

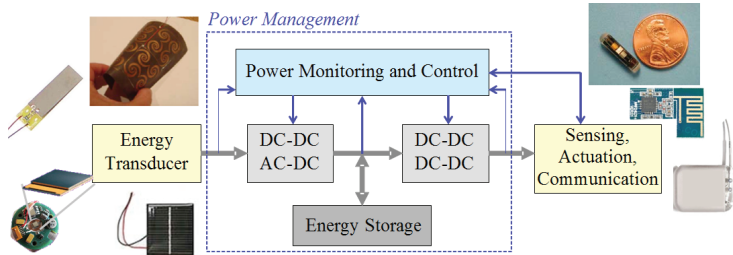


# RESEARCH

## Low Power Energy Harvesting Platforms

### Overview

Harvesting small amounts of power (1 micro W – 1 mW) of power from ubiquitous sources enables the deployment of low-maintenance, long-life, highly integrated devices which perform sensing, actuation and communication in environments in which it previously would have been impossible or impractical to operate. Applications include implantable medical devices, embedded industrial and structural monitoring systems, and military devices for long-term remote deployment, and large-area maintenance-free environmental or commercial monitoring networks.

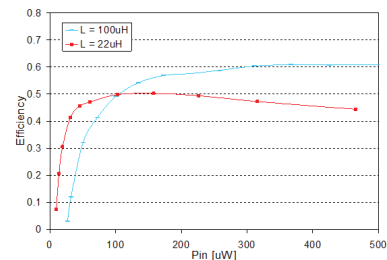
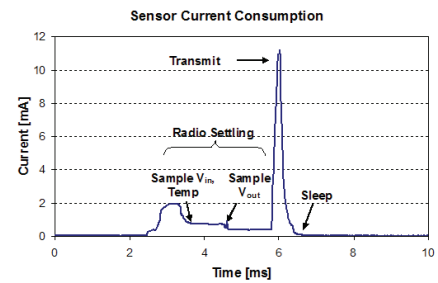
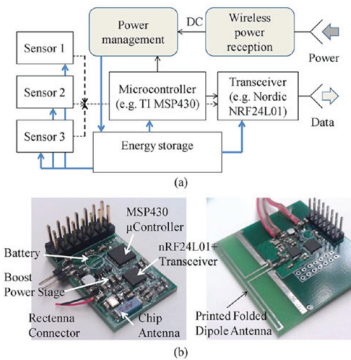
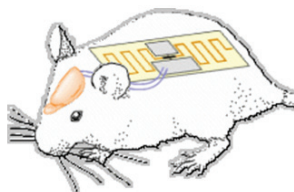


### Technology Pathway

A platform for implantable sensing and transmission of biological signals in mice has been developed. The platform consists of power electronics for energy conversion from an RF rectenna transducer, sensor loads, and low power custom protocol RF transceiver. A single microcontroller manages sensing, transmission, and harvesting, allowing adaptive behaviors based on available power.

The platform is designed to minimize power consumption when not actively sensing or transmitting. The frequency of data transmission, as well as burst power conversion frequency, are scaled to match available power, yielding only a trivial change in stored energy during operation.

Converter design is adjusted based on operating power characteristics, allowing operation of the platform with only 10 micro W of incident RF power.



### Impact

The platform, built entirely from low-cost, discrete, commercially-available parts demonstrates the feasibility of operation within a number of environments which would previously be impossible for deployment at a similar level of performance, including remote, hazardous, or inaccessible environments.

### POINT OF CONTACT



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research funding provided by

