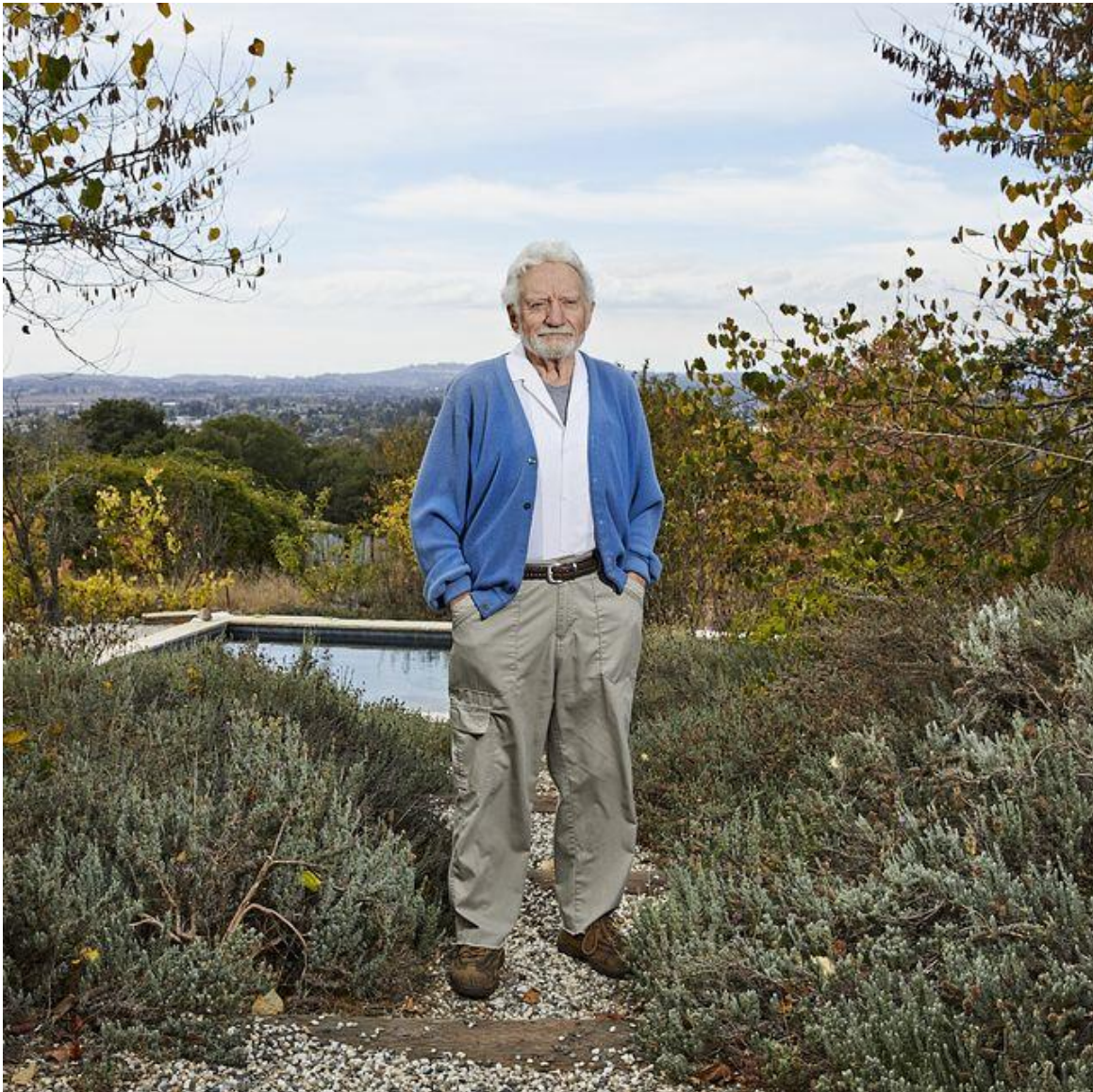


## This 91-Year-Old Inventor's New 'Big Idea' Could Extend Battery Life By 30 Percent

[HTTPS://WWW.POPULARMECHANICS.COM/TECHNOLOGY/A40616227/BATTERY-SAVERS-INVENTION-EXTEND-BATTERY-LIFE/#:~:TEXT=IN%20BETWEEN%20BITES%20OF%20DEEP,BY%20UP%20TO%2030%20PERCENT.](https://www.popularmechanics.com/technology/a40616227/battery-savers-invention-extend-battery-life/#:~:text=IN%20BETWEEN%20BITES%20OF%20DEEP,BY%20UP%20TO%2030%20PERCENT.)



Larry Udell is in a race against the clock to bring his BatterySavers concept to market ... before it's too late.

