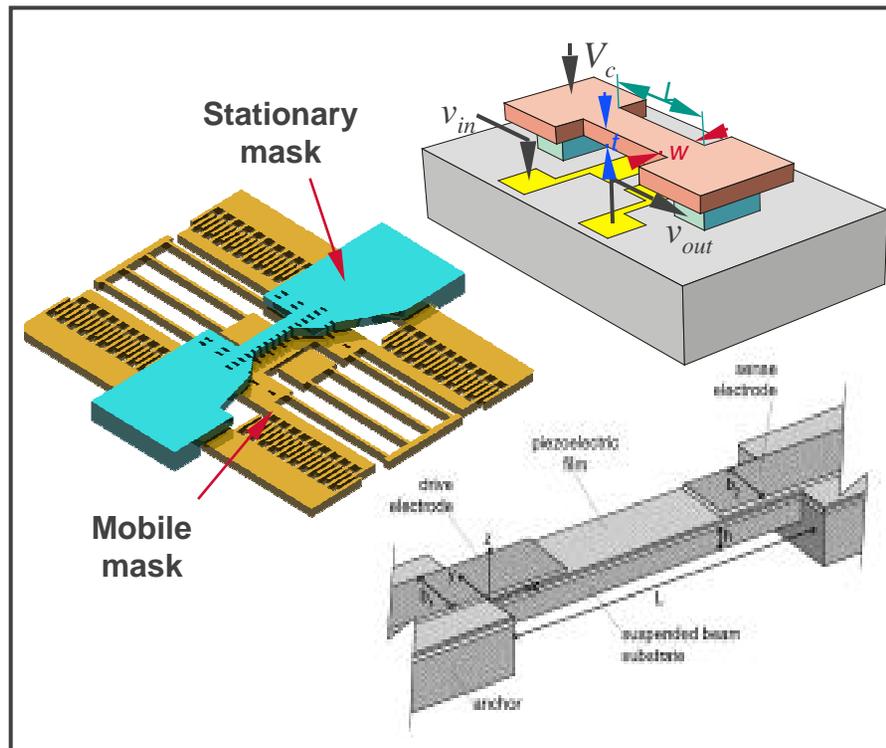


Nano Mechanical Array Signal Processors (NMAASP)

Daniel J. Radack, Ph.D.



