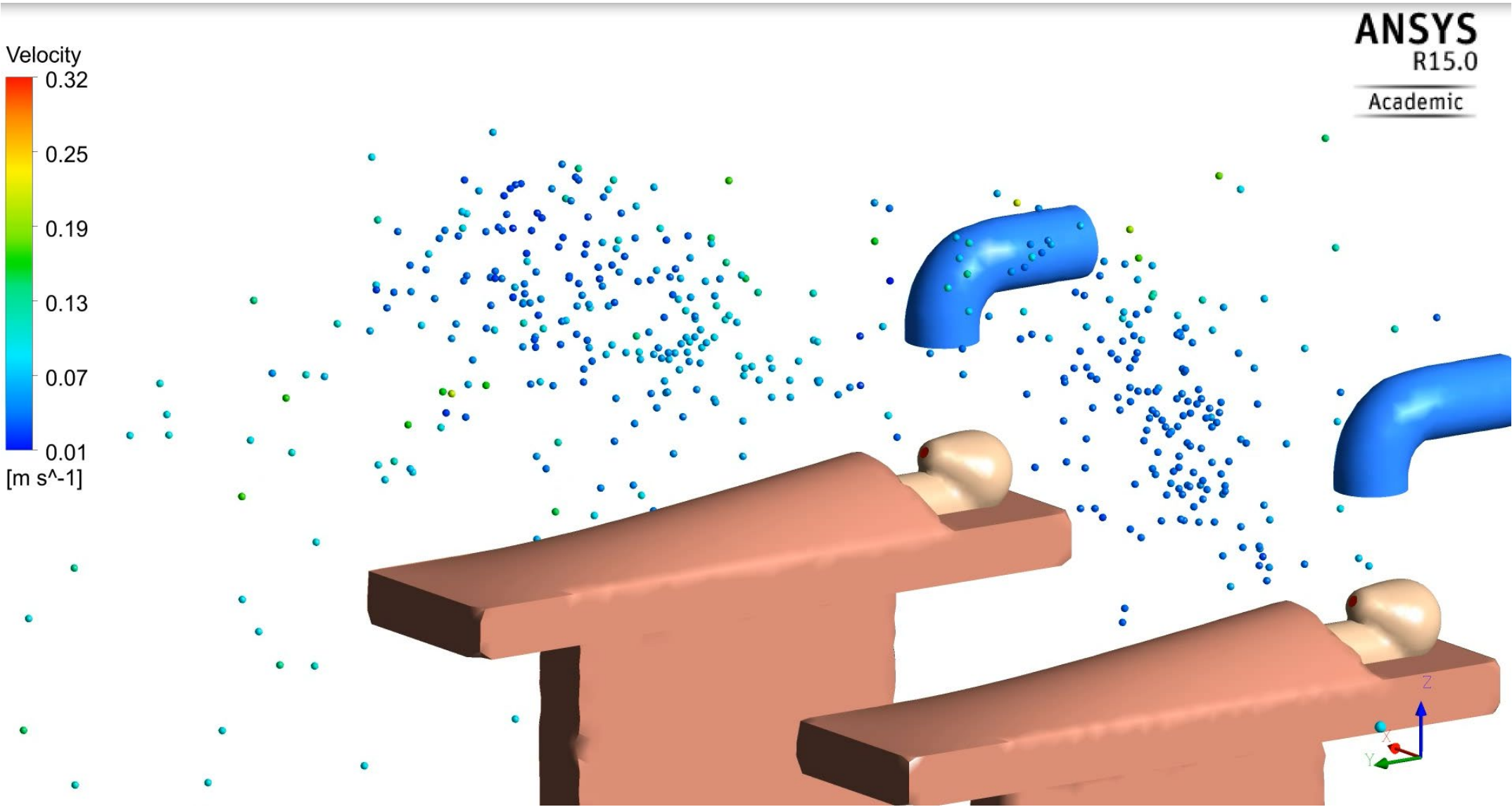


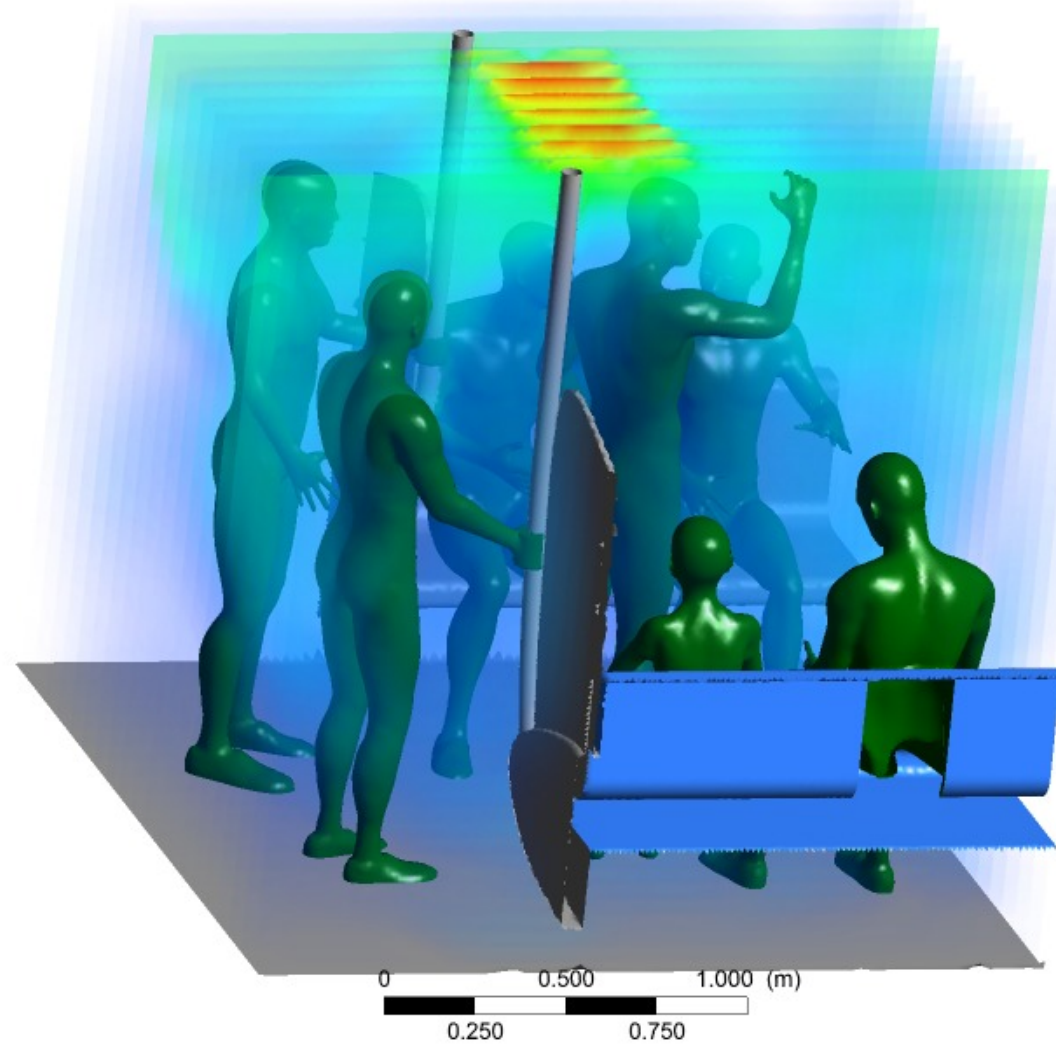
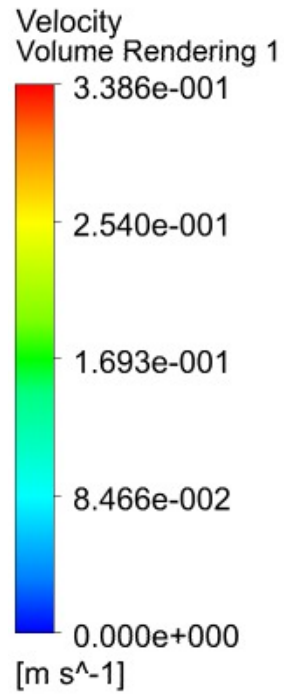