BY ADAM POPESCU

JUL 18, 2022



## PART I: THE CLOCK IS TICKING

In between bites of deep-fried schnitzel in sleepy Santa Rosa, California, retired technologist Larry Udell says he's come up with something that could revolutionize modern electronics: an invention that could extend battery life by up to 30 percent. If it takes off at scale, he says, it could revolutionize everything from regular AA batteries and space rovers to military special forces and electric vehicles.

Big talk is normal here in Silicon Valley, but few have as deep of a CV as Udell, 91, who looks like a trim Ernest Hemingway, talks like a modern Doc Emmet Brown, and has spent decades developing and improving products at Fortune 500s, startups, and blue-chip ventures.



In the past, Udell has consulted with HP, Samsung, and Siemens; created United Nations programs for economic diversity in the Middle East and the Caribbean; lectured on technology transfer and commercialization at UC Berkeley and Sandia National Laboratories; and even designed a moon city called “Lunar Base One” for NASA. He also led Eye-Com, a medical research startup specializing in tracking eyelid movement—best known for Stephen Hawking’s eyeball-controlled wheelchair—eventually rebranding and selling to Google for

\$75 million in 2016.

His real specialty, though, lies in patents and licensing inventions, namely how to keep big ideas down-to-earth, practical, and on a store’s shelves, all of which bode well for his “big idea,” called BatterySavers.

But Udell’s own life was hanging by a thread not long ago. In December 2020, he contracted COVID-19, and at that time, there were no hospital beds available. At one point, Udell’s granddaughter even pleaded with the mortuary to prepare a plot. Somehow, he recovered four weeks later. “My doctor told me I’m lucky to be alive,” he laughs. “He said ‘I have one piece of advice: keep doing what you’re doing.’”

And so that’s what he did. When he recovered, he threw a big party—then got back to work.

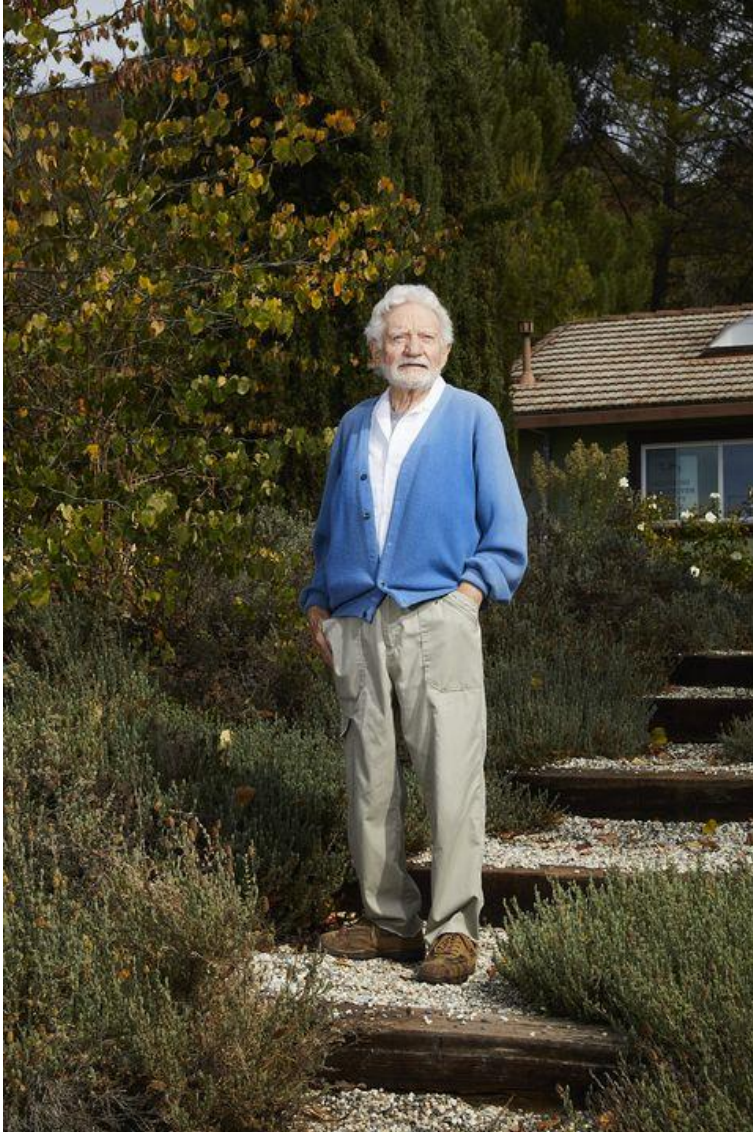
“My work keeps me young,” Udell tells *Popular Mechanics*. He could pass for 20 years younger, and he speaks like a man who has hit a new gear, rattling off new side projects in AI and agro-tech, and reveling in the technological aspects as opposed to the financials. Despite that, his focus always comes back to BatterySavers.