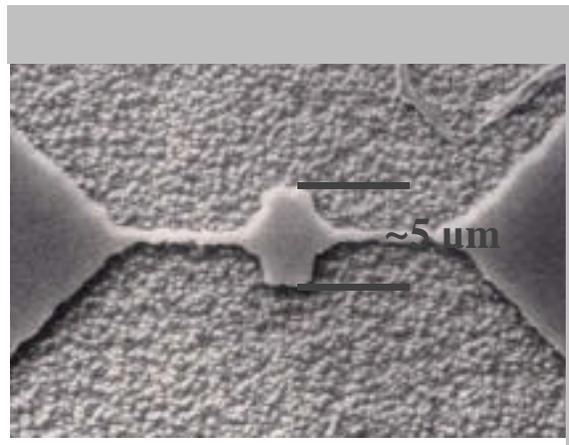
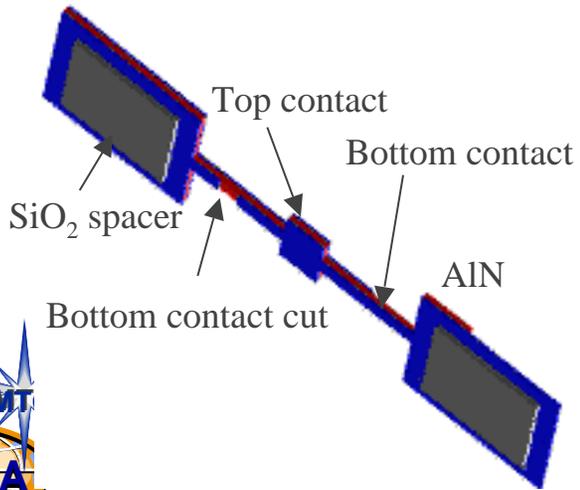
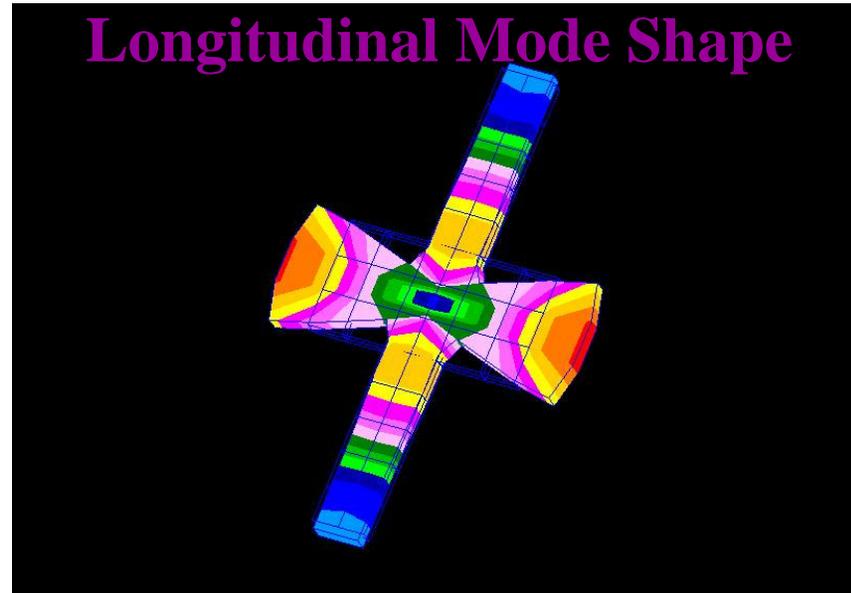
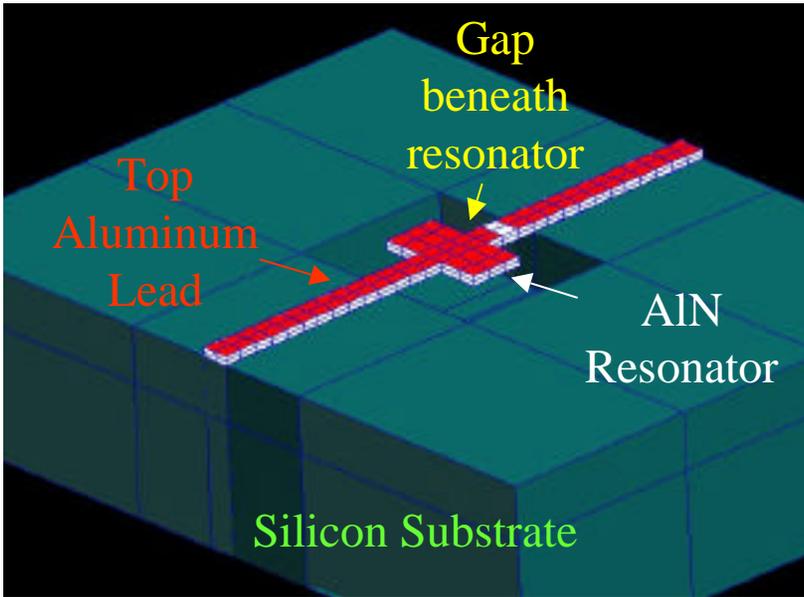
- **Goal:** Create arrays of precision, nano mechanical structures for RF-signal processing.
- **Challenges:** Nano precision fabrication, transduction mechanisms, loss mechanisms, interconnects.



