



# Coughing head as a surrogate for sick person

Jyrki Widenius, Paavo Heikkilä

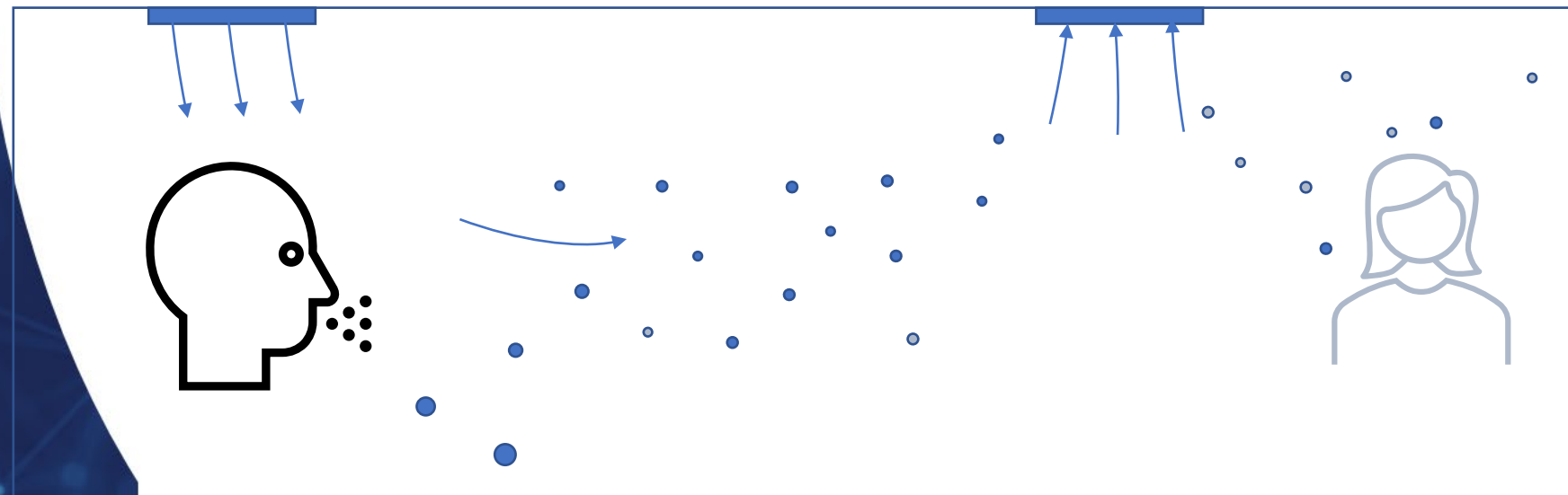
Aerosol Physics Laboratory, Tampere University

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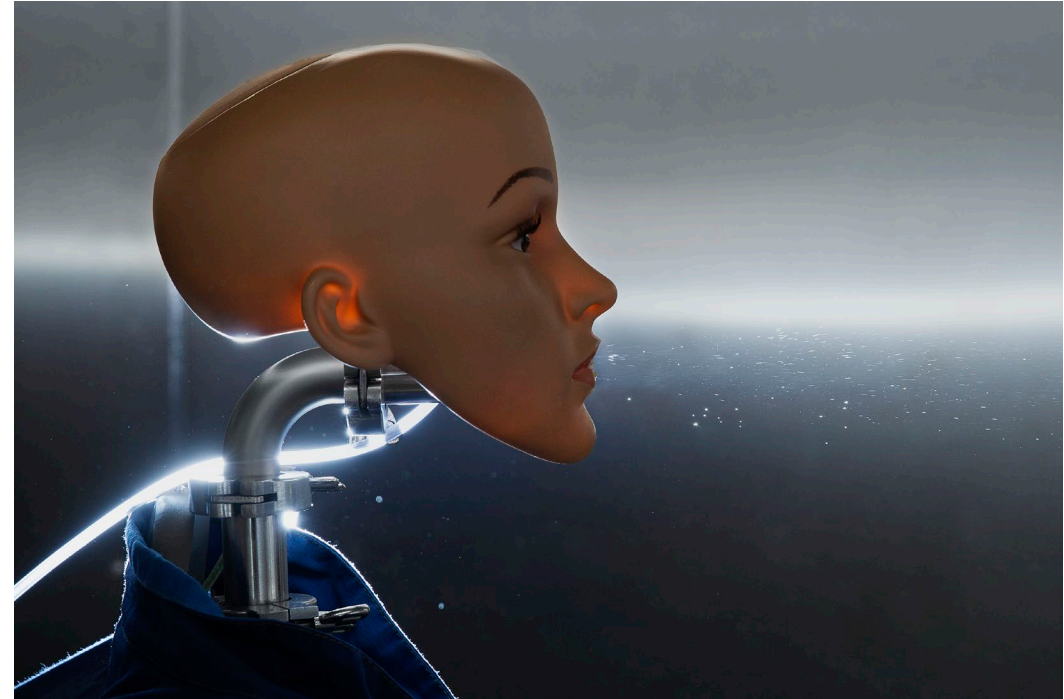
# Background

