

# **GPDQ Documentation**

***Release 0.0.0***

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GPDQ (Gold Particle Detection and Quantification) is a tool for the analysis of images obtained by immunogold labeling. It is written in Matlab, and provides a set of functionalities that allow:

- Managing projects and experimental series
- Automatic and semiautomatic labeling of images
- Basic image processing
- Data analysis
- Generating and exporting reports.

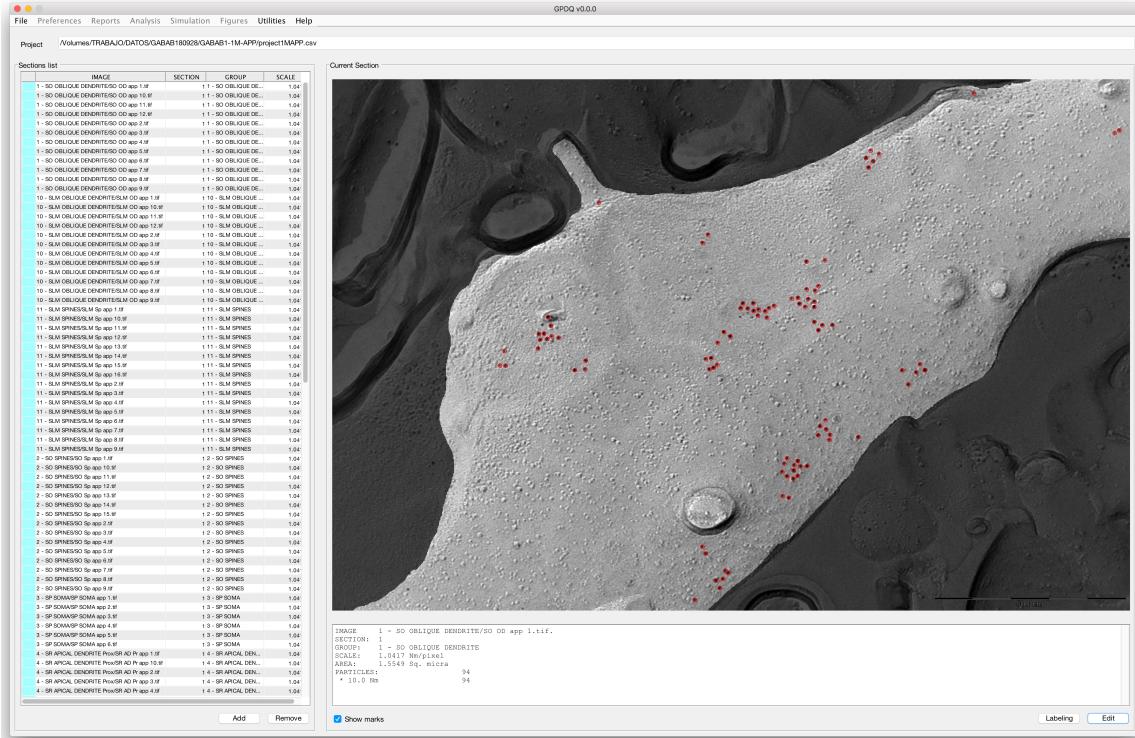


Figure 1. Main application for project management.

The Matlab APP covers the whole analysis process, and the objects and functions use a transparent repre-

sentation of the information (data structures, images and csv files) so that they can be used as a complement in the work with other tools or statistical packages.

```
% Reads the description of the project from a csv file
project = GPDQProject.readFromFile('DATA/GABAB1-6M-WT/', 'project.csv');
% Calculates Nearest Neighbour Distances between 5Nm particles
report = reportNNDStats(project.getProjectData(), [5]);
% Exports a report to csv
report.save('GABAB1-6M-WT.csv');
```

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## Quickstart: GUI App

GPDQ (Gold Particle Detection and Quantification) is a tool for the analysis of images obtained by immunogold labeling. It is written in Matlab, and provides a set of functionalities that allow:

- Managing projects and experimental series
  - Automatic and semiautomatic labeling of images
  - Basic image processing
  - Analyzing data
  - Generating and exporting reports.