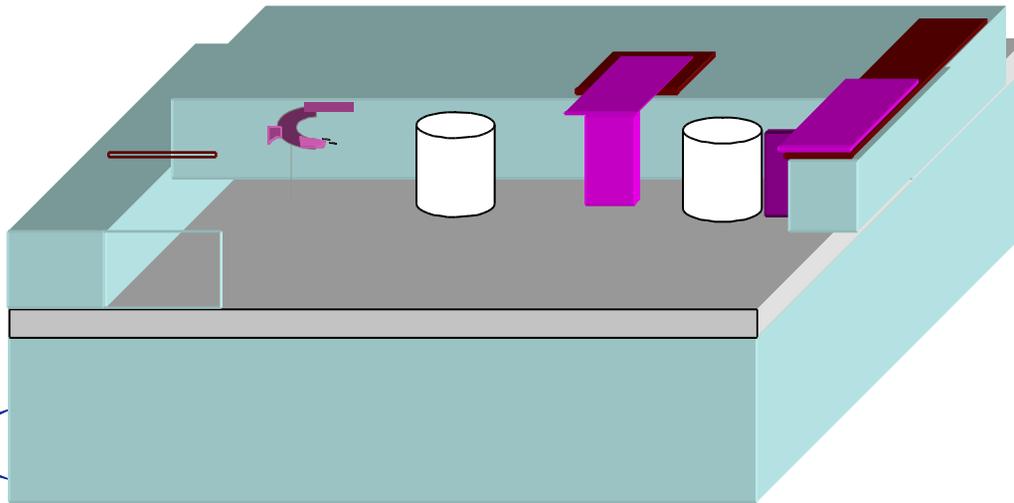
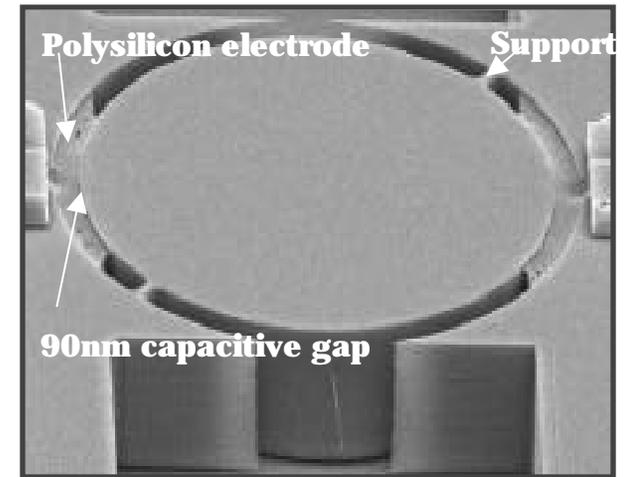
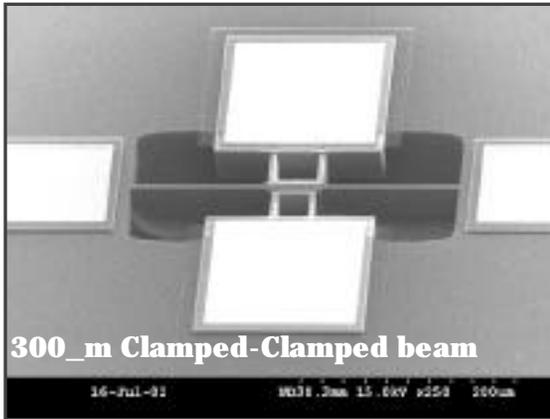
NMASP

- Motivation for Program
 - Enable >100X reduction in size & power consumption & 10X improvement in performance for UHF wireless communication.
- Military Impacts
 - The development of NMASP will enable ultra miniaturized (wristwatch or hearing aid in size) and ultra low power UHF communicators/GPS receivers. Their uses can greatly improve the mobility and location identification of individual war fighters, as well as standalone wireless sensor clusters.