- The COVID-19 pandemic
- Lack of knowledge causes uncertainty and confusion in protection actions
- The disease spreading mechanisms must be studied to overcome future pandemics more efficiently
- Generation, dispersion, transmittance, exposure, ventilation, masks...



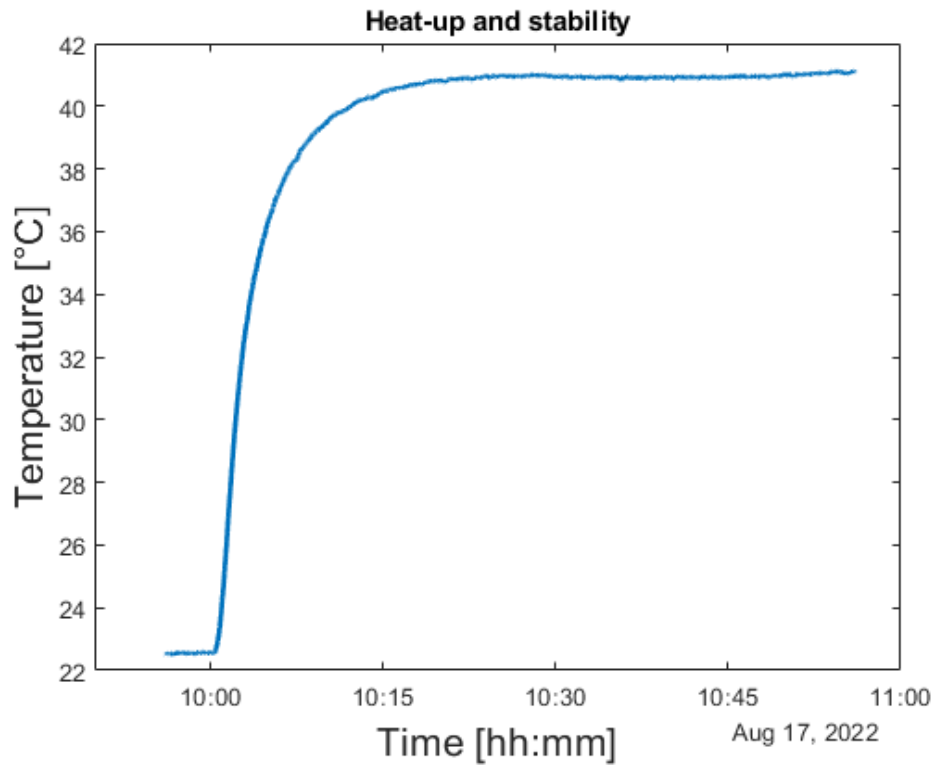
# Cough aerosol generator - requirements

- Should mimic an actual cough:
  - Air velocity
  - Volume flow rate
  - Aerosol particle size
  - Aerosol concentration
  - Aerosol material
  - Temperature and humidity
- Cough should be reproducible and adjustable

