



Mon, 18 Nov 2024 | 10 am | DBS Conference Room 1

Hosted by Assoc Prof Sun Ji

# Towards understanding and engineering new genome-editing tools using CRISPR-associated transposons

CRISPR-associated transposition systems allow guide RNA-directed integration of a single DNA insertion in one orientation at a fixed distance from a programmable target sequence. These transposition systems are highly complex, with multiple components interacting to carry out a highly coordinated sequence of events to select target-sites and subsequently integrate cargo DNA. The Kellogg lab seeks to understand the underlying mechanisms of programmable DNA-insertion by using high-resolution single-particle Cryo-EM to characterize the structure of these and related transposition systems. The Kellogg lab further seeks to harness their mechanistic insights for engineering novel transposon systems for genome-editing applications.



**By Elizabeth Kellogg**

*Structural Biology Department,  
St Jude Children's Research Hospital*

## About the Speaker

*Elizabeth Kellogg did her undergraduate studies at UC Berkeley and received a PhD from the University of Washington, where she worked on computational biology with David Baker, Nobel Prize winner in Chemistry 2024. She returned to UC Berkeley as a postdoctoral fellow in the lab of Eva Nogales, PhD, focusing on cryo-electron microscopy. Her scientific background results in a scientific approach that seeks to understand biology from a quantitative perspective, relying on biological structure determination and design.*

*Since starting her own group at Cornell University in 2019, Dr. Kellogg has sought to understand how transposons reshape genomes and how they can be repurposed as genome-editing tools. Her group has investigated the behavior and molecular mechanisms of programmable, CRISPR-associated transposons (CASTs) to determine how DNA integration is regulated spatially and temporally in a genomic context, using a combination of biochemical, structural, single-molecule and genetic approaches. Among other honors, Dr. Kellogg was selected as a Pew Biomedical Scholar in 2021 and received the 2023 Margaret Oakley Dayhoff Award from the Biophysical Society. She joined St. Jude as an Associate Member in 2023 where she pursues research questions related to genome engineering, organization and architecture.*