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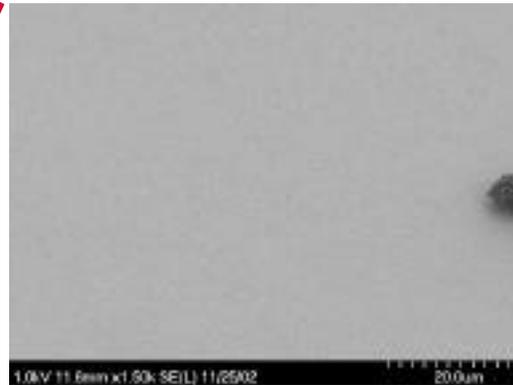


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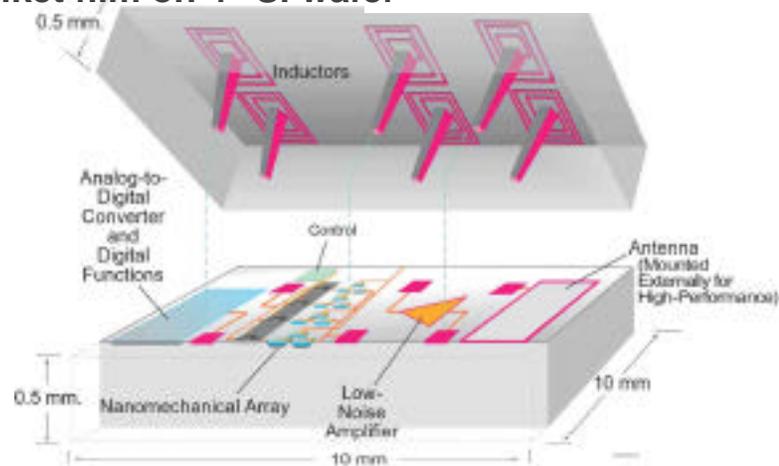
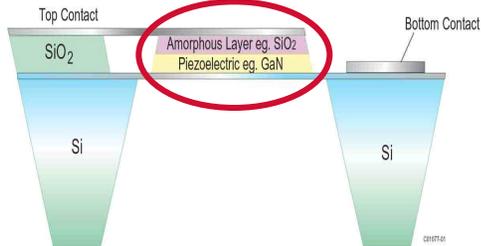
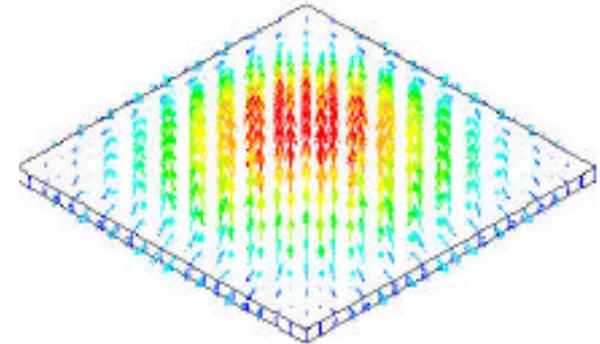
GA Tech

NMASP

1.75u thick for 1.575 GHz



Crack-less GaN blanket film on 4" Si wafer



Objective:

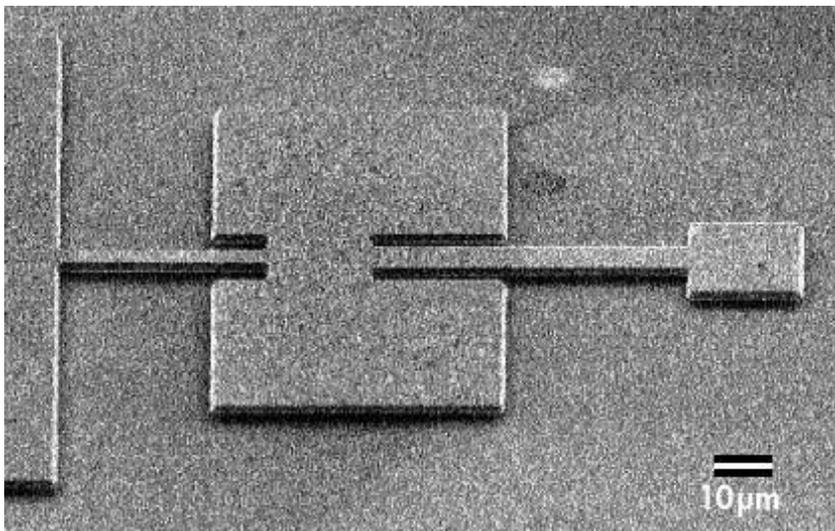
Develop nanomachined resonator arrays and packaging techniques to demonstrate a single chip GPS receiver front