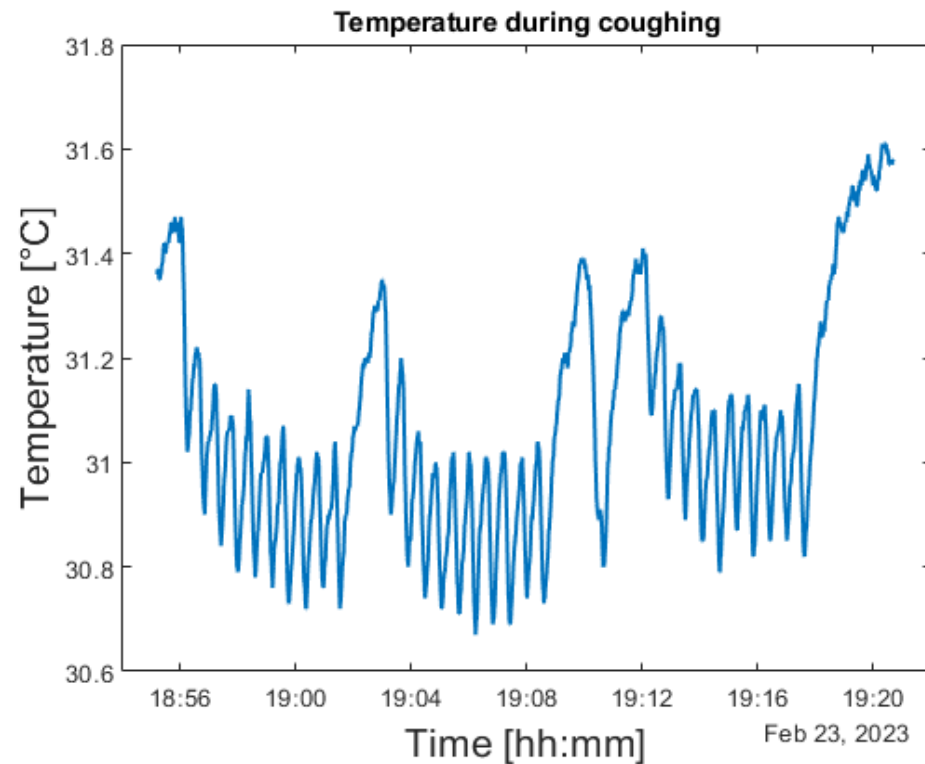


Picture: Liisa Mäkinen, VTT

# Measurement results (temperature)

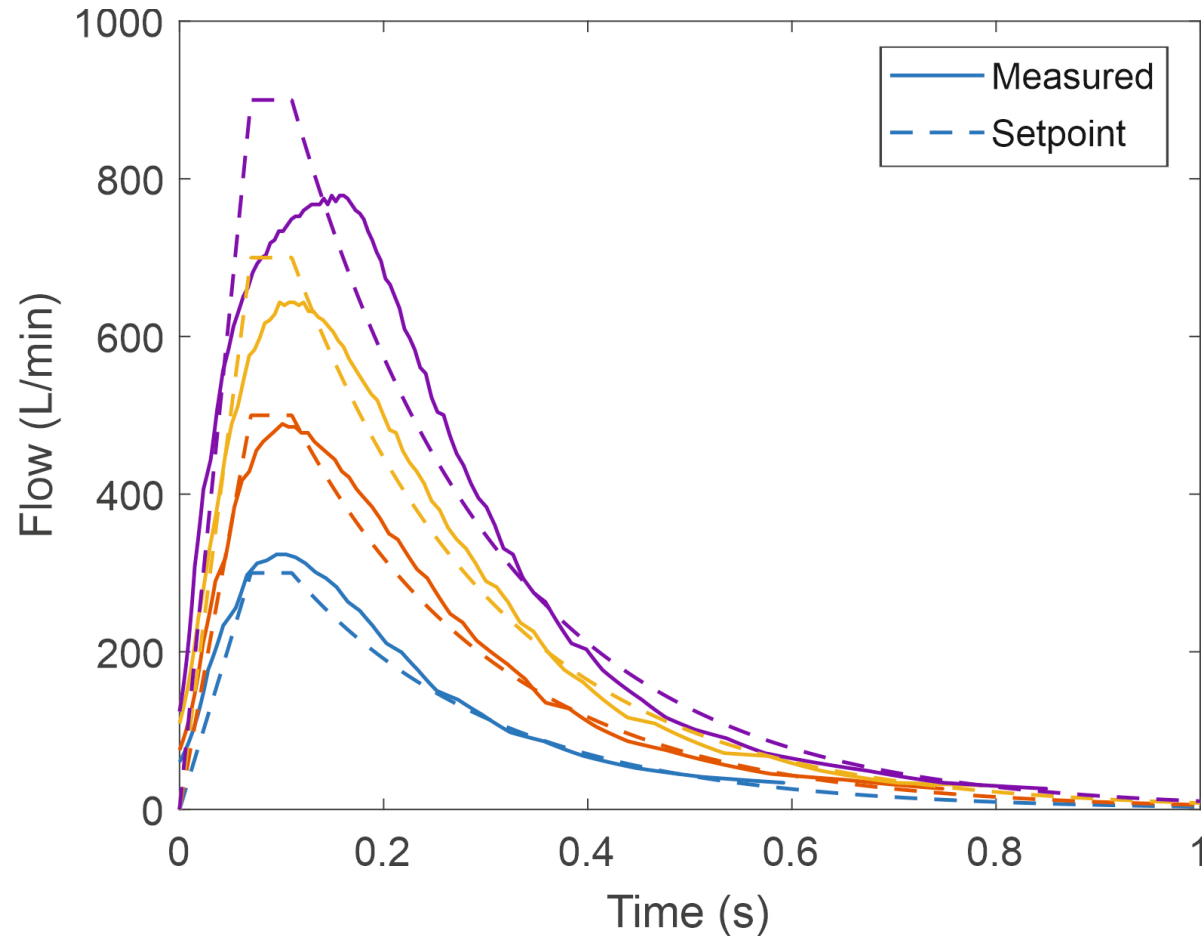


