# Plenary Lecture

**June 30 (Mon), Halla Hall A**

**Chair:** Moonjae Cho (Jeju Nat'l University)

PL **14:20-15:00**

## Chemical modifications on RNAs: a potent mechanism of gene regulation

Hunseung Kang

*Department of Applied Biology, Chonnam National University, Gwangju 61186, Republic of Korea*

Epitranscriptomic chemical RNA modifications have recently emerged as a new layer of post-transcriptional gene regulation. Recent advancements in methylated RNA immunoprecipitation sequencing ($m^6A$-seq) and mass spectrometry have revealed widespread chemical modifications on diverse RNAs, including mRNA, tRNA, rRNA, microRNA, and long-noncoding RNA. Currently, > 170 RNA modifications have been identified in living organisms. Among them, N6-methyladenosine ($m^6A$) is the most prevalent modification found in eukaryotic mRNAs. In recent years, cellular factors adding, deleting, and interpreting $m^6A$ marks, designated as "writers" (methyltransferases), "erasers" (demethylases), and "readers" ($m^6A$-binding proteins), respectively, have been identified in plants and animals. An emerging body of evidence shows that methylation on mRNAs affects diverse aspects of RNA metabolism, including stability, splicing, nucleus-to-cytoplasm export, alternative polyadenylation, and translation. In particular, the roles of writers, readers, and erasers in plants are rapidly uncovered, which clearly demonstrates that they are essential for plant growth and abiotic stress responses. In this talk, I will introduce several key findings via analyzing the mutants of $m^6A$ writers, erasers, and readers, which emphasizes the crucial roles of epitranscriptomic chemical mRNA methylation in the plant growth, development, and stress responses.

PL

# Chemical modifications on RNAs: a potent mechanism of gene regulation

**강훈승 교수 (Professor)**

전남대학교 농업생명과학대학 응용생물학과
(Department of Applied Biology, Chonnam National University)

■ **학력 / 경력**

| 연 도 | 학교/기관 | 전공/직위 | 학위/비고 |
|---|---|---|---|
| 1983 | 서울대학교 (Seoul National University) | 식품공학 (Food Engin. & Technology) | 학사 (Bachelor) |
| 1985 | 한국과학기술원 (KAIST) | 생물공학 (Biological Engineering) | 석사 (Master) |
| 1993 | 오레곤주립대학교 (Oregon State Univ.) | 생화학 (Biochemistry) | 박사 (Ph.D) |
| 1994 ~ 1996 | 캘리포니아 버클리대학교 (University of California at Berkeley) | 박사후연구원 (Post-doc.) | |
| 2011 ~ 2012 | 한국식물생명공학회 (Kor. Soc. for Plant Biotech.) | 부회장 (Vice-president) | |
| 2017 ~ 2018 | 한국식물학회 (Kor. Soc. of Plant Biol.) | 회장 (President) | |

■ **주요 연구 분야 및 업적**

Jing Cai, Ling Shen, Hunseung Kang, and Tao Xu (2025). RNA modifications in plant adaptation to abiotic stresses. *Plant Comm*. 6, 101229.

Thi Kim Hang Nguyen and Hunseung Kang (2024). Reading $m^6A$ marks in mRNA: a potent mechanism of gene regulation in plants. *J. Integr*. Plant Biol. 66, 2586-2599.

Umme Amara, Jianzhong Hu, Jing Cai, and Hunseung Kang (2023). FLK is an mRNA $m^6A$ reader that regulates floral transition by modulating the stability and splicing of FLC in Arabidopsis. *Mol. Plant* 16, 919-929.

Hunseung Kang and Tao Xu (2023). N6-methyladenosine RNA methylation modulates liquid-liquid phase separation in plants. *Plant Cell* 35, 3205-3213.

Jianzhong Hu, Jing Cai, Tao Xu, and Hunseung Kang (2022). Epitranscriptomic mRNA modifications governing plant stress responses; underlying mechanism and potential application. *Plant Biotech. J*. 2245-2257.

Jianzhong Hu, Jing Cai, Amara Umme, Yao Chen, Tao Xu, and Hunseung Kang (2021). Unique features of mRNA $m^6A$ methylomes during expansion of tomato (Solanum lycopersicum) fruits. *Plant Physiol*. 188, 2215-2227.

# Special Lectures

**June 29 (Sun), Samda Hall A**

**Chair:** **Yeon Jong Koo** (Chonnam Nat'l University)

SL-1 14:00-14:50

## Integrating Generative AI in Academic Research: From Idea Generation to Data Analysis Automation

Hyun-Soo Ahn

*R&BD Partners, Yong-In, Republic of Korea*

The rapid advancement of generative AI technologies has significantly transformed the landscape of academic research. This lecture aims to provide a comprehensive overview of how researchers can strategically incorporate AI tools throughout the entire research process—from ideation and literature review to writing, data analysis, and automation.

The first half of the curriculum focuses on **research ideation and academic writing using generative AI**. Participants will explore how AI models such as GPT can assist in the initial stages of research design by facilitating idea generation, topic refinement, and research planning. Through case-based demonstrations, attendees will learn to outline a research proposal, create a logical table of contents, and draft abstracts using AI assistance. Emphasis will be placed on the use of AI tools like Perplexity and Consensus for literature search, and Markdown for structuring academic documents. Practical sessions will guide participants through the process of creating a research topic and draft outline using AI prompts.

In the second half, attention shifts toward **data analysis and automation using AI and Python**. The session begins with foundational data handling techniques, where