Contour plots of predicted microorganism distribution in the breathing plane

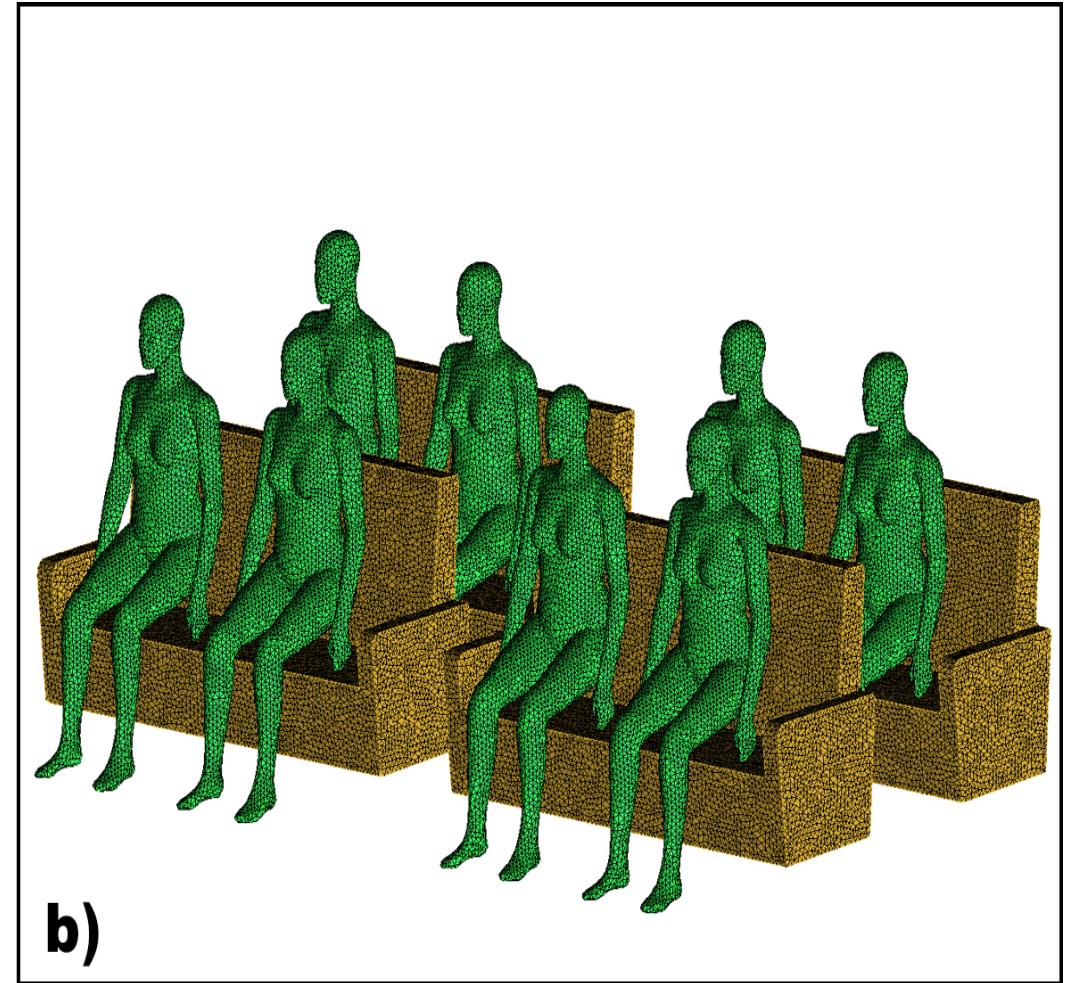
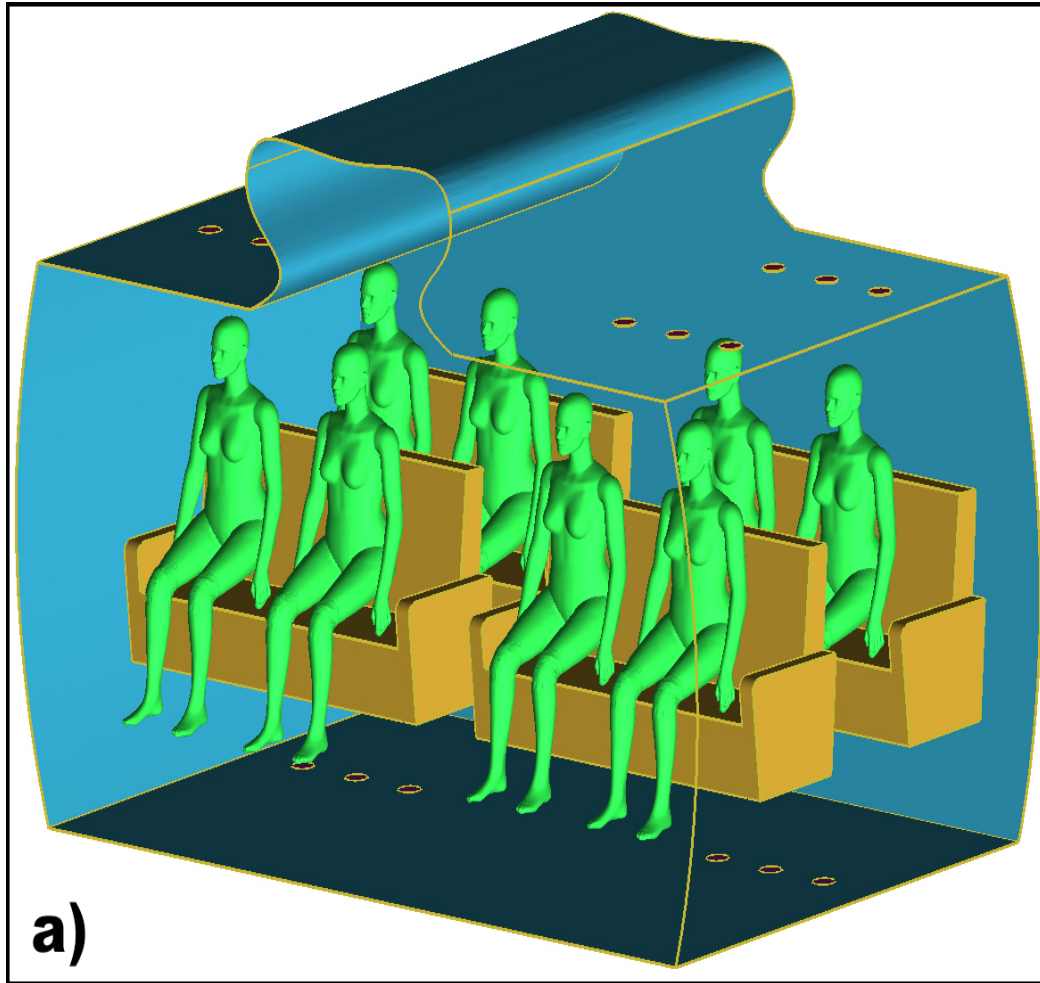
Air velocity contour map in a vertical plane through the air supply diffuser

