

# Structured-light 3D Tomography

For: MSc or PhD Students; 6 months

Program supported: [Advanced Manufacturing](#)

Academic Collaborator	NRC Principal Investigator	Associated NRC Research Centre
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**Project Description:**

3D shape acquisition of semi-transparent surfaces remains a challenging topic in structured-light 3D imaging. The problem with these surfaces is that they weakly reflect light. As result, the data is recorded with a low signal-to-noise ratio.

The student (computer engineering or electrical engineering) will explore the ability of the discrete Fourier transform and nonlinear regressions to deal with such noisy data in order to perform the 3D tomography of the scene, i.e., to perform the 3D shape acquisition of all the surfaces present in the scene, including the semi-transparent surfaces and the surfaces behind them.

The student will benefit from the facilities of the NRC computer vision and graphics group and its expertise in structured-light 3D imaging. He will also benefit from the facilities of the computer vision and systems laboratory of Laval University, the host organization, whose director, Professor Denis Laurendeau, will provide academic mentorship to the student.

The short-term impacts of this project will be (1) to provide a solution to the problem of 3D shape acquisition of semi-transparent surfaces and (2) to provide a means to perform 3D shape acquisition in unconventional scenarios such as underwater or in the presence of fog.

In the medium to long term, we anticipate that this project will help give NRC a significant competitive advantage in terms of intellectual property and expertise, primarily by providing 3D metrology and digitization solutions for industrial applications and manufacturing processes involving optically complex objects.

**Student Profile:**

The ideal candidate holds a Master's degree in electrical engineering, computer engineering or computer science. He has experience in 3D vision, 3D imaging, signal processing and nonlinear regressions.