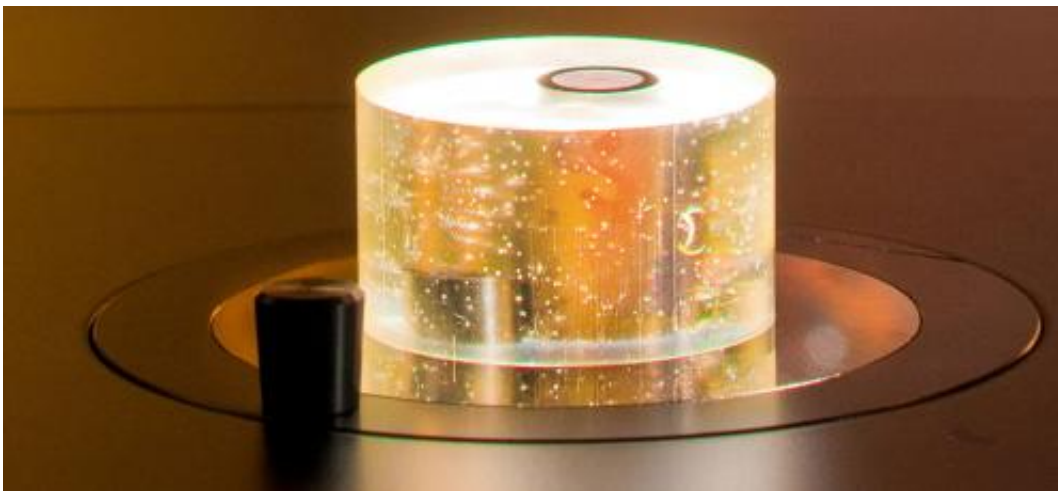


## Author provides inside look at ANL's efforts to build a 'super battery'

March 30 2015, by Laura Alessio

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Argonne National Laboratory coordinates nationwide battery research through JCESR, in an initiative that aims to make batteries five times more powerful and five times cheaper within five years. Credit: Argonne National Laboratory

So secretive were efforts to create the first self-sustained nuclear reaction in 1942 that physicist Enrico Fermi and his Manhattan Project team quietly toiled beneath the stands of Stagg Field and communicated with each other in code.

That breakthrough ushered in the nuclear age, but also led to the creation of the country's first national lab, Argonne National Laboratory. Some 70 years later, with 20 countries racing to achieve another world-changing scientific shift—to design and build a better rechargeable

"super battery"—Argonne allowed veteran reporter Steven LeVine two years of access to write about U.S. researchers leading the "battery war" charge.

"I wanted to be with America's team in the battery race, and I found that team right here at Argonne," said LeVine, a foreign policy journalist who covered energy security and political conflicts in the former Soviet Union, Pakistan and Afghanistan. "I wanted people to get an idea of how innovation and technology shifts happen."

The result is his new book, *The Powerhouse: Inside the Invention of a Battery to Save the World*, in which LeVine lays out the high stakes of the battery race: The winner would steer geopolitical power away from Russia and the Middle East, dominate the production of affordable electric cars, and mitigate climate change by transforming the electric grid, drastically reducing fossil fuel consumption.

## **Reporting the 'battery war'**

For LeVine, Washington correspondent for Quartz and a veteran reporter for the Wall Street Journal, The New York Times and Newsweek, finding the epicenter of American battery research was easy. Argonne employs several of the world's top experts, including Michael Thackeray, a pioneer in a [lithium battery](#) technology inside the hybrid-electric Chevy Volt. But while the lab's work is no longer top-secret, it still took LeVine a year to gain permission to embed himself within the lab. Even after the Department of Energy granted approval, Argonne's scientists had reservations about LeVine spending two straight years with them.

"It was great that he wanted to show what research and innovation is really like, because it is difficult to tell the story to the average person exactly what it is we do with their tax dollars," said Jeff Chamberlain,

executive director of the Joint Center for Energy Storage Research (or JCESR, pronounced "J-Caesar") at Argonne, whom LeVine eventually made his "guide" at Argonne and a prominent character in *The Powerhouse*. "I told him the problem was that when you follow a product development, you are assured the product is coming out within a target timeframe. But with scientific discovery, you can't predict that. It might be tomorrow, it might be a month from now, it might be three years from now. We just don't know when we're going to have the big breakthrough."

Another doubt Chamberlain and others expressed was whether LeVine could make a readable, dramatic story out of the tweaking and re-tweaking of molecular structures in hopes of finding one capable of storing and transporting a strong, steady supply of energy. After all, batteries hadn't seen many significant advances since Alessandro Volta invented the first one in 1799—and not for lack of scientists at Argonne and elsewhere trying. Even famed inventor Thomas Edison's efforts to create rechargeable storage batteries left him less than optimistic about their potential: "The storage battery is, in my opinion, a catchpenny, a sensation, a mechanism for swindling the public by stock companies," Edison wrote in *The Electrician* in 1883.

"My concern was that if LeVine wrote a dud," Chamberlain said, "it would defeat the purpose and make people think the field was just impossible, so why fund it?" His mind was put to ease after he received a package from LeVine containing three books. One was LeVine's earlier book, *The Oil and the Glory: The Pursuit of Empire and Fortune on the Caspian Sea*, describing the geopolitical implications of society's reliance on oil. Another was *The Soul of a New Machine*, a compelling account of an engineering team's race to design a next-generation computer that earned author Tracy Kidder a Pulitzer Prize in 1982. The third book was *The Department of Mad Scientists: How DARPA Is Remaking Our World, from the Internet to Artificial Limbs*, in which a writer

embedded at the Defense Advanced Research Projects Agency brought to life its innovative undertakings.

## Writing a 'thriller'

LeVine said he set out to write *The Powerhouse* as a "thriller," and reviews since its February release suggest he achieved his goal. New York Times business columnist Joe Nocera called it "a rollicking good tale." Although LeVine didn't witness a major scientific breakthrough, his book culminates with Argonne's dramatically successful 2012 bid to host the U.S. Department of Energy' (DOE) battery innovation hub, to be modeled after the strong scientific management characteristics of the Manhattan Project and other efforts spurred by nationally declared goals.

In addition to its many own researchers, Argonne, through JCESR, now coordinates some of the battery work conducted at four other DOE national labs, five universities and four private companies to speed advancement toward a goal of fives: batteries that are five times more powerful and five times cheaper within five years.

Chamberlain said JCESR already has yielded significant developments, including a new computer modeling system called the Electrolyte Genome that resulted from a collaboration between hub scientists Gerbrand Ceder at the Massachusetts Institute of Technology, Kristin Persson at Lawrence Berkeley National Laboratory, and Larry Curtiss at Argonne. The new system has already allowed scientists to develop tens of thousands of new molecular systems before having to spend the resources to actually synthesize them, Chamberlain said.

"It really is a team effort to make these larger technology shifts," he said.

**More information:** [www.penguin.com/book/the-power ...](http://www.penguin.com/book/the-power...)

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Provided by University of Chicago

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