

Topic: Quantifying the measurement capabilities of point cloud data across different measurement systems

Location: Coventry University

In this research project, the student will explore the use of different point cloud inspection systems to understand measurement accuracy and variance on the geometry of parts across different instruments. With many manufacturers showcasing their technologies, for example, Creaform's MetraScan, Hexagon's Absolute Arm, Zeiss's LineScan etc, the uptake of such 3D scanning systems is now a common tool within advanced manufacturing systems where accuracy and precision are required.

The student will investigate and understand measurement reliability across different state-of-the-art measurement technologies, and will work towards the task of outlining how these technologies under different conditions play an effect on the quality of data (point cloud or volumetric data) recorded. The student will also compare how industrial 3D point cloud inspection tools such as Polyworks, Metrolog, Ziess Calypso have influence on the point cloud or volumetric data. This will provide a future framework of methods and tools that one can implement towards achieving a reliable inspection process.

The project will be supervised by Professor Trevor Toman and Dr Ranveer Matharu from the Metrology Group at AME / FTC CU. CU Metrology is an international and diverse team that thrives on openness and cooperation – students work in teams to achieve joint goals in a friendly but professional cohort.

The position is available for UK candidates, but EU or International applicants who can pay the difference between the Home and International Fees would also be welcome to apply. Candidates must possess or expect to obtain, a high 2:1 or 1st class degree in mathematics, computational science or engineering, or other relevant discipline.



Supervisor: Dr Ranveer Matharu

Dr Ranveer Matharu completed his PhD study in Electrical Engineering from The University of Queensland in 2012. He has experience of working in both fast-paced research and teaching environments with interests in imaging and sensing using interferometry. His contributions to research include building and designing of optical systems that make use of VCSELs (Vertical-Cavity Surface-Emitting Lasers) and broadband sources utilising laser feedback interferometry (self-mixing effect) and low coherence interferometry, respectively. He has also experience with machine vision systems for manufacturing metrology with current interests associated with the internet of things (IoT), through the integration of sensors to attain optimum efficiency in industrial and manufacturing environments.

Ranveer joined Coventry University in 2018, prior to this, he worked as a Research Associate at Loughborough University developing in-process metrology to support real-time adaptive process control for high-value manufacturing systems.

His research interests include vision systems, robotics, interferometry, semiconductor lasers and sensor integration at both hardware and software levels.

Supervisor: Professor Trevor Toman



Professor Trevor Toman is currently a Professor in Metrology at Coventry University. Trevor joined CU in 2006 to launch and manage the new Metrology Development, which was a three-year funded project to deliver Metrology facilities for CU for teaching and research and to deliver measurable improvements for manufacturing businesses within the West Midlands area. Since joining CU Trevor has developed working relationships for delivery of training, education and research in metrology to a wide range of organisations, both nationally and internationally.

Trevor has also been actively involved with various academic and industrial committees including Academic Chair on The Executive Committee for the Coordinate Metrology Society of North America, various BSI committees, technical and supervisory groups within the Catapults and is a member of several professional metrology bodies. Trevor is also the lead academic on several externally funded research projects.