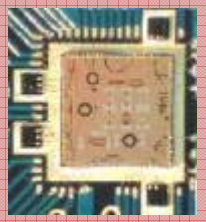
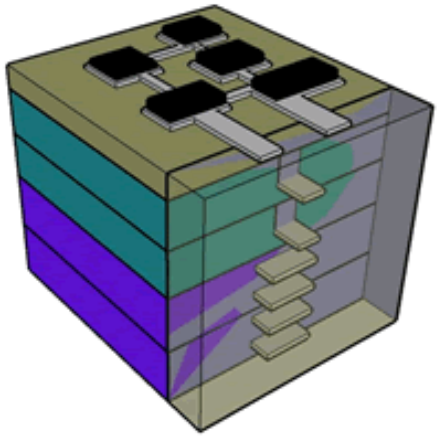
Integration of Wireless Sensor Nodes

Elizabeth Reilly

Wireless Sensor Node

Low Power Radio





"Picocube"

Power Storage

Sensor

Renewable Power

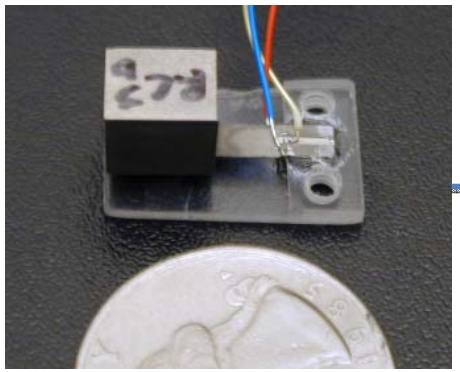
Supply

Introduction

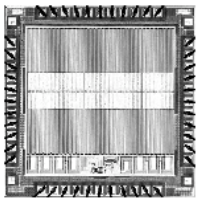
- Fabrication of radio, energy scavenging system, energy storage, and sensor first generation near completion
- Integration of individual technologies to form functioning node
  - Testing of node bench-top environment
- Future Work: Testing and integration of microscale energy scavenging device and microscale sensor