Temperature is adjustable  
Measured from throat air



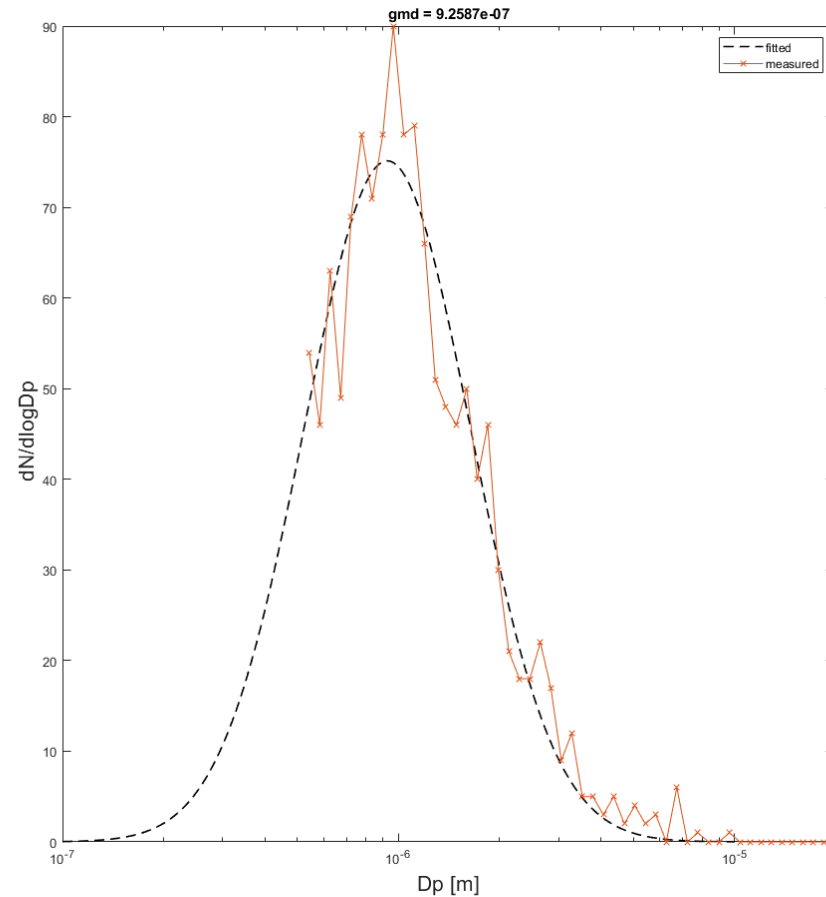
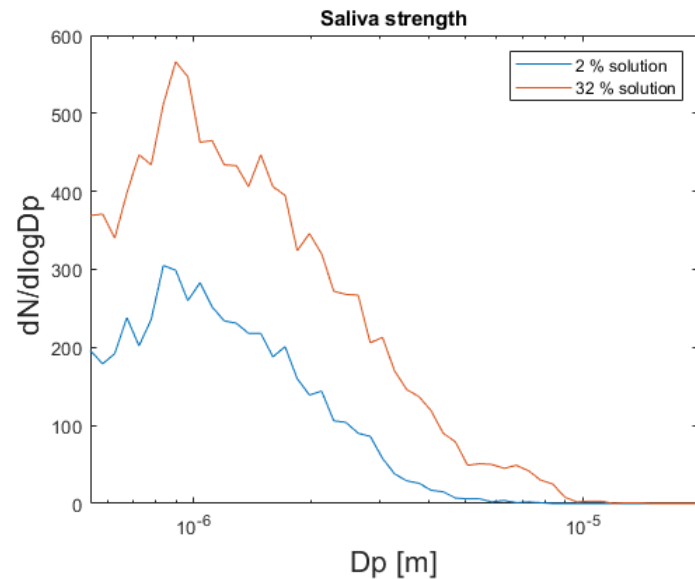
