

# 2021년 제 4회 통계세미나

고려대학교 통계연구소와 BK21 통계학교육연구팀이 다음과 같이  
공동으로 세미나를 개최하오니 많은 참여 바랍니다.

일시 : 2021년 4월 30일 (금) 오전 11시

장소 : 고려대학교 정경관 201호

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## **Bayesian statistical methods of analyzing complex count data with applications to microbiome study**

### <Abstract>

The rapid development of high-throughput sequencing technology in recent years is providing unprecedented opportunities to profile microbial communities from a variety of environments, but analysis of such multivariate taxon count data remains challenging. I present two flexible Bayesian methods to analyze complex count data with application to microbiome study. The first project is to develop a Bayesian sparse multivariate regression method that model the relationship between microbe abundance and environmental factors. We extend conventional non-local priors, and construct asymmetric non-local priors for regression coefficients to efficiently identify relevant covariates and their effect directions. The developed Bayesian sparse regression model is applied to analyze an ocean microbiome dataset collected over time to study the association of harmful algal bloom conditions with microbial communities. For the second project, we develop a Bayesian nonparametric regression model for count data with excess zeros. The approach provides straightforward community-level insights into how characteristics of microbial communities such as taxa richness and diversity are related to covariates. The baseline counts of taxa in samples are carefully constructed to obtain improved estimates of differential abundance. We apply the model to a chronic wound microbiome dataset, comparing the microbial communities present in chronic wounds versus in healthy skin.

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