Building the **Batteryless Computing Community** through **Access** to **Education**, **Testbeds**, and **Tools**

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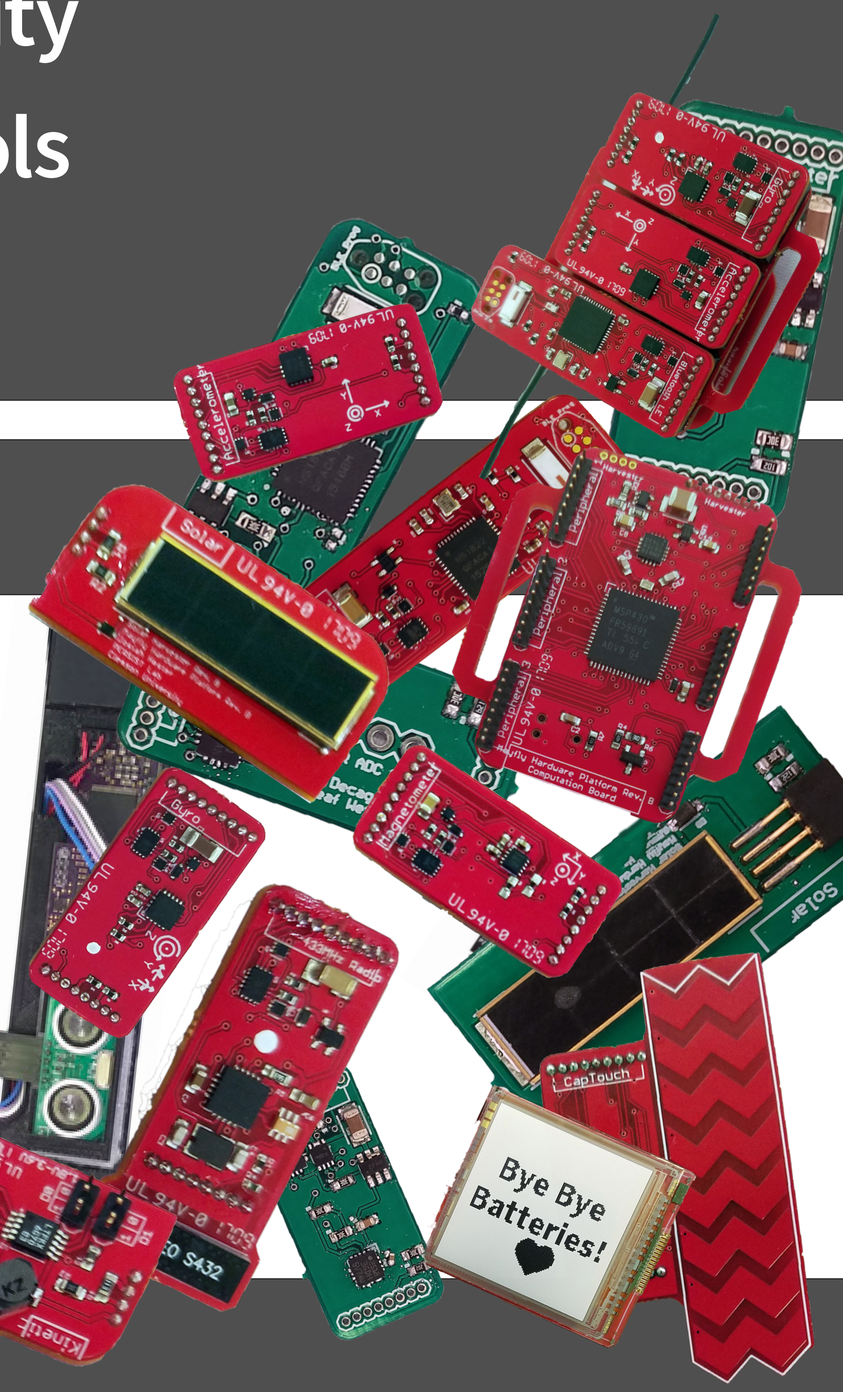
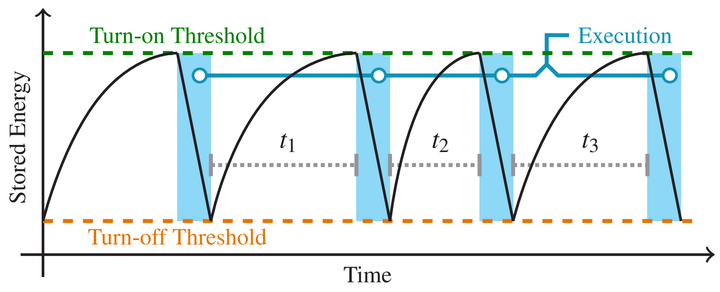


A growing community for a smaller, sustainable IoT

Batteryless Challenges

unpredictable & volatile
low power, few resources
frequent power failures
timekeeping and timeliness
consistency and forward progress



A decade of growth

~ 5 people ➔ hundreds of researchers

893+ papers — most in the last 5 years

Spanning many areas: programming languages, operating systems, networks, architecture, embedded systems, sensors, HCI

Conferences: ASPLOS, IMWUT, SenSys, IPSN, OOPSLA, and more.

