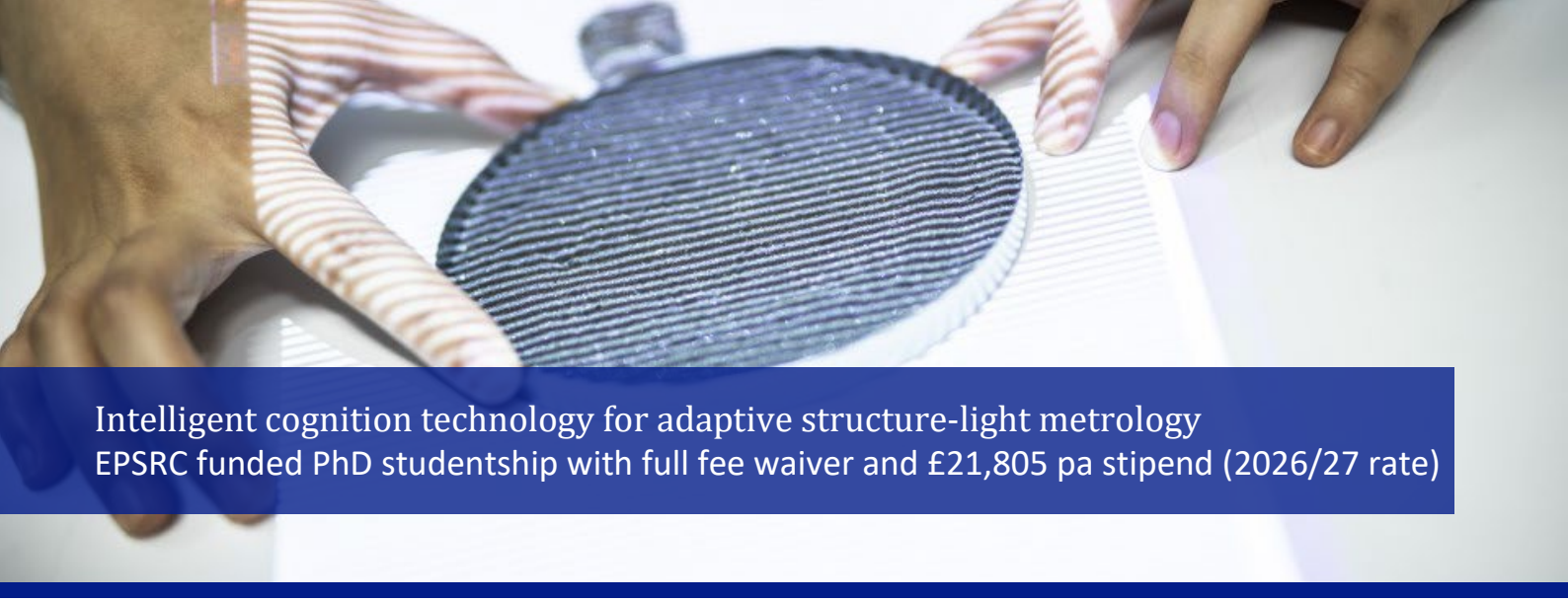


Intelligent cognition technology for adaptive structure-light metrology

EPSRC funded PhD studentship with full fee waiver and £21,805 pa stipend (2026/27 rate)

Project Code: DLA_DTP_2026_24

Main Supervisor: Dr Yongjia Xu

Co-Supervisor: Prof Dame Jane Jiang, Dr Feng Gao

Project Introduction

Structured-light metrology technology delivers precision measurement with micro/submicron accuracy and compact in size and lightweight. However, it still a challenge to establish efficient scanning strategies for new metrology targets. This project aims to realise smart object sensing and identification and 3D model prediction for adaptive metrology. This will be achieved by developing novel synthesis algorithm to generate dataset for AI models training and creating new intelligent cognition technology. CPT will provide strong support to the proposed project in experiment space, and equipment.

Project Details

1. Background

Structured-light profilometry generally has submeter-scale field-of-view for ensuring a good lateral resolution. Scanning and stitching processes are essential to setup a complete 3D data of the object. Existing scanning processes in industry are performed through human-operation and pre-programmed robot arm. Plenty of time are required to establish scanning strategies for new metrology targets.

