

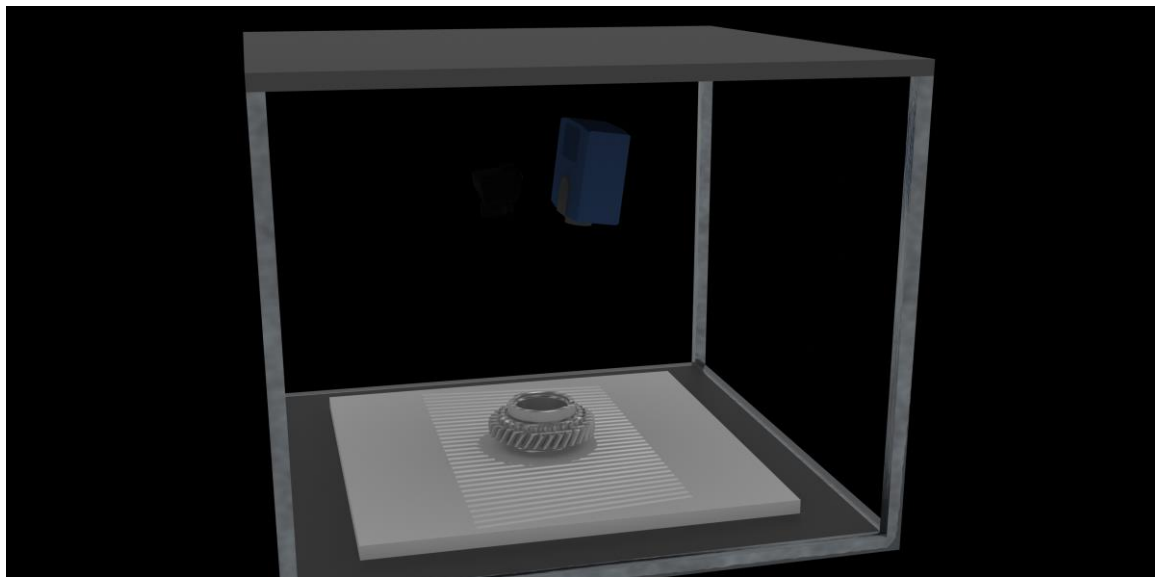
Winter
2025

Optics & Photonics Group Lunchtime Seminar Series

University of Nottingham

Quantitative Simulation of Fringe Projection Profilometry

Daniel Weston
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12:00 Wed 12 March 2025

Coates – Room C25



Daniel
Weston

Quantitative Simulation of Fringe Projection Profilometry

Fringe projection profilometry (FPP) is a non-contact, high-precision, speed-adjustable optical measurement technique for the recovery of object surfaces. Structured light is projected onto an object; a camera takes an image; the absolute phase map is extracted and can be reconstructed into a height map. FPP is used in several fields such as in-situ manufacturing process monitoring [1] and tumour identification [2].

There are many different techniques, parameters, and hardware choices made to deploy an FPP setup and it is difficult to have knowledge of how a system may perform without building it. A simulation was made in Blender in order to remove this barrier and analyse how these factors can be tweaked to mitigate the limitations of FPP. A dataset of 100k images and 10k reconstructions was generated along with similarity scores comparing the ground truth surface data to the virtual measurements.

[1] In-situ monitoring of laser-based powder bed fusion using fringe projection, ResearchGate, Oct. 2024, doi: 10.1016/j.addma.2024.104334.

[2] W. M. W. Norhaimi, Z. Sauli, H. Aris, V. Retnasamy, R. Vairavan, and M. H. A. Aziz, 'Digital Fringe Projection System for Round Shaped Breast Tumor Detection', vol. 13, no. 1, 2020.

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All are welcome



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