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Sharing data to encourage accessibility and reproducibility within academia and beyond

A case study of the Henriques Lab with Ricardo Henriques

Key Points

- Ricardo and the researchers in his lab are focused on sharing data as openly as possible to make it accessible and reproducible.
- He has uploaded a video explaining super-resolution using the nighttime lights of the Eiffel Tower to illustrate the concept to other researchers and the general public.
- This video was initially hosted on YouTube but has recently been uploaded to Figshare to allow researchers to download the video and reuse it.

About Henriques

Ricardo Henriques leads the Quantitative Imaging and NanoBiophysics research group at University College London (UCL), with a small attachment laboratory at the Francis Crick Institute. He's an Associate Professor at UCL.

The focus of Ricardo's research is cell biology twinned with technology development in microscopy to develop the technology needed to solve unanswered biological questions. One area of research for the lab is viral infection - viruses and their interactions with cells can be viewed using super-resolution microscopes available in the lab.

The technological breakthroughs the lab establishes are easily extendible to other laboratories, making them broadly applicable to biomedical studies and other research areas. "We have tried to make the research we do accessible and reproducible: software we develop is all open source, the designs for the hardware are openly available, and we publish preprints to get our work out as soon as possible," said Ricardo. "We try and share as much information about our research as possible."

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The laboratory frequently publishes data about their research on Figshare as well as lectures from Ricardo on his research. A notable hosted dataset is his movie demonstrating how Single-Molecule Analysis algorithms commonly used in microscopy can be applied to detect the blinking lights of the Eiffel Tower and generate a super-resolved image of it. To do this, Ricardo used his QuickPALM algorithm to analyse a movie of the Eiffel Tower at night.

QuickPALM was showcased in Ricardo's first paper as the primary author in 2010. QuickPALM is the first fully open-source algorithm for 3D super-resolution microscopy based on single-molecule localization, developed to be easily accessible and reusable. As part of this paper, Ricardo published some of the data, his QuickPALM microscopy analysis referencing the Eiffel Tower, on Figshare. "I wanted a way to explain to researchers and the general public what super-resolution was," said Ricardo. "It happened that I was doing this research while in Paris. While at the Eiffel Tower at night, I realized that what I was trying to convey regarding cell and cell biology could be easily explained using the lights from the Eiffel Tower."

A large number of laboratories use this movie to explain super-resolution microscopy, as it is easy to understand and relatable worldwide. "The idea of detecting photographic blinking in lights to increase the resolution is not only applicable to imaging of cells, the physical principles can be seen and applied to many things around us," said Ricardo. "It's not only about the cell and the microscope - the laws of physics are universal and can be applied across many different scales and objects."

Prior to being uploaded to Figshare in 2018, the videos were available on YouTube. However, in terms of reproducibility, YouTube wasn't suitable for downloading the data and reusing it. Because he was using Figshare for his presentations, he decided to upload the videos to Figshare, as well, so others could download them and reuse them.

Since sharing the data, he's been approached by a number of researchers and organisations using the data to explain super-resolution microscopy. "I've been told by many researchers that they're using the movies in their presentations and one of them was shown at the Boston Museum of Science," said Ricardo. The museum reached out to Ricardo to ask for the original files; now that the data is in Figshare, anyone can download it and reuse it.

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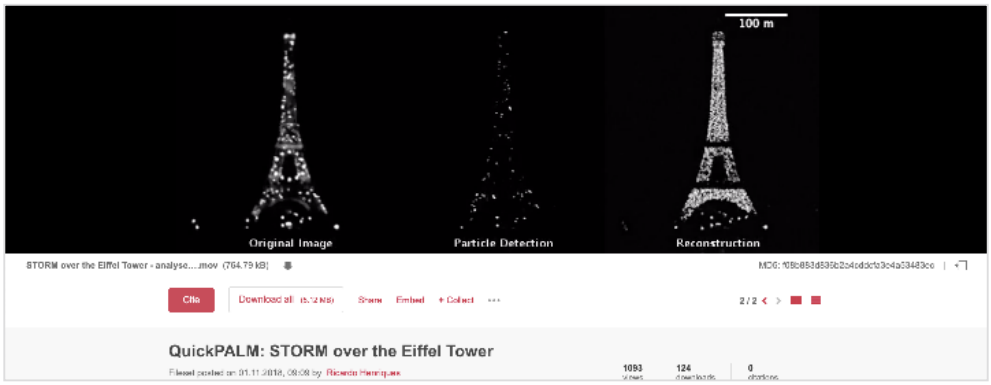

Henriques, Ricardo (2018): QuickPALM: STORM over the Eiffel Tower. figshare. Fileset.
https://doi.org/10.6084/m9.figshare.7284584.v1

Read more about Ricardo's research on Figshare