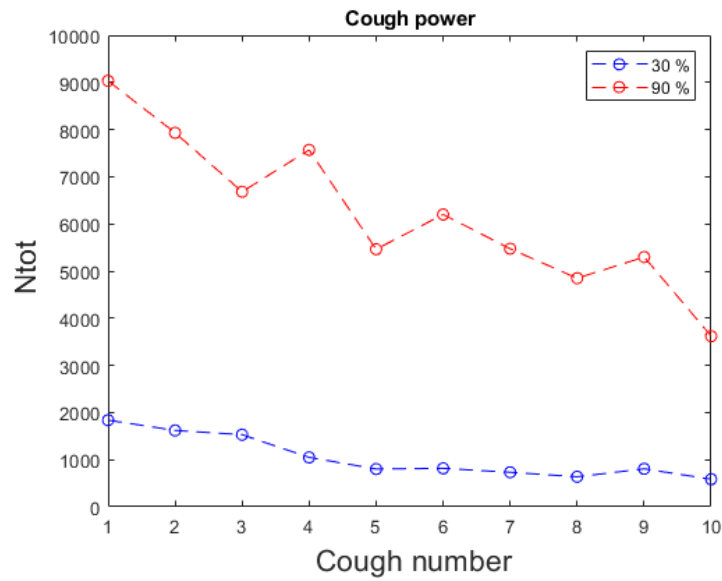


# Measurement results (flow)



Exhale flow strength  
and profile adjustable  
Flow measured with a  
spirometer

