

## CystAnalyser

### Problem

The Polycystic Kidney Disease (PKD) is characterized by progressive renal cyst development and other extrarenal manifestation as Polycystic Liver Disease (PLD). Phenotypical characterization of animal models mimicking human diseases is commonly used by the scientific community, in order to study new molecular mechanisms and identify possible new therapeutic approaches. The main biomarker of disease progression is total volume of human and mouse kidney and liver, which correlates with organ function. For this reason, the estimation of the number and the area occupied by the cysts is critical for the understanding of physiological mechanisms underlying disease. In this regard, cystic index is a robust parameter commonly used to quantify the severity of the disease.

Up to date, the vast majority of biomedical researchers use ImageJ as a software tool to estimate the cystic index by quantifying the cystic areas of histological images after thresholding. This tool has the limitation of being poorly accurate, due to unspecific identification of non-cystic regions (white regions in the image) wrongly counted as cystic area.

### Proposed Solution: CystAnalyser

CystAnalyser is a software tool for the automatic detection and quantification of cysts in Polycystic Kidney and Liver Disease, and other cystic disorders. It combines automatic image processing with a friendly graphical user interface (GUI) that allows researchers to supervise and easily correct the image processing before quantification. CystAnalyser is able to provide users the cystic index, the number of cysts and the cystic size profile.

CystAnalyser is fast enough to work online on a general-purpose personal computer in any biomedical laboratory (automatic analysis take aproximatly 3 seconds per image). If expert supervision is needed, it takes less than 3 minutes.

### Demostration video

[See the demonstration video](<https://gitlab.citius.usc.es/analyser/cystanalyser/-/raw/master/video/cystanalyserVideo.mp4>)

### Advantages of CystAnalyser over ImageJ

- Provides more information: the number of cysts in the images and the cystic profile (based on individualized cystic size)
- Allows the experts to monitor or supervise the default quantification process to obtain results with greater precision and robustness.
- CystAnalyser outperforms ImageJ in precision and reliability, being less subjective even without user supervision.

### Collaborators

NefroCHUS lab

### Publications

- Adrián Cordido, Eva Cernadas, Manuel Fernández-Delgado and Migual A. García-González. *CystAnalyser: a new software tool for the automatic detection and quantification of cysts in Polycystic Kidney and Liver Disease, and other cystic disorders*, PLOS Computational Biology, October 22, 2020 ([DOI](#)) ([PDF](#))

### Downloads

Please, cite the paper above if you use the software cystAnalyser in your research.

- [Usage and installation instructions \(PDF\)](#)
- [Windows installer - setupCystAnalyzer.exe](#)
- [Ubuntu 18.04 installer - cystanalyser\\_1.0\\_all.deb](#)

## Image and annotations dataset

The set of images and their annotations can be downloaded from [the CystImagesDB repository](#).

### INFORMACIÓN

Investigadores  
Eva Cernadas García  
Manuel Fernández Delgado  
Adrian Cordido Eijo  
Miguel A. García González

### DESCARGAR

-  Repositorio Gitlab
-  Descargar de Gitlab

### PUBLICACIONES

*CystAnalyser: A new software tool for the automatic detection and quantification of cysts in Polycystic Kidney and...*  
PLOS Computational Biology, 2020