CVMMyM4

Título: **Could Maths avoid deaths by heart attacts?**
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Abstract: Coronary Artery Disease (CAD), the most prevalent form of heart disease, caused due to the formation of atherosclerosis plaques within the walls of coronary arteries, causing heart attacks and leading to 360,000 annual deaths in the US (Cecil Essentials of Medicine E-Book, 2021). Diagnosis before symptom onset is challenging, typically a heart attack. Traditional detection methods for coronary stenosis are invasive. So, the problem of early unveiling an obstruction (stenosis) within a blood flow duct by no-invasive means, plays a central role in Medicine. In this talk, we study the inverse blood flow-accoustic problem to unveil an obstruction contained in a 2D duct for Stokes viscous flow, which become "turbulent" post obstruction and generating an acoustic wave. To be precise, using acoustic wave measurements at certain points on the exterior of the duct (over the chest surface), we can unvealing the location, extent, and height of the obstruction. With synthetic examples, we validated the effectiveness by numerical simulations of our proposed mathematical modeling formulation.