# Measurement results (Aerosol)

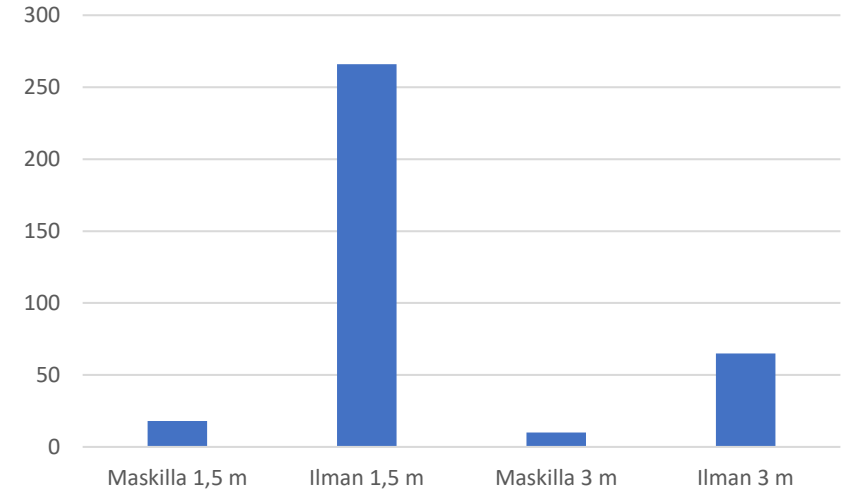


- Adjustable parameters
- Filling amount
  - Cough strength
  - Liquid concentration
  - Grid density

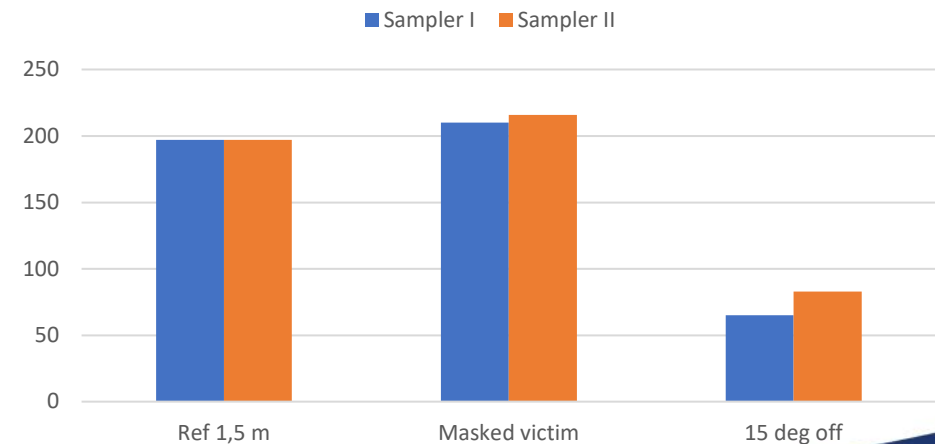
# Conducted campaigns

- Basic characterization measurements
  - Temperature stability
  - Flow
  - Aerosol generation
  - Bioaerosol measurements
- Aerosol plume visualizations
- Pathogen spreading campaigns
  - With and w/o masks

B. atrophaeus w. Andersen (masked cough)



B.atrophaeus w. Andersen (masked victim)







# Thank you!

## Contribution list:

P. Heikkilä<sup>1</sup>, J. Hakala<sup>2</sup>, A. Rostedt<sup>1</sup>, J. Widenius<sup>1</sup>, R. Malmgren<sup>3</sup>, S. Salo<sup>2</sup>, M. Romantschuk<sup>3</sup>, N. Atanasova<sup>3</sup>, M. Täubel<sup>4</sup>, A. Karvinen<sup>2</sup>, J. Keskinen<sup>1</sup>, H. Salmela<sup>2</sup>, H. Timonen<sup>5</sup>, E. Asmi<sup>5</sup>, T. Rönkkö<sup>1</sup>

<sup>1</sup>Aerosol Physics Laboratory, Physics Unit, Faculty of Engineering and Natural Sciences, Tampere University, Tampere, 33720, Finland

<sup>2</sup>VTT Technical Research Centre of Finland Ltd., 33100, Tampere, Finland

<sup>3</sup>Faculty of Biological and Environmental Sciences, University of Helsinki, Helsinki, Finland

<sup>4</sup>Environmental Health Unit, Finnish Institute for Health and Welfare, 70701, Kuopio, Finland

<sup>5</sup>Atmospheric Composition Research, Finnish Meteorological Institute