June 6, 2020

Dear Editor

We submit the attached document for consideration as a letter in Scientific Reports. The title of our paper is "Frame Localisation Optical Projection Tomography"

In this paper we present new a tomographic reconstruction algorithm which is applied to Optical Projection Tomography (OPT). Volumetric imaging approaches in microscopy are rapidly becoming the standard for interacting with more relevant 3D biological tissues, as such, OPT is seeing a growing interest and adoption in the laboratory. However, OPT is often plagued by reconstruction artefacts due to mechanical instabilities that are difficult to address. This paper presents an algorithm that is robust to mechanical instability through the use of multiple (5+) tracked fiducial beads whereby the sample pose is recovered and image rays are back-projected at all orientations. Our approach shows an improvement when compared to the standard Radon transform, particularly when systematic representative drifts (angular and spatial) are introduced.

Yours faithfully,

Craig Russell