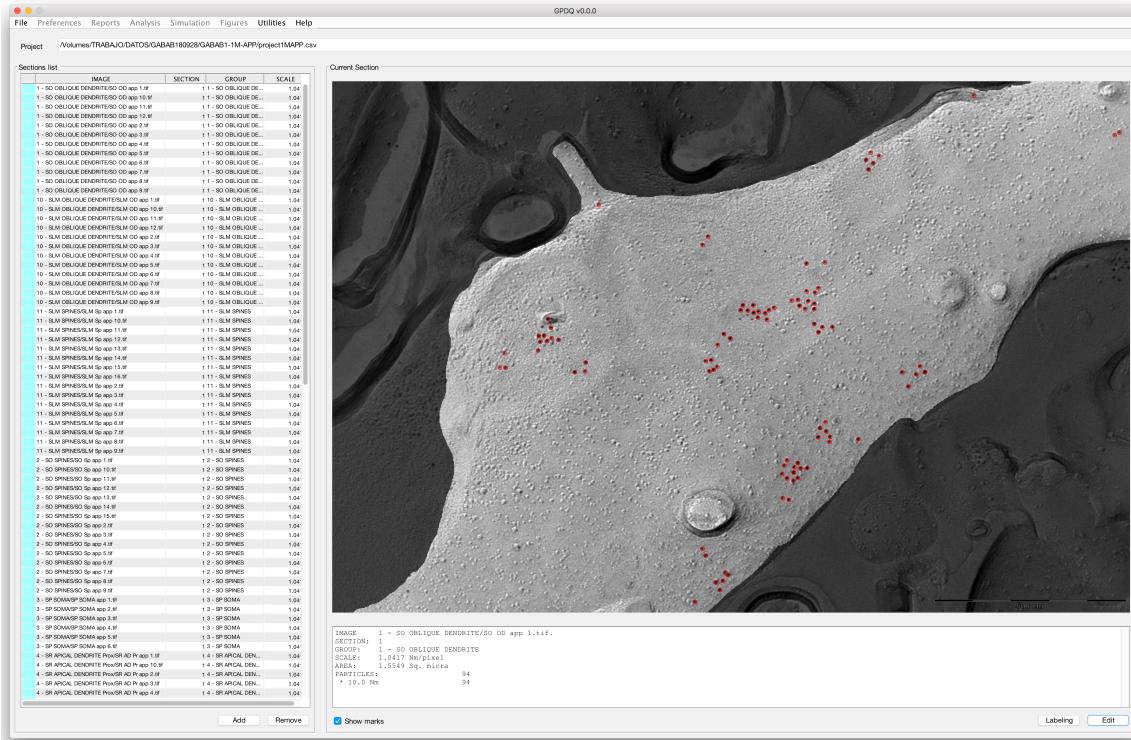


Figure 1.1. Main application for project management.

The Matlab APP covers the whole analysis process, and uses a transparent representation of the information.

tion (structures, images and csv files) so that it can be used as well as a set of objects and functions that complement the work with other tools or statistical packages.

```
project = GPDQProject.readFromFile('DATA/GABAB1-6M-WT/', 'project.csv');  
report = reportNNStats(project.getProjectData(), 2);  
report.save('GABAB1-6M-WT.csv');
```

GPDQ v1.0.0 has been written on Matlab R2018b. It requires these toolboxes:

- Image Processing Toolbox (Version 10.3)
- Parallel Computing Toolbox (Version 6.13)

## **Projects**

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Description of a project, how it is structured here we will see *Creating new projects*



### Utility Functions

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How to use each function separately *Creating new projects*

### 3.1 Creating new projects

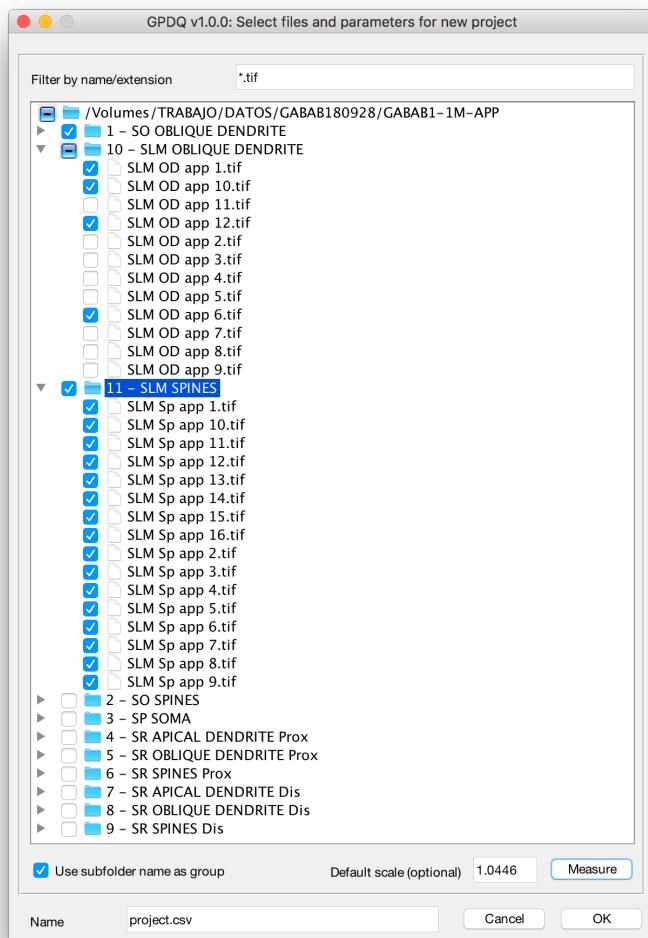


Figure 3.1. Project creation with `newProjectEdit()`.

