



## Thesis Projects (MIE498 H/Y) 2018–2019

**Title:** Thermophotonic dynamic imaging of human teeth for noninvasive detection of caries

**Number of Students:** 1 or 2

**Nature of Work Proposed:** Experimental, image processing

**Project is appropriate for:** Mechanical

**Description:**

Specialty waveforms will modulate a mid-infrared camera in the CADIPT to obtain subsurface images of otherwise optically scattering human teeth with demineralization lesions (caries) in the enamel and dentin as a means of non-invasive monitoring tooth decay. The teeth will be illuminated with a synchronously modulated near-infrared laser beam. To study the sensitivity and specificity of this thermophotonic technique to enamel or dentin demineralization caries, data/images from both healthy and carious teeth will be acquired and the results will be compared with histological investigation following sectioning of the tooth. The work will entail obtaining images from occlusal and/or interproximal locations in teeth, optimize image contrast and resolution and histologically validate the results. The thesis student(s) will work closely with a CADIPT Research Associate in charge of the project and a clinical dentist acting as partner and consultant.

**Notes:** For 2-term theses.