CNST Center for Nanoscale Science & Technology

# Inertial Sensing Transducer

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## GOAL

To fabricate a proof-of-concept inertial motion sensor that uses an electron tunneling circuit to monitor the frequency of a microelectromechanical harmonic oscillator.

## KEY ACCOMPLISHMENTS

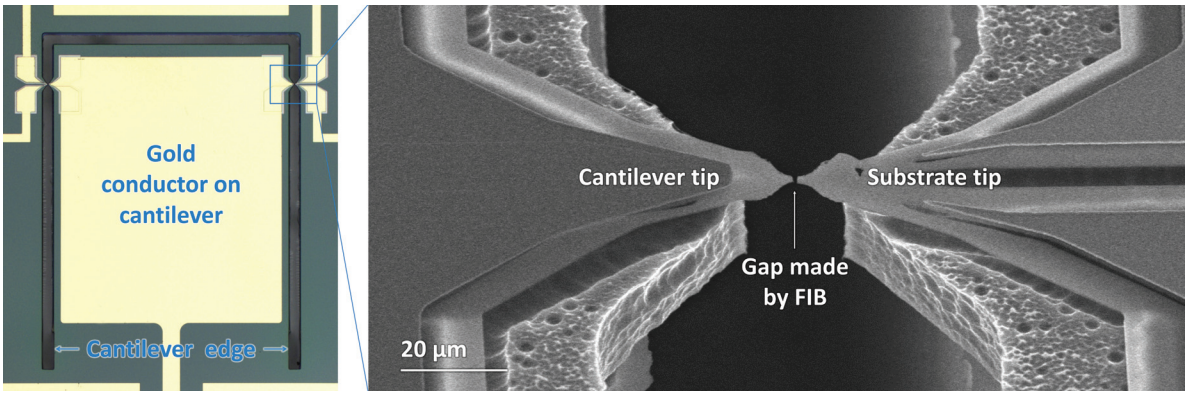
Fabricated a small low-power, low-cost mechanical oscillator with tunneling tips as a prototype timing trigger in a sensitive force and position detector.

Successfully created the 10 nm to 40 nm tunneling gaps required to allow electron tunneling.

## KEY NANOFAB PROCESS

Precise focused ion beam ablation to define a nanoscale gap between tunneling tips on a microcantilever and on an adjacent rigid substrate.

**Left:** *Microscope image of the cantilever device with gold electrical connections.* **Right:** *Scanning electron micrograph shows conducting tips on the cantilever and on the rigid substrate. With each oscillation of the cantilever, a tunneling current flows between the tips as they pass each other, triggering timing circuitry.*




## REFERENCE

http://www.lumedynetechnologies.com/