## 3.2 Measuring scales

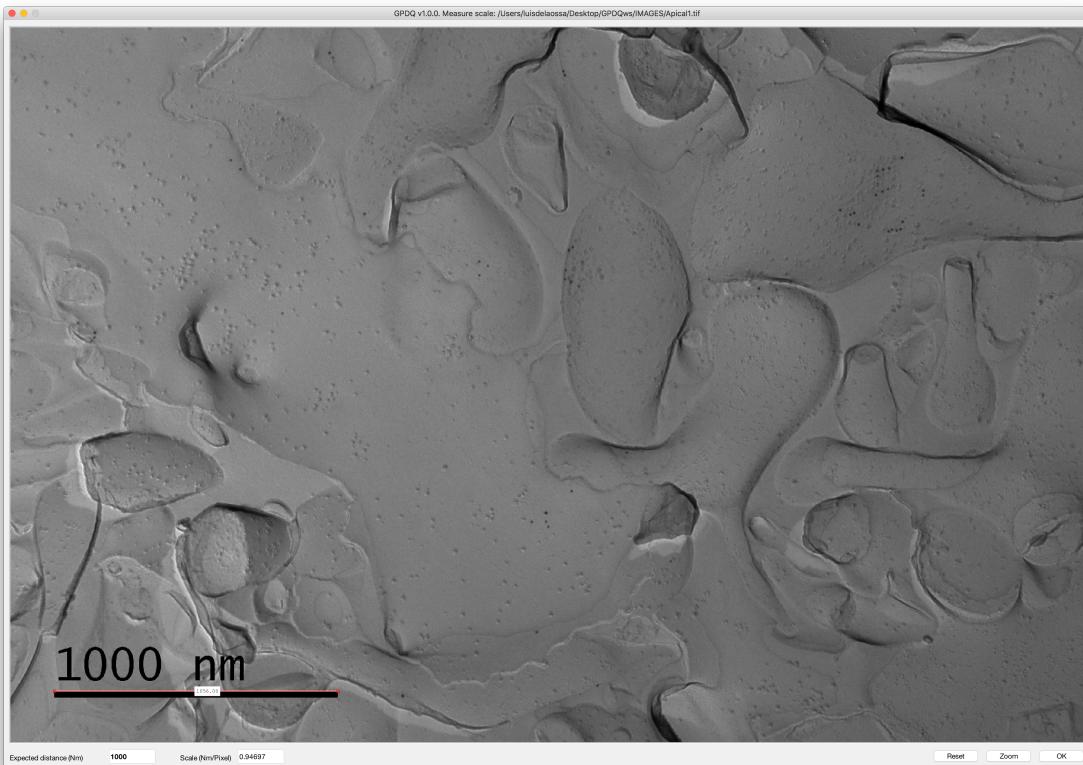


Figure 3.2. Scale measuring with `measureScale()`.

### 3.3 Editing sections

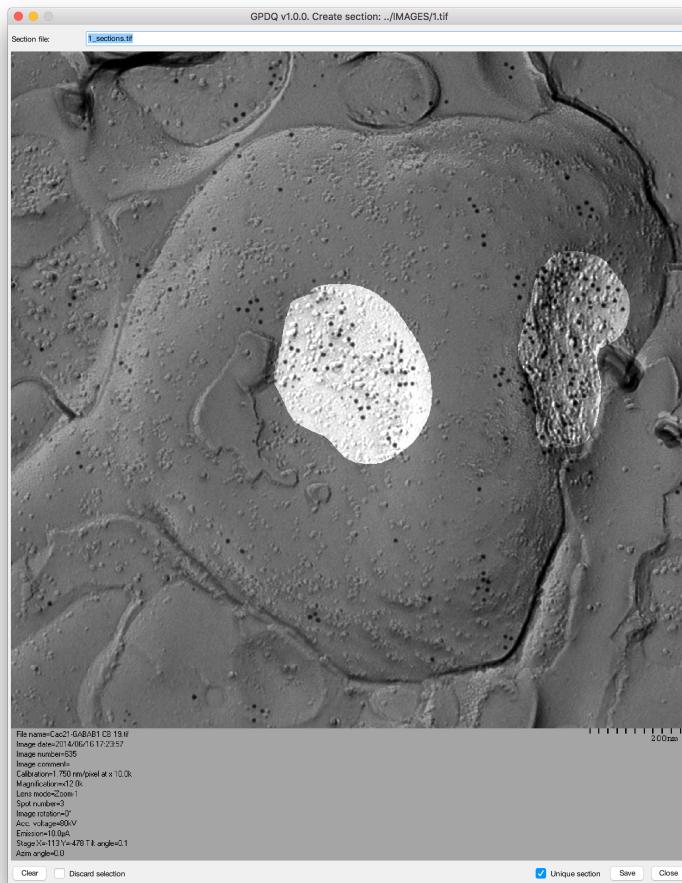


Figure 3.3. Section edition with `createSection()`.