Meso Integration

Initial integration attempt

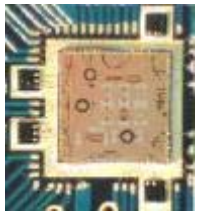


Macro Scale Energy Piezoelectric Scavenging System



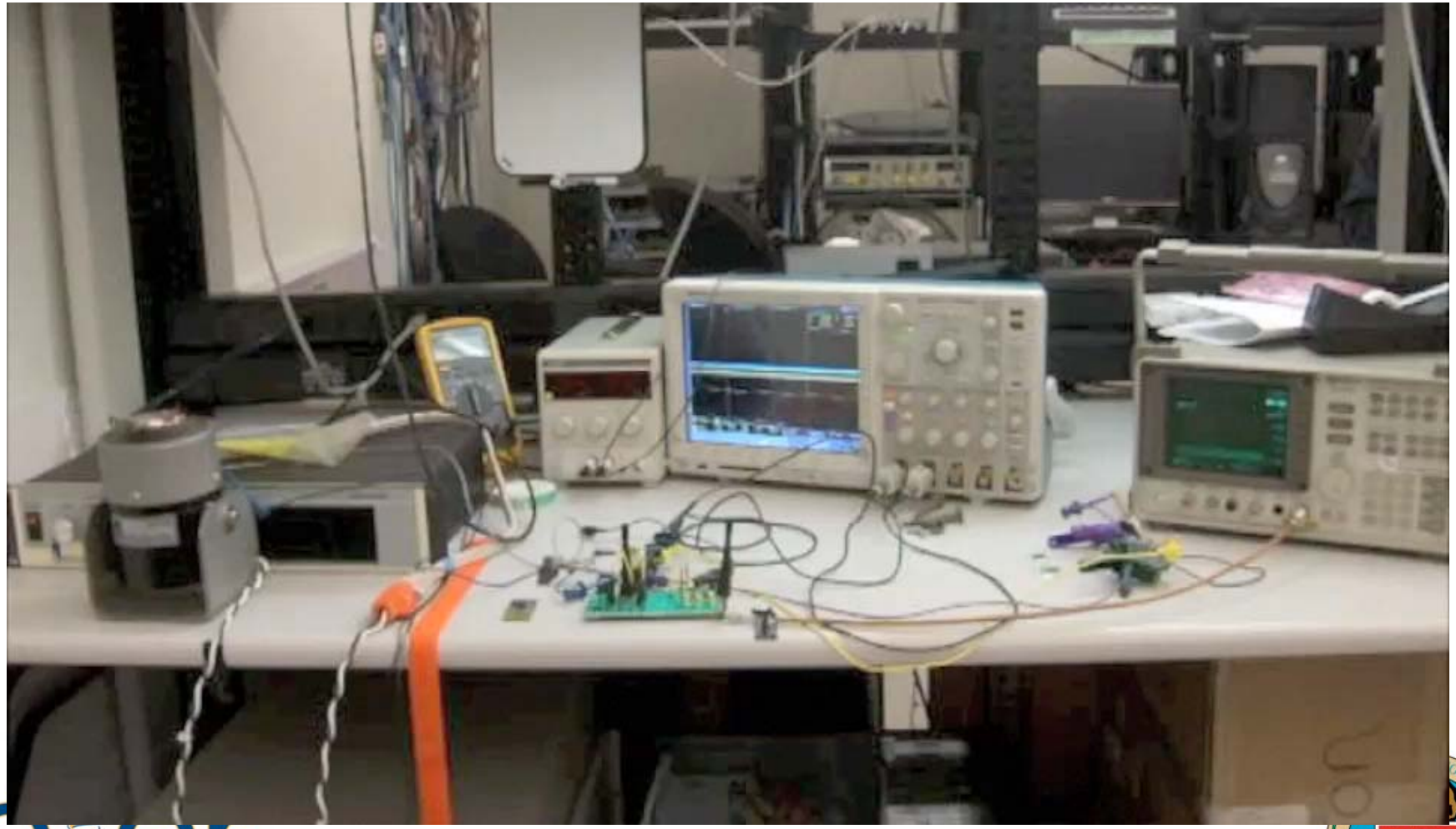
Power conditioning circuitry (*F. Burghardt)*

Dispenser printed capacitor *(C. Ho)*



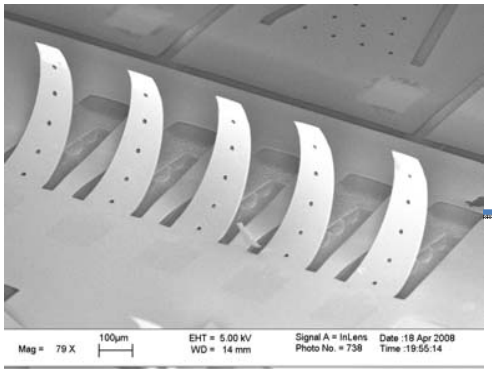
Low power radio *(M. Mark et al)*

Demonstration

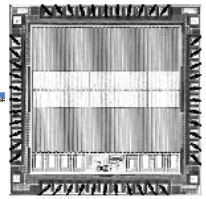


Micro Integration

Second integration attempt using microfabricated prototypes available in Spring 2009

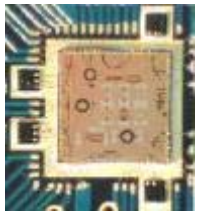


Microfabricated piezoelectric energy scavenging system *(L. Miller et al)*

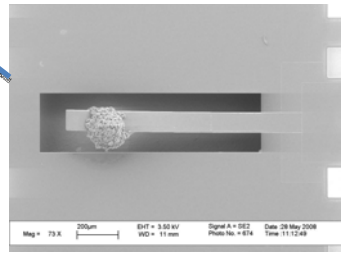


Power conditioning circuitry (*M. Seemans)*

Dispenser printed capacitor (C.Ho)



Low power radio *(M. Mark)*



Microfabricated current sensor *(E. Leland)*

Conclusions

- Current radio, power circuitry, and energy storage devices all functional
- 2nd generation of microscale energy scavenging system and sensor by May
- Integration of power circuitry with sensor, power storage, and mesoscale piezoelectric scavenger
- Working proof of concept mesoscale prototype
- Microscale integration starting with current generation
- Testing of devices is on going