



The Center for Organic Battery Innovation (COBI)

Pioneering a new frontier in energy storage by using earth-abundant organic materials as an alternative to lithium-ion technology

The Center for Organic Battery Innovation (COBI) is replacing critical minerals like lithium with carbon, hydrogen, oxygen, and nitrogen—the same elements found in air, water, and all living things—to develop next-generation organic batteries that promise to be safer, cheaper, and recyclable. Based at the University of Chicago's Institute for Climate and Sustainable Growth and leveraging resources at Argonne National Laboratory, COBI combines world-leading materials science, AI-driven discovery, and state-of-the-art facilities to accelerate the clean energy transition.

THE CHALLENGE

Countries around the world are working to reduce fossil fuels and confront climate change, while also expanding energy access to accelerate economic growth. Batteries are essential to powering the electric vehicles and renewable energy storage needed for this clean energy transition. But just as global battery demand is projected to increase up to 14-fold by 2030, several challenges threaten to slow electrification at the moment the world needs it most. The lithium, cobalt, and nickel that power today's batteries are concentrated in a handful of countries, subject to price volatility, and mined with significant environmental and human impact. Today's lithium-ion battery materials remain difficult to recycle and pose risks of overheating and fire

“We're not just improving batteries. We're redefining the basic architecture of energy storage. By using organic materials, we can build batteries that are inherently non-flammable, rely on earth-abundant, carbon-based molecular building blocks rather than critical metals, and can be potentially fully recycled back into new batteries. This is a significant opportunity in the global energy transition.”

— **Shrayesh Patel**, COBI Director; Associate Professor, UChicago Pritzker School of Molecular Engineering

THE OPPORTUNITY

Three forces are converging to make this the right moment for COBI's efforts.

- + Acute supply constraints are forcing automakers, utilities, and governments to seek immediate alternatives to lithium-ion.
- + Breakthroughs in organic chemistry and artificial intelligence (AI) are allowing for new battery designs and testing at a quicker pace.
- + Significant capital is moving toward new energy solutions, with battery technology at the top of many investors' agendas.

WORLD-CLASS SCIENCE, BUILT TO COMMERCIALIZE

COBI researchers use some of the most advanced battery research infrastructure in the world. The newly-constructed laboratories at Hyde Park Labs feature a state-of-the-art dry room for battery cell assembly, high-throughput robotic synthesis platforms, and integrated testing facilities. Combined with access to Argonne's Advanced Photon Source and computational resources, COBI can iterate from molecular design to working prototypes with shorter development cycles.

LEADERSHIP



Shrayesh Patel

Associate Professor of Molecular Engineering in the UChicago Pritzker School of Molecular Engineering; Director, COBI



Doug Weinberg

Co-Director & Translation Lead, COBI; Co-Director, CAMES; Entrepreneur

“Traditional battery development could take decades because of the complexity of materials science. We’re combining AI-driven discovery with world-class facilities to compress the timeline to move breakthroughs from the lab to production.”

— Doug Weinberg, COBI Co-Director

SCHOLARS



Rajeev Assary

Group Leader, Chemist Molecular Materials Group in the Materials Science Division, Argonne National Laboratory



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