

# Virtual Parallax — Experimental Procedure



Documentation regarding the procedure for virtual analysis of the effect of parallax on producing errors for bone references; specifically references taken during Total Knee Arthroplasty (TKA) and Partial Knee Arthroplasty (PKA)

## Background

This experiment was proposed as a way to quickly and effectively analyse the real effects of parallax on references taken during TKA and PKA surgical procedures. Existing theoretical models can be used to predict the parallax effects, however these do not take into account real life conditions such as lighting and perspective as well as a human's ability to correct for these conditions. As such, this experiment is way of understanding the real parallax effects exhibited by having real users define what they believe to be the references.

## Experiment Information

### References

The references to be analysed are as follows:

- Epicondylar axis
- Whiteside's Line
- Posterior Condylar axis

These were chosen given their prevalence in TKA/PKA procedures.

### TKA & PKA

Analysis of references taken for TKA and PKA will both be analysed. Upon further research, it was found that, typically, references for TKA are taken after the distal femur cut and thus are taken upon a flat femoral surface. However, for PKA, given the absence of any such distal femur cut, these references are taken upon the

curved and complex femoral surface. These differences will most likely produce differences in the data obtained. As such, two sets of renders have been prepared to replicate the different conditions experienced when taking TKA and PKA, and both sets will be analysed separately.



Example of TKA image



Example of PKA image

## Setup

The experiment will be conducted virtually with the intention of using a remote desktop to access the test software. Guidance will be given beforehand on how to set this up.

## Procedure



Throughout your attempt at the experiment, Junho Choi (jc8818@ic.ac.uk) will be on hand to answer any queries or solve any problems you may encounter during the process

1. Once loaded into the remote desktop, open up the File Explorer and go to “This PC” —> “Local Disk” —> “Junho Files” —> “whitesides\_app”
2. To begin the program, double click myapp.py to begin the program
3. Please enter your name before proceeding.
  - You should already see an image of the first render
  - **Please do not resize the window**
4. To draw your take at the references, click the relevant button, then click and drag on the image to place

- **Green** — *Epicondylar axis*
  - **Red** — *Whitesides*
  - **Blue** — *Posterior Condylar axis*
5. If you need to redraw the line, just **drag and click again** and the previously drawn line should disappear
  6. Make sure **all three lines** have been drawn and they are positioned as intended
  7. Click “**Go**” to proceed to the next render
  8. Repeat **steps 2 - 5** for both TKA and PKA image sets
  9. Once all image sets have been completed, you should be meet with a congratulatory message!
    - You have finished the experiment

If in doubt, please check the demo video or contact us using the email above!

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