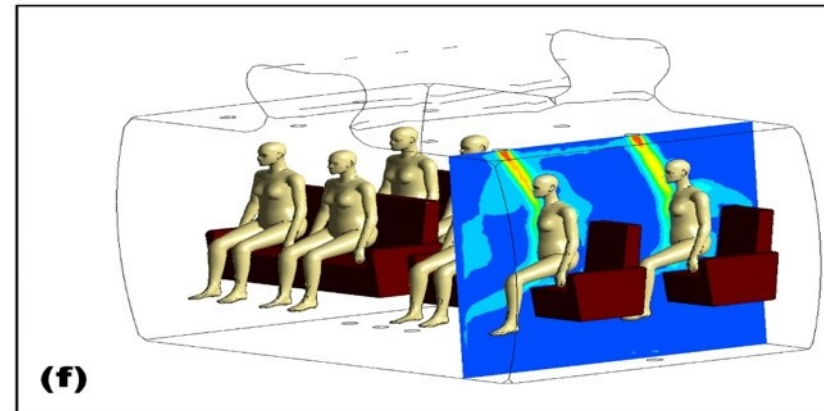
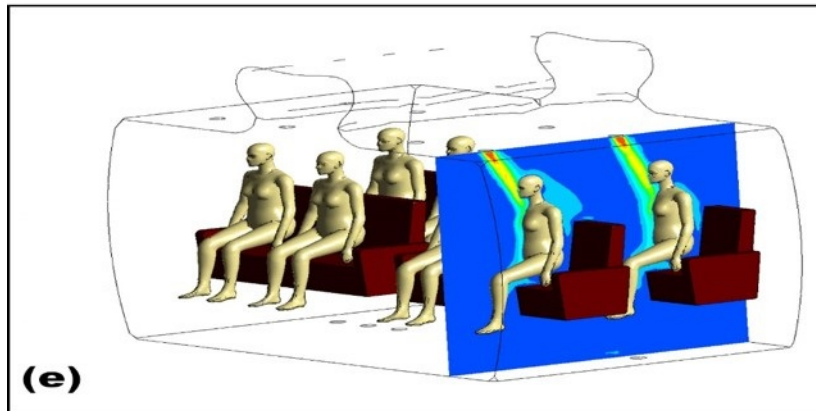
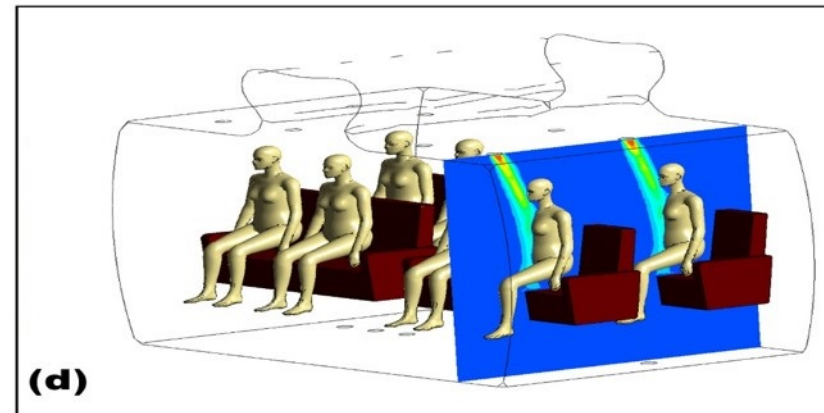
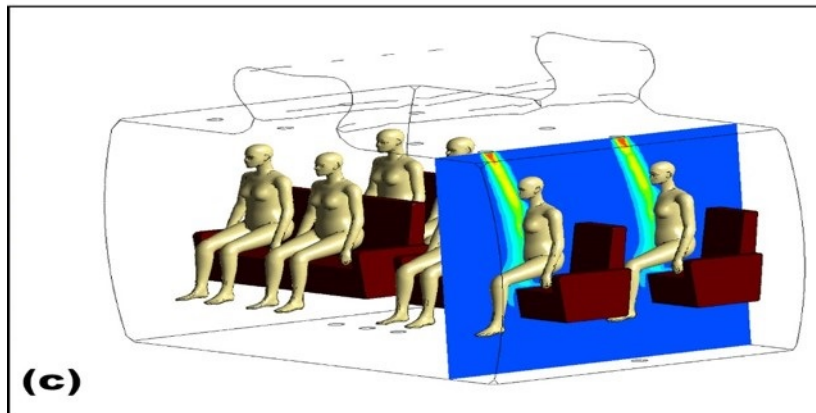
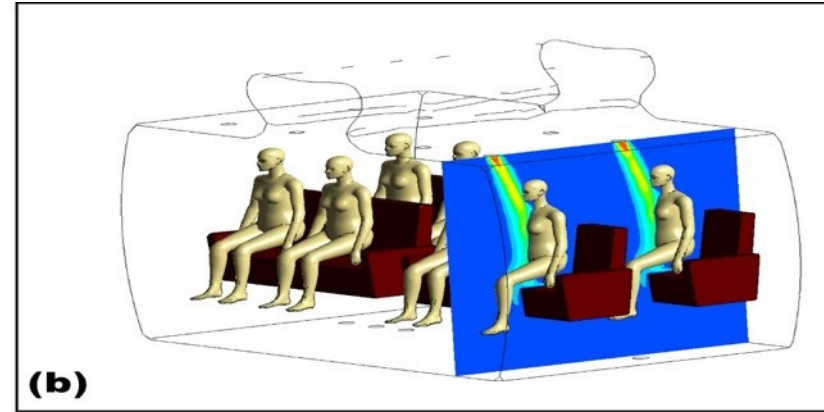
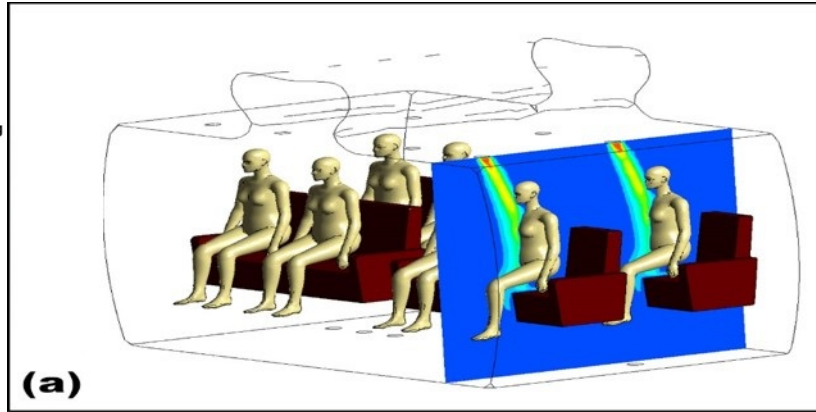
Velocity
0.32
0.25
0.19
0.13
0.07
0.01
[m s⁻¹]





Air quality and health in Airplane cabins







KTH Architectural Engineering

VisBac: Visualizing Bacteria

FORMAS

ETT FORSKNINGSRÅD FÖR
HÅLLBAR UTVECKLING
A SWEDISH RESEARCH COUNCIL FOR
SUSTAINABLE DEVELOPMENT



Christophe Duwig



Sasan Sadrizadeh



Mario Romero







KTH Architectural Engineering



Airflow and contaminant visualization in OR Environment





What we want to do in the coming projects:

- High quality CFD simulation of airborne particle and use visualization technology for demonstration
- Study and understand the airborne particle (e.g Covid) spread
- Optimize sensor location (e.g CO2 was found to be a proxy for aerosol)
- Design more resilient and energy efficient ventilation systems
- Demonstration at KTH Live-In Labs