**ABSTRACT**

Photothermal tomography is a non-invasive imaging technique that uses the generation of broadband emissions from the absorption of laser light to form an image of the subsurface. Laser-generated gold nanoparticles can be targeted to specific cell types, allowing for the formation of cavitation around the nanoparticles. The cavitation can then collapse, generating a broadband emission, which can be used to form an image of the subsurface.

**MOTIVATION**

The use of nanoparticles targeted photoacoustic cavitation for tissue imaging and therapy shows significant promise. However, before this can be used in-vivo applications, the following questions need to be addressed:

- What are the acoustic pressure and laser light thresholds for the generation of nanoparticle nucleated inertial cavitation?
- How reproducible are the acoustic emissions and are there are there efficacy for imaging applications?

**RESULTS**

- Nanoparticle-targeted photoacoustic cavitation can be formed in small (<550 μm) nanoparticle-doped regions, giving contrast between cancerous and normal tissue. For sufficiently high laser fluence, a vapour cavity can be formed around the nanoparticles. This cavity can undergo an inertial collapse, generating a broadband emission, which can be used to form an image of the subsurface.

**REFERENCES**