2. Aim and objectives

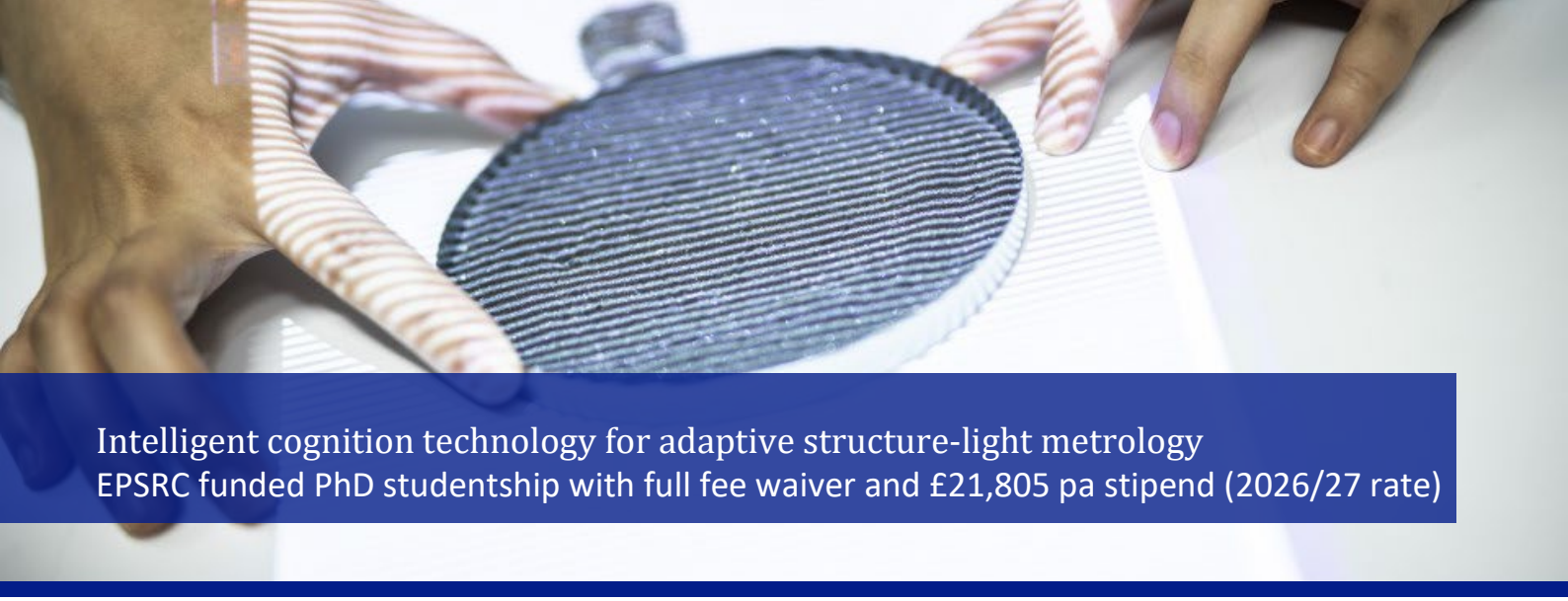
This project aims to realise smart sensing and identification of objects and making 3D model prediction, by which to strategise the optimal scanning path for agile metrology. Two objectives are established: 1. develop novel synthesis algorithm to generate dataset for AI models training; 2. create new intelligent cognition technology for adaptive metrology.

3. Methodology

An intelligent cognition technique will be created for industrial standard parts (ISP) to be measured. An AI algorithm will be explored to invoke Computer Aided Design (CAD) models of the measured ISP based on 2D images captured by the robotic metrology system. Based on the CAD, a rough 3D model of the ISP in the real world can be acquired, by which to instruct the metrology system in making scanning strategy. To achieve this aim, a ML (machine learning)-based synthesis algorithm will be applied to generate a large enough dataset to accurately train AI models, where CAD models, texture data, and the calibrated camera imaging parameters are used to generate plenty of simulated images for system training. The synthesis algorithm will be developed as a universal recognition module and can be used to rapidly train AI models for any ISP needing to be measured.

4. Research environment

CPT has undertaken leadership of several EU and EPSRC projects, which are equipped with state-of-the-art ultra precision machines and surface metrology equipment. CPT will provide strong support to the proposed project in experiment space, and equipment such as robot arm, optical platform, visible laser devices,
precise mobile platform, imaging devices, etc.



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Project-specific entry requirements

Good programming skills, such as Matlab, Python.

Further Information

This call is open to **UK Applicants only**.

Applicants should be of outstanding quality and exceptionally motivated.

The studentships are funded for 3 years (subject to satisfactory annual performance and progression review) and will provide for tuition fees and a tax-free stipend paid monthly.

Please note that there are more projects than funded studentships available and therefore this is a competitive application process which will include an interview. Shortlisted candidates will be contacted for an interview in person or via Teams. After interview the most outstanding applicants will be offered a studentship.

Queries about the application process are welcome and should be emailed to pgrscholarships@hud.ac.uk.

Informal enquiries about this project should be directed to Dr Yongjia Xu.

Type of Award: Doctor of Philosophy (PhD).

Eligibility: UK applicants only. First Class or Upper Second-Class Honours degree or equivalent in a relevant subject area, please refer to the entry requirements on the specific projects being advertised.

Location: Huddersfield.

Funding: 3 years full time research covering tuition fees and a tax-free bursary (stipend) starting at £21,805 for 2026/27 and increasing in line with the EPSRC guidelines for the subsequent years. Funded via the Engineering and Physical Sciences Research Council Doctoral Training Programme.

Duration: 3 years full-time plus 12 months writing up (please note no funding available for writing up period).

Closing date: 28th April 2026

Start date: 1st October 2026

Application details

- Go to the EPSRC webpage and download the Expression of Interest Form 2026.
- Provide copies of transcripts & certificates of all relevant academic and professional qualifications.
- Provide references from two individuals – please contact your referees and ask them to send them directly to pgrscholarships@hud.ac.uk from their email address.
- Proof of eligibility – e.g. scan of passport photo page.
- Completed forms, including all relevant documents should be submitted via-email to pgrscholarships@hud.ac.uk.

Please note: if you do not attach all the relevant documentation prior to the closing date your application will not be considered.

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