

Lung Anatomy + Particle Deposition (lapd) Mouse Archive for Modeling and Computational Toxicology

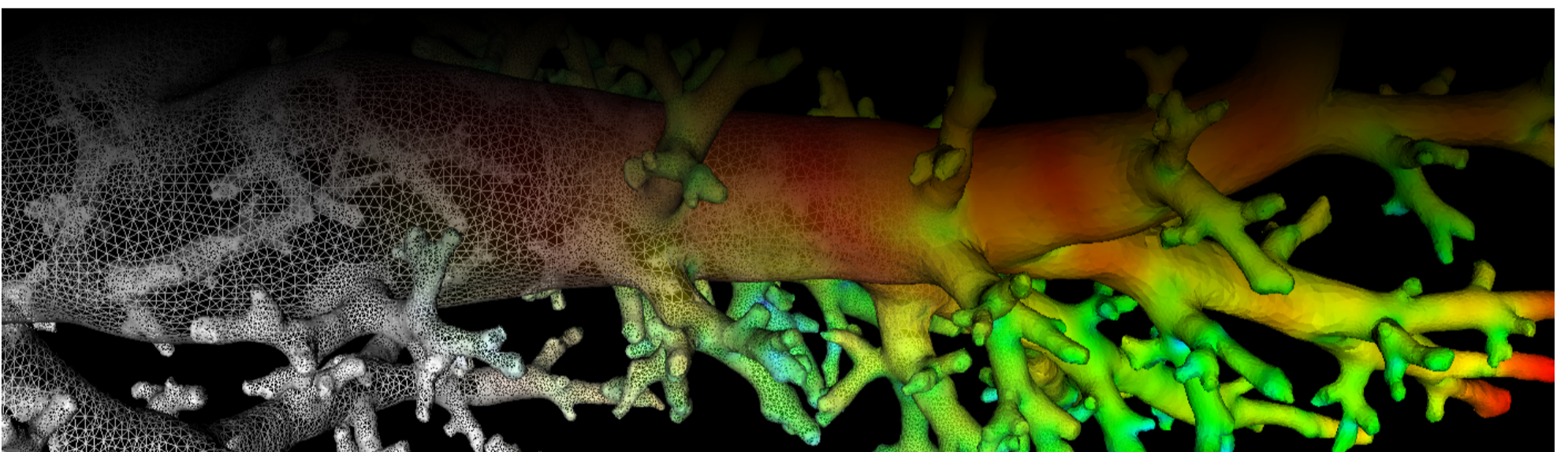


Table *_Ventilation*.csv

Respiratory Rate and Tidal Volume Measurements

Respiratory rate and tidal volumes are measured using a plethysmographic approach. The animal's body is sealed around the neck in an Allay™ restraining system that is closed to the atmosphere. A flow meter is connected to the sealed chamber such that the animal's inspiration will force an equal amount of air out of the chamber and through the flow meter.

During analysis, the operator chooses a short (3-5s), representative sample for each of 3 time points:

- **_Ventilation_Pre.csv**: baseline data collected prior to aerosol administration
- **_Ventilation_Post1.csv**: collected after the first dose of aerosol
- **_Ventilation_Post2.csv**: collected after the second dose of aerosol

Each of these files contains four columns:

- **time**: time from the start of the experiment in seconds
- **Flow**: calibrated inspiratory flow in mL/s. *Flow values are reliable **only** during inspiration*
- **RR**: respiratory rate estimated by MacLab during the experiment
- **Inspiration**: flag denoting inspiration (1) and expiration (0)

From these 3 short samples, respiratory rate (RR), tidal volume (VT), I:E ratio (IE), and minute ventilation (VE) are estimated and reported for the pre, post1, and post2 time points in [*_Info.md](#).

Code Example

This example shows how to read and interpret ventilation measurement tables. It explains the organization of the stored information, shows how to create simple visualizations, estimate tidal volume and I:E ratio.

Ventilation Parameters

The following example demonstrates how to work with Ventilation measurements represented in *_Ventilation*.csv .

We utilize `pandas` for representation of data tables and `matplotlib` for visualization of data.

```
In [1]: import os, pandas, matplotlib, numpy
import matplotlib.pyplot as plt
```

First, we download an example file from the `lapdMouse` data archive using the `lapdMouseUtils` module which is part of the [lapdMousePythonExamples](#). We can then load the `.csv` file with `pandas`

```
In [2]: from lapdMouseUtils import DBUtil
DBUtil().downloadFile('m01/m01_Ventilation_Pre.csv')
df = pandas.read_csv('m01/m01_Ventilation_Pre.csv')
df.head(10)
```

```
Out[2]:
```

	time	Flow	RR	Inspiration
0	4.62	3.739	180	1
1	4.63	35.119	180	1

Related Data Structures

[* Info.md](#)

Related Code Examples

[VentilationParameters.ipynb](#)

Updated: 7/24/19
2018 r2b