

## **Single-cell photonic nanocavity probes (Presentation Video)**

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### **BIOS 2014 Hot Topics Presentation**

The use of nanometer-sized probes for single-cell studies is presented by Gary Shambat of Adamant Technologies (USA) in, "Single-cell Photonic Nanocavity Probes." This work, conducted by Shambat at Stanford University in Jelena Vukovic's lab, seeks to extend traditional nanoprobe work by being able to insert a nanobeam into a single cell without damaging the cell. By functionalizing the beam, the team enables single-cell studies, essentially taking the lab to the biological system instead of extracting the biological system for study in a lab.

The probe consists of a nanobeam optical cavity resulting from the tapering a GaAs device containing InAs quantum dots and coupled to an optical fiber to enable handling. The team demonstrated the ability to insert and retract the beam from PC3 cells (prostate cancer cells) in a reversible and elastic fashion.

Using this technique allowed a study of the optical properties of the cell. Cell viability in this initial work was 75%. Future work includes in vitro protein sensing and adapting chemistries for studies of intracellular targets such as proteins, all of which may find applications in fields such as drug screening.

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