



Innovation > Telecommunications > Researchers develop battery-free cell phone that uses almost no power

## RESEARCHERS DEVELOP BATTERY-FREE CELL PHONE THAT USES ALMOST NO POWER

 TELECOMMUNICATIONS

### **A prototype battery-free cell phone harvests what little energy it needs from radio signals and light.**

Wireless technology now allows [electric vehicles](#) to charge as they travel and smartphones to recharge using their [screens as solar panels](#). Now, researchers at the [University of Washington](#) have eliminated not just the phone charger and cord, but the entire battery. The team has developed the first battery-free cell phone, using only a few micro-watts of power, which it harvests from either ambient radio signals or light.

The prototype phone reduces the amount of electricity needed to operate to a bare minimum by eliminating the step that takes up the most energy – converting analog signals into digital data. Instead, the new phone uses tiny vibrations in the phone’s speaker, which occur when a person talks or listens, into encoded signals that can be transmitted by a base station. Once the amount of power required was reduced to a miniscule 3.5 microwatts, the team was then able to harvest this power from ambient radio signals, also transmitted by the base station; and from ambient light, using a solar cell the size of a grain of rice. Using the phone, researchers were able to make a Skype call as proof-of-concept.

The prototype phone was constructed using off-the-shelf components on a printed circuit board. Although the phone requires a custom base station to operate, the technology could conceivably be integrated into cell towers and wi-fi routers, theoretically providing continuous battery-free cell phone coverage. The team plans to focus next on improving the phone’s operating range and

developing encryption for security, as well as developing a way to stream videos and add a visual display that uses low-power e-ink screens. What effect might battery-free cell phones have on the way we communicate?

25th July 2017

Email: [batteryfreephone@cs.washington.edu](mailto:batteryfreephone@cs.washington.edu)

Website: [batteryfreephone.cs.washington.edu/](http://batteryfreephone.cs.washington.edu/)

Contact: [netlab.cs.washington.edu/](http://netlab.cs.washington.edu/)