Accelerating Cas9 mechanism discovery with Backend.AI

How KIST accelerated their research with Backend.AI Cloud

lablup

Korea Institute of Science and Technology

Case Study KIST Korea Institute of Science and Technology

Accelerating Cas9 mechanism discovery with Backend.AI

“Lablup's cloud resources have streamlined our research operations. With Backend.AI's fast, convenient, and anywhere-accessible platform, our team maintains productivity regardless of location.”

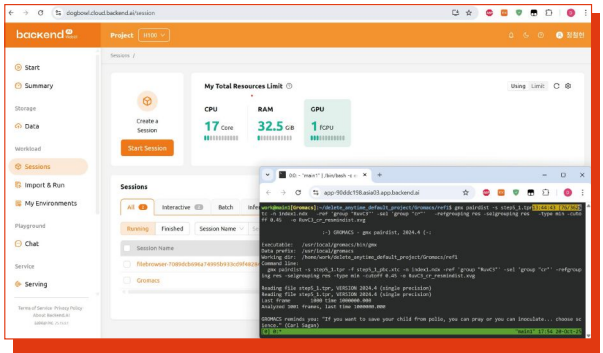
KIST (Korea Institute of Science and Technology)
CJLab, Chemical and Biological Integrative Research Center
Jeongmin Lee, Dr. David S. Yang, & Dr. Cherlhyun Jeong*
* corresponding author

The Korea Institute of Science and Technology (KIST) is a leading national research institute dedicated to advancing science and technology for societal progress. Renowned for its multidisciplinary research spanning materials, robotics, and artificial intelligence, KIST drives innovation through close partnerships with academia and industry. Its collaborative environment promotes the translation of fundamental research into real-world applications that strengthen Korea’s technological competitiveness.

Understanding Cas9 at its molecular level

CJLab is conducting research to understand the fundamental mechanisms of Cas9 function. Cas9, an endonuclease derived from bacterial immune systems, can recognize and cleave specific DNA sequences, making it a key tool in gene editing. Understanding how Cas9 operates at the molecular level is essential for designing systems that precisely target desired DNA sites while minimizing off-target effects. Moreover, insights into Cas9’s mechanism enable broader biotechnological applications in areas such as diagnostics, therapeutics, and synthetic biology.

Accelerating molecular dynamics with Backend.AI



Running GROMACS on Backend.AI Cloud

To support this research, the team required a computing environment that allows rapid and accessible large-scale molecular simulations. Given the varying computational requirements across different research projects and the prohibitive overhead of maintaining comprehensive on-premises infrastructure, researchers at KIST decided to utilize Backend.AI cloud services powered by Lablup's GPU resources.

Backend.AI's container-level GPU virtualization enables flexible and efficient resource allocation, allowing researchers to dynamically deploy specialized software suites like GROMACS and terminate instances as needed. Through this collaboration, KIST conducts its Cas9 research through Lablup's robust cloud infrastructure, while Lablup contributes to advancing scientific research beyond its role as a platform developer.