



# Benchmarking Statistical Analysis of Anatomical Measurements

Project Management and Software Development for Medical Applications

## General Info



Virtonomy.io

Contact Persons: Ching-En Lin, Gentrit Begaj

Contact Email: [lin@virtonomy.io](mailto:lin@virtonomy.io),  
[begaj@virtonomy.io](mailto:begaj@virtonomy.io)

## Project Abstract

It is important to have insight on population-based data of target group in the development process of medical devices, and it is challenging to perform statistical analysis on data while being precise and fast. The purpose of the current project is to benchmark the performance of statistical analysis tool on anatomical measurements. The result will help shape a more robust statistical analysis tool that is user friendly and efficient. Successful outcome of the project will be deployed to Virtonomy's SaaS web platform.

## Background and Motivation

Virtonomy GmbH is developing the first web platform for conducting fully data driven clinical trials of medical devices with the use of virtual patients. Our system is based on clinical scans (CT, MRI), pathology data and data about the medical devices. The statistical analysis tool is a submodule user can take advantage of the understand measurements from a collection of patient data, e.g., distribution, outlier. An efficient mathematical algorithm and implementation can give room to comprehensive computation on the dataset. With this, virtual testing is promoted making human and animal studies slowly less and less needed.

## Student's Tasks Description

- Understand the requirements of statistical analysis;
- Investigate plausible implementation of the requirements;

- Evaluate and optimize various implementations;
- Compare result with current implementations;
- Create performance evaluation report of the tool implemented.

At the end of the project, the student shall have the following outcome: A conclusion report of performance benchmarking of statistical analysis tool, and all the relevant source code in a GIT repo. The student will learn how to apply statistical analysis methods on real clinical data and expand skillset during experimentation with different implementation. Virtonomy will provide supervision with medical industrial computer vision training and software development experience.

## Technical Prerequisites

Python for data analysis or algorithm design  
Optional: Golang, Julia  
Basic understanding of Git.

## Why you should choose us

- Opportunity to work in an international start-up environment or remotely
- Participation in the exciting development and growth of a start-up
- Contributing to an exciting real-life medical data solution with impact

## References

<https://www.virtonomy.io/product/>

<https://benchmarksgame-team.pages.debian.net/benchmarksgame/fastest/julia-python3.html>

[Sonntag SJ, Meyns B, Ahn HC, et al. Virtual implantations to transition from porcine to bovine animal models for a total artificial heart](#)

Please send the completed proposal to [ardit.ramadani@tum.de](mailto:ardit.ramadani@tum.de), [lennart.bastian@tum.de](mailto:lennart.bastian@tum.de) and [tianyu.song@tum.de](mailto:tianyu.song@tum.de)  
Please note that this proposal will be evaluated by the BMC coordinators and will be assigned to a student only in case of acceptance.