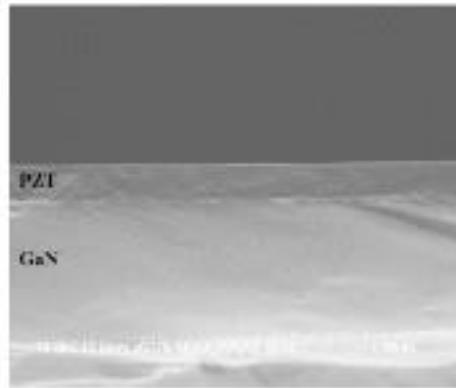
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Honeywell Labs

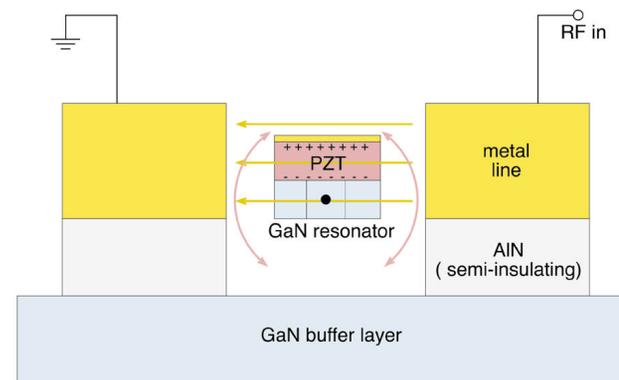
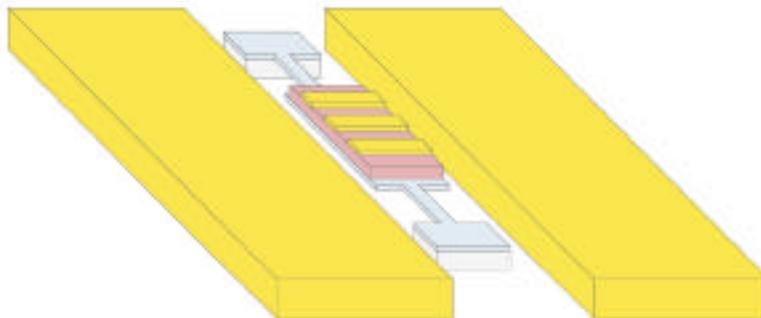
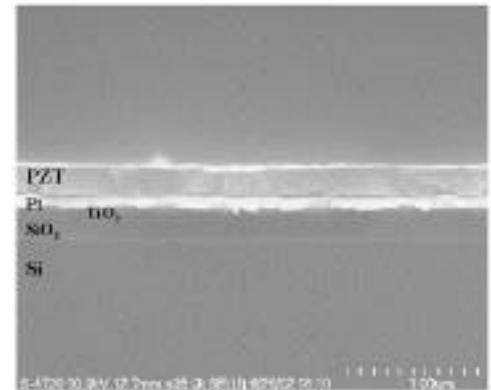
NMASP



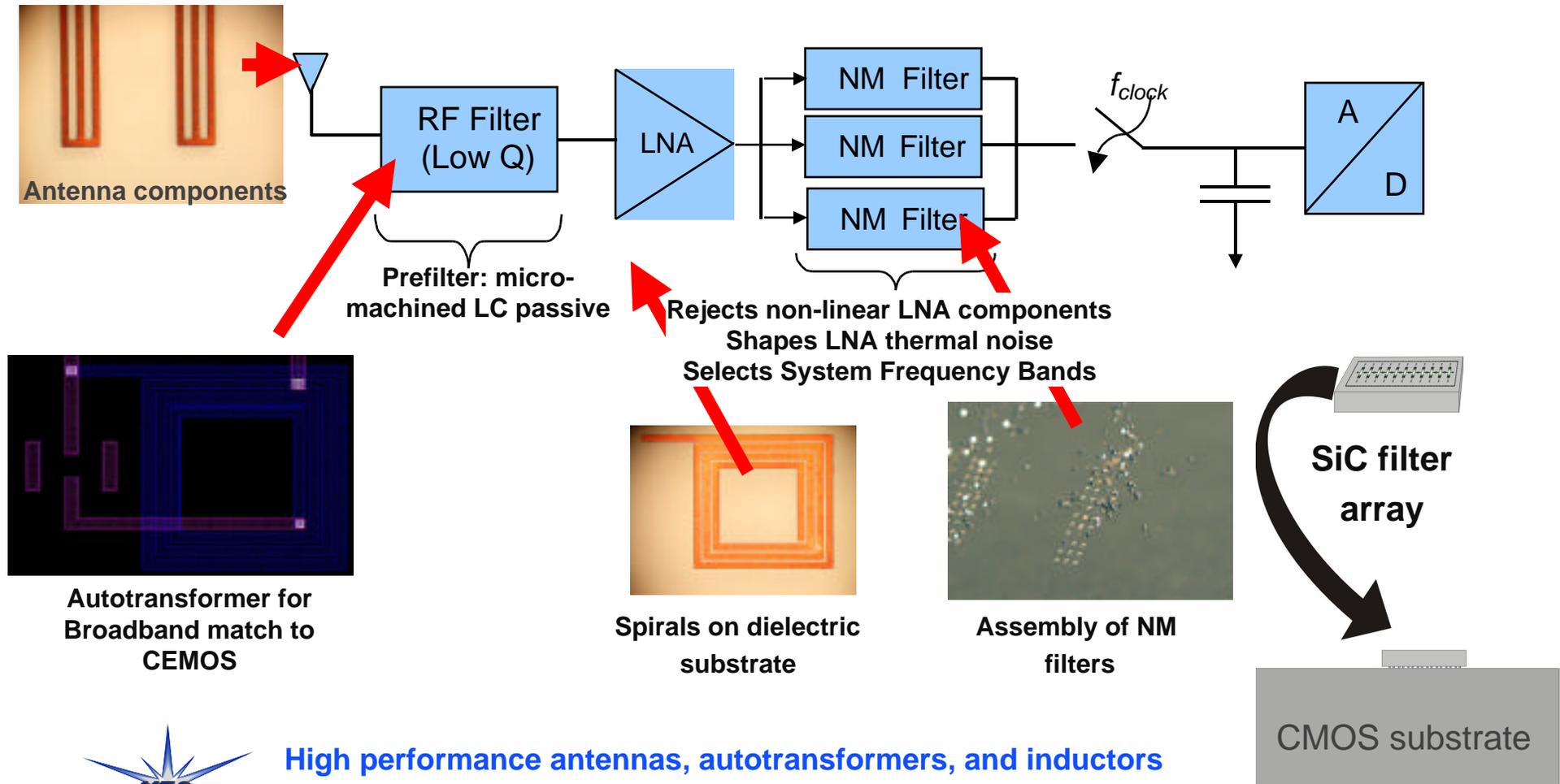
PZT/GaN/Sapphire
(700°C/10 min)



PZT/Pt/TiO₂/SiO₂/Si
(700°C/10 min)



NMASP



High performance antennas, autotransformers, and inductors



Microsystems Technology Office

UC Berkeley