

Advances and Application of CRISPR-Cas Systems and Protein Engineering

Background

- Synthetic biology is a rapidly growing field.
- Advances in synthetic biology enable efficient engineering of microbes and plants to have desired phenotypes and to produce biofuels and sustainable chemicals.

Approach

- Two chapters in the book, *New Frontiers and Applications of Synthetic Biology*, discuss advances in, and applications of, CRISPR-Cas and protein engineering technologies.

Outcome

- One chapter covers advances in CRISPR-Cas technologies including genome editing, transcriptional regulation, and epigenetic regulation in microbes, plants, and mammalian cells.
- One chapter covers advances in protein engineering including directed evolution, rational design, and *de novo* design.

Significance

- These chapters review recent advances in CRISPR-Cas-based engineering and protein engineering for industrially-relevant phenotypes.
- The work of multiple CBI researchers is highlighted.

R Liu, L Liang, M Habib, EF Freed, CA Eckert. "Advances and application of CRISPR-Cas systems", In V. Singh, *New Frontiers and Applications of Synthetic Biology*, Elsevier, December 2021, ISBN: 9780323859868.

R Liu, L Liang, MP Lacerda, EF Freed, CA Eckert. "Advances in protein engineering and its application in synthetic biology", In V. Singh, *New Frontiers and Applications of Synthetic Biology*, Elsevier, December 2021, ISBN: 9780323859868