### 3.4 Section labeling

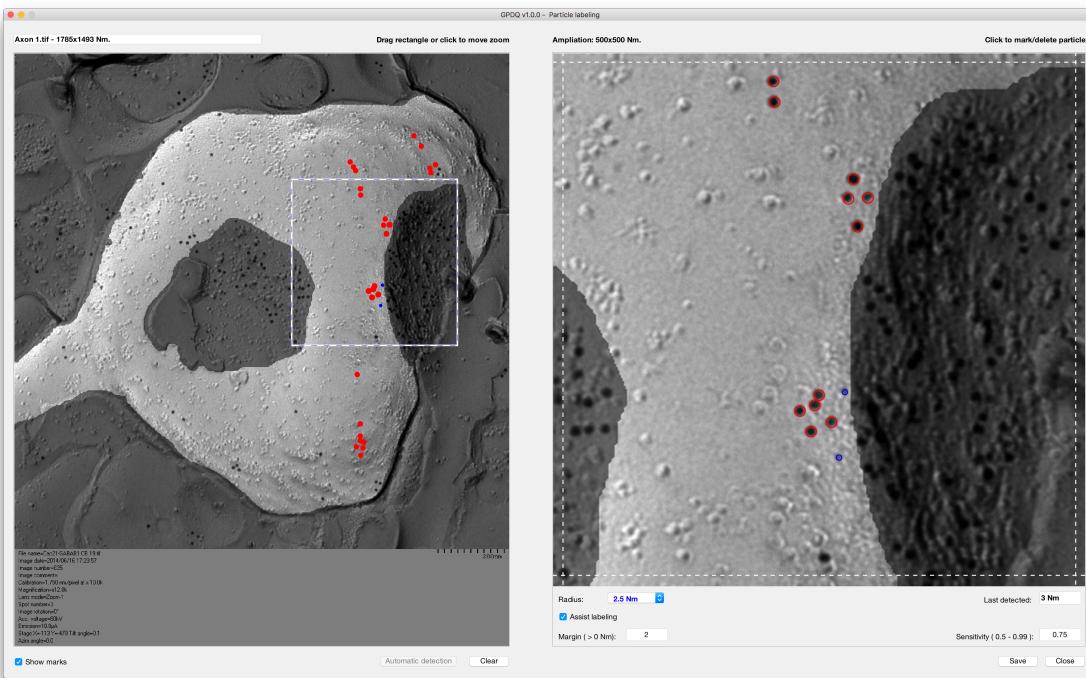


Figure 3.4. Section labeling with `sectionLabeling()`.

## 3.5 Showing reports

ID SEC...	IMAGE	SECTION	GROUP	SCALE	AREA	RADIUS	#PARTICLES
1 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.5549	2.5000	0
1 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.5549	5	94
2 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.1039	2.5000	0
2 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.1039	5	30
3 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.8309	2.5000	0
3 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.8309	5	44
4 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.0199	2.5000	0
4 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.0199	5	21
5 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.9939	2.5000	0
5 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.9939	5	62
6 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.0901	2.5000	0
6 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.0901	5	47
7 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.8712	2.5000	0
7 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.8712	5	33
8 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.9063	2.5000	0
8 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.9063	5	37
9 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.4839	2.5000	0
9 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.4839	5	25
10 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.1728	2.5000	0
10 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	1.1728	5	88
11 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.5801	2.5000	0
11 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.5801	5	26
12 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.4060	2.5000	0
12 1 - SO OBLIQUE DENDRI...		1 1 - SO OBLIQUE DENDRITE		1.0417	0.4060	5	52
13 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.8946	2.5000	0
13 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.8946	5	31
14 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	1.3605	2.5000	0
14 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	1.3605	5	51
15 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.9362	2.5000	0
15 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.9362	5	13
16 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.6313	2.5000	0
16 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.6313	5	28
17 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.6611	2.5000	0
17 10 - SLM OBLIQUE DEND...		1 10 - SLM OBLIQUE DEND...		1.0417	0.6611	5	26

Report file gabab-1m-app.csv

Figure 3.5. Report showing with showReport () .

**Code**

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Packages



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## **Creating New Modules**

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How specific modules can be created

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### Credits

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This project has been developed as...

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