



David R. Liu

Harvard University

Monday, October 23, 2017; 10:45 AM

David R. Liu is Professor of Chemistry and Chemical Biology at Harvard University, Howard Hughes Medical Institute Investigator, and Core Institute Member and Vice-Chair of the Faculty of the Broad Institute of Harvard and MIT. Liu graduated first in his class at Harvard in 1994. He performed synthetic organic and bioorganic chemistry research on sterol biosynthesis under Professor E. J. Corey's guidance as an undergraduate. During his Ph.D. research with Professor Peter Schultz at U. C. Berkeley, Liu initiated the first general effort to expand the genetic code in living cells. He earned his Ph.D. in 1999 and became Assistant Professor of Chemistry and Chemical Biology at Harvard University in the same year. He was

promoted to Associate Professor in 2003 and to Full Professor in 2005. Liu became a Howard Hughes Medical Institute Investigator in 2005 and joined the JASONS, academic science advisors to the U.S. government, in 2009. Liu has earned several university-wide distinctions for teaching at Harvard, including the Joseph R. Levenson Memorial Teaching Prize, the Roslyn Abramson Award, and a Harvard College Professorship. He has published more than 135 papers and 47 issued patents. His research accomplishments have earned distinctions including the American Chemical Society Pure Chemistry Award, the Arthur C. Cope Young Scholar Award, and awards from the Sloan Foundation, Beckman Foundation, NSF CAREER Program, and Searle Scholars Program. In 2016 he was named one of the Top 20 Translational Researchers by *Nature Biotechnology*. Professor Liu's research integrates chemistry and evolution to illuminate biology and enable next-generation therapeutics. His major research interests include (i) the evolution of proteins with novel therapeutic potential using phage-assisted continuous evolution (PACE); (ii) the engineering and delivery of genome-editing proteins to study and treat genetic diseases; and (iii) the discovery of bioactive synthetic small molecules and synthetic polymers through DNA-templated organic synthesis, an approach developed in his laboratory. He is the scientific founder or co-founder of several biotechnology and therapeutics companies including Ensemble Therapeutics, Permeon Biologics, and Editas Medicine.

Abstract: Base Editing: Genome Editing of Single Base Pairs in Living Systems Without Double-Stranded DNA Cleavage

In this lecture I will describe the development and early *in vitro* and *in vivo* applications of base editing, a new approach to genome editing that enables programmable correction of point mutations efficiently without requiring DNA backbone cleavage or donor DNA templates. Base editing has the potential to advance the scope and effectiveness of genome editing of point mutations, which represent the substantial majority of known human genetic variants associated with disease but are difficult to correct cleanly and efficiently using standard genome editing methods.