But the clock is ticking and he knows it. Will Udell have enough time to bring his gadget to market?



## PART II: AN “ELECTRONIC SOLUTION TO A CHEMICAL PROBLEM”

Battery life is a constant constraint for everything from cell phones to medical devices. Devices can only store so much power, and they need an electrical signal to tap into that energy. When low on power, the signal doesn't work, leaving the battery “dead.”



Where is this breakthrough of most value? “Places where power is essential and indispensable like NASA, military special forces, portable medicine, [and Emergency Medical Technicians],” Udell explains. “When life hangs in the balance, the extra power can make the difference.”

The idea originally came to Udell via Andrew Miller while at the New Mexico Institute of Mining and Technology, where Udell has taught, lectured, and consulted since 2015. After Miller presented at a *Shark Tank*-like competition in 2017, Udell realized the potential. “He was very excited to take this into the world and *out* of the lab,” Miller says. “You don't see that very often.”

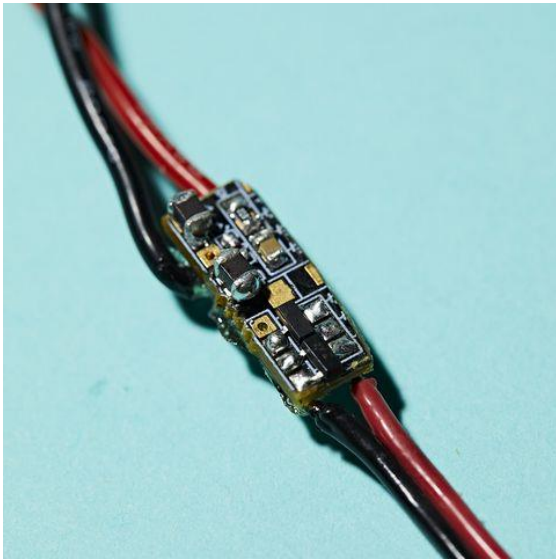
BatterySavers' model takes the remaining low-voltage output from dead batteries and boosts the voltages to usable levels by discharging the remaining energy at a higher rate. It does so by operating at lower voltages than standard voltage regulators can adapt to, allowing it to extend the life of nearly any battery type, capacity, and chemistry.

This unique approach avoids expending energy when boosting isn't needed, as this technology uses low power switching to autonomously engage the boosting circuitry only when necessary. No other boosting method yet can recover this remaining energy in dead batteries without sacrificing response time or power output, both of which make other methods unusable in most electronic applications.

How does it work? It's essentially a circuit board rewiring that can fit on top of an existing battery or inside a battery casing; it's small, low-tech, and cheap enough to be retrofitted or built into a device from the get-go, and clever enough to tap into energy reserves that regularly go to waste.

After four years perfecting the prototype, the team has bootstrapped to the tune of \$100,000, and are exploring licensing offers.

At Udell's place in the Santa Rosa hills, he shows me a working prototype about the size of a penny, a strip of wiring tiny enough to attach to a battery terminal. The BatterySavers prototypes are small, cheap, flexible, and can be connected to terminals or housing, installed on a battery itself, or retrofitted after manufacture.



Udell removes a dead battery from a radio, adds the prototype, reinserts, and the machine comes to life.

“What we have is an electronic solution to a chemical problem,” Bill Seidel, 75, a longtime Udell collaborator with a gray ponytail, tells *Popular Mechanics*. Seidel has turned out QVC hits, developed U.S. military products, and now serves as BatterySavers' vice president of marketing.

The cost to manufacture is just 12 cents per unit, Udell says, with a retail plan to package two BatterySavers units for 99 cents per package.



## PART III: THE ROAD TO TOMORROW

Udell was born into a Ukrainian-Austrian Jewish family in the Chicago suburbs in 1931. As a boy, he listened to radio space operas, read sci-fi, and dreamed about “the road to tomorrow,” as he calls it.

His father, Phillip J. Udell, a self-taught engineer, moved the family to White Sands, New Mexico to work with the Department of Defense and Atomic Energy Commission, where the first atomic weapon was developed. The relocation, with oddballs launching their dreams into the stratosphere as part of an early government nuclear program, showed the junior Udell that there *was* a future in thinking outside-the-box. The self-described rebel never fit in in a classroom, he was a dreamer. “I couldn't sit still,” he says. “I learned from my father the struggles of the inventor. I thought there was a need for someone to organize these poor people and that's where this all started.”

Back then, most inventors were terrible at explaining their ideas or designing them, terrible at business, and terrible at pitching, Udell says. But these were among his strong suits—especially the power of persuasion.

By his early 20s, Larry quit school to help his father design and market the Camp Pal, an electric pneumatic pump that inflated a full-size mattress in two minutes; then, the Beam-O-Phone, a voice

transmitter that was a sort of like an early walkie talkie, shaped like a *Star Trek* ray gun. But Larry's rebelliousness led to a string of dead-end jobs at department stores, drugstores, and even at a lumber yard, chopping wood.

All the while, he kept dreaming—that's when his sixth sense for what's next bloomed at San Francisco's



Civic Auditorium. With his parents' support, he hatched an ambitious plan: create a professional group for inventors, advertise it in local periodicals and job bulletins, and see who'd show up.

It was 1957 and Udell was a 26-year-old factotum gambling on his own talent. And the gamble worked.

The California Inventor's Association was an invention exhibition that so impressed the *Wall Street Journal* that it sent a West Coast reporter to cover it. And the Association was a paper company, with Udell and his parents the only staff, but no one knew that.

The *Journal* was so taken with the 321 inventors and inventions Udell assembled that Ronald J. Ostrow—

who helped break the Watergate story decades later—put him on the front page.

Udell discovered an untapped market of dreamers and tinkerers willing to gamble on their talents, too. He convinced them all to pay \$10 a year on association dues and a \$20 fee for him to search whether their idea had already been patented. "That was my coming out party. I even got the U.S. Department of Commerce to participate," Udell says. Soon thereafter, Udell charged \$10 a year on an inventor's newsletter he penned and mailed to 1,500 like-minded rebels. Two years later, he had enough wind in his sails and money in his pockets to move out, marry, and turn his talent into a career.



## PART IV: COMPETING WITH BIG BATTERY

BatterySavers *could* revolutionize our lives, but there are hurdles. The biggest challenge is from the big battery companies themselves, Udell says. They operate on a massive scale, and it's in their best interests to have more products on more shelves; a longer-lasting battery means fewer batteries sold. Udell's team hopes to get one of these companies to trade volume for loyalty. If that happens, the savings could provide a windfall, not a loss.

"We could make this ourselves, but we'd much rather license the [intellectual property]," Seidel says. It helps that BatterySavers is market-ready and requires no additional research or development. A light design also means the option for bulk sales.

Electric vehicles could be one huge opportunity. In 2017, over one million EVs were sold, and by 2018, that number doubled. By 2040, electric cars are expected to make up more than 50 percent of all new car sales. That means manufacturers need to rethink how to power these vehicles, experts say.

If BatterySavers can deliver, its approach could be “essential” to “enabling longer service time or reducing battery mass,” Andrew Abbott, a professor at the University of Leicester, whose work focuses on solving such big battery problems, tells *Popular Mechanics*.

Tom Denton, an auto expert and technical consultant for the Institute of the Motor Industry, agrees. “If my AA Duracell battery-operated devices could use more of the energy left in their discharged batteries, just 5 or 10 percent would be significant.”

Still, the market is crowded. Murata, a Japanese manufacturer that acquired Sony’s battery group in 2017, is rolling out small solid-state batteries right now. Meanwhile, automakers are moving toward electric, and may enter the battery fray, themselves—or license the intellectual property. If these companies make their own batteries, BatterySavers is at a disadvantage because many big firms prefer working in-house to maintain control and keep costs down. But it also takes time and money to develop batteries, so licensing a technology like BatterySavers could be the best option for both Udell’s company and the Big Battery institution itself.



## **PART V: VANISHING MEMORIES**

Udell’s home office is cluttered with decades’ worth of mementos, awards, paperwork—and a slew of his own oil paint and watercolor landscapes. He used to have a space in Downtown San Francisco where most of this was stored, but that’s all changed. A few years ago, he moved here with his wife, Bessie, whose declining health means she requires near constant care. But as she suffers with Alzheimer’s just a few feet away, Udell’s rearranged his own life, turning the living room into an office so he’s never far from his wife.

“Complaining is a negative and I constantly attempt to keep my life positive,” Udell says. “There’s a lot of things I want to be doing that I’m not doing, but I wake up every morning and I count my blessings.”

So, what does Udell truly want? For one, travel and lecturing to classes, exploits both curtailed by his brush with death during the COVID-19 pandemic. He hands me a flier for his upcoming annual inventors and entrepreneurs workshop, eyes twinkling at the prospect of 200 idea-hungry attendees.

And of course, he wants to see BatterySavers commercialized before he passes—a prospect looming ever closer. “Waking up every morning is special,” he says. “You make a choice. I choose to appreciate it. Tomorrow it could all be gone.”