

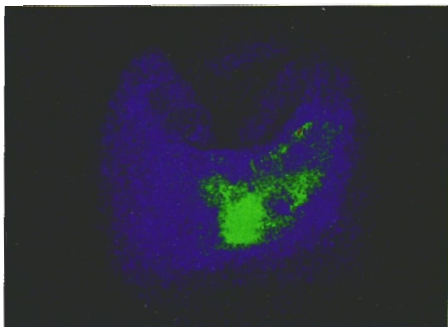
## Earlier detection of tooth decay

A further biomedical application of structured lighting could lead to earlier detection of tooth decay, thus reducing the need for drilling and filling of teeth. Researchers from Glasgow's Institute of Photonics (part of the University of Strathclyde), the Glasgow Dental Hospital, and the University of Dundee have developed a structured lighting technique for early detection of tooth decay. (There is an unusually high prevalence of tooth decay among the population of Glasgow and of Scotland generally.)

The scientists took a tooth with a known area of decay, and illuminated it with a beam of structured infrared light of around 880nm. They took three sets of images at different spatial phases and combined them using standard image processing techniques.

According to Simon Poland, of the Institute of Photonics: 'Dentists usually detect disease by scraping and looking, or by taking X-rays, but these methods only catch decay once it's already quite serious. Some of the more complex techniques currently available give dentists data readings only. The advantage of a detailed 3D image, like the one we've created, is that it can reveal decay in its earliest stages, and lets the dentist take measures to stop or repair the damage before it gets too bad. It gives them a powerful diagnostic tool, and tells them about the size and shape of the disease, and its progression.'

The technique developed by the Scottish researchers could help dentists catch disease before too much mineral loss occurs, while the possibility of re-mineralisation still exists. If mineral loss continues unchecked, cavities grow, and then fillings are needed.



Two-photon image of a carious tooth from the Institute of Photonics, Strathclyde university.