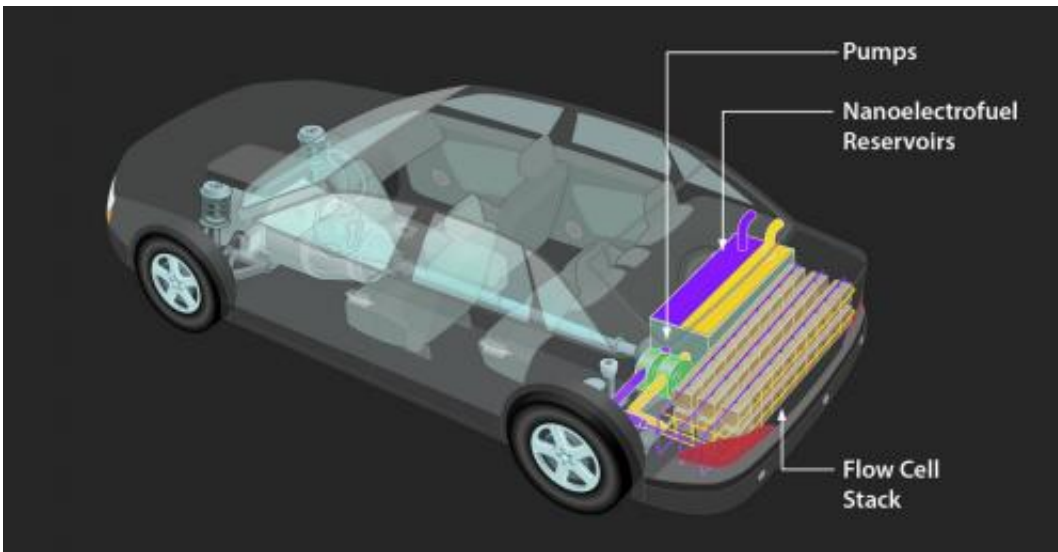


# ARPA-E awards IIT-Argonne team \$3.4 M for breakthrough battery technology

September 4 2013

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Carlo Segre, Duchossois Leadership Professor of Physics at Illinois Institute of Technology, has received a \$3.4 million award from the U.S. Department of Energy's Advanced Research Projects Agency (ARPA-E) to develop a breakthrough battery technology that may more than double the current range of electric vehicles (EV), increase safety, reduce costs and simplify recharging.

Segre and his collaborators John Katsoudas, also of IIT, and Elena Timofeeva, Dileep Singh and Michael Duoba of Argonne National

Laboratory will develop a prototype for a rechargeable "nanoelectrofuel" flow battery that may extend the range of EVs to at least 500 miles and provide a straightforward and [rapid method](#) of refueling. Current EV ranges are 100-200 miles, with recharging taking up to eight hours.

Flow batteries, which store chemical energy in external tanks instead of within the battery container, are generally low in energy density and therefore not used for transportation applications. The IIT-Argonne nanoelectrofuel flow battery concept will use a high-energy density "liquid" with battery-active nanoparticles to dramatically increase [energy density](#) while ensuring stability and low-resistance flow within the battery.

"I am delighted by this award, not only because of the quality and importance of the proposed research but also as another example of the longstanding and effective collaboration between IIT and the world-class researchers and facilities at Argonne," said Russell Betts, dean of the College of Science at IIT.

Segre's expertise is in the structure and properties of materials using synchrotron radiation techniques. He has a wide variety of ongoing research projects, including fuel-cell catalysts and battery materials. Segre is deputy director of the Materials Research Collaborative Access Team (MR-CAT) [beamline](#) at the Advanced Photon Source (APS), located at Argonne; and director of the Center for Synchrotron Radiation Research and Instrumentation (CSRRI) at IIT.



Katsoudas and Timofeeva began their work on the IIT-Argonne nanoelectrofuel flow battery at Argonne, leveraging Timofeeva's expertise in nanofluids engineering and electrochemistry. Katsoudas is an expert in instrumentation design, automation of experiments and materials characterization.

Singh will bring to bear on the project his knowledge of how nanoparticle-fluid interaction effects the thermal management and behavior of nanoparticles in the IIT-Argonne nanoelectrofuel [flow battery](#). Duoba's expertise in vehicle systems and EV testing, in particular, will provide critical guidance in the development of a nanoelectrofuel battery prototype for EV applications.

The IIT award is one of 22 projects across the country awarded a total of

\$36 million through the DOE's Advanced Research Projects Agency-Energy Robust Affordable Next Generation EV Storage (RANGE) program, which seeks to develop innovative EV battery chemistries, architectures and designs. ARPA-E was officially authorized in 2007 and first funded in 2009. The agency invests in high-potential, high-impact energy technologies that are too early for private sector investment.

IIT and Argonne will share the funding award to continue their research.

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Provided by Argonne National Laboratory

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