So many new tools, techniques and artifacts!

Batteryless Computing Barriers

Particular Set of Skills

Hardware
ultra-low-power circuits,
breaking traditional rules,
repurposing components
Software
scant memory,
energy constraints

Research-grade Tools/ Platforms

Ekho, Capybara, Mayfly, Alpaca, SONIC, Flicker, Zygarde

No commercial hardware!

Standards/Benchmarks

energy traces and models
test programs,
reference circuits,
common components,
lessons learned the hard way

How do I...

determine the right capacitor size?
emulate an I-V surface?
adjust power supply hysteresis?
use a comparator for charging?
deal with HW and SW heisenbugs?

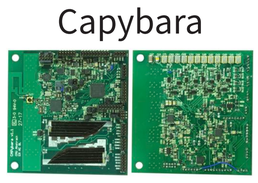
Fundamental Infrastructure

Platform Inventory

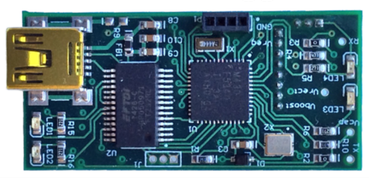
Ekho Emulator

BOTOKS

Capybara



EDB Debugger

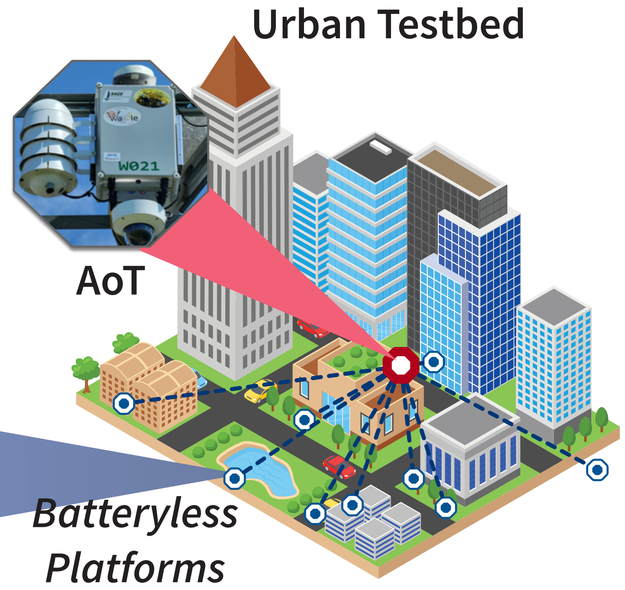


…Future Platforms…

Testbed Infrastructure

Firmware Deployment | **Provisioning** | **Code Checks**
CONOPS | **Monitoring** | **Experiment Management**

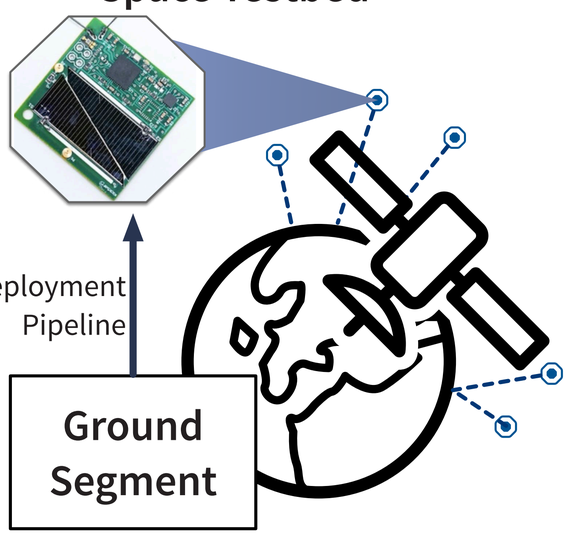
Urban Testbed



AoT

Batteryless Platforms

Space Testbed

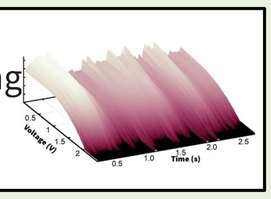


Deployment Pipeline

Ground Segment

Resources, Datasets

Analysis Tools
Software Artifacts
Energy Harvesting Data and Traces



Common Components Taxonomy

Community Engagement

Workshops | Tutorials
Education | Conferences

https://persist.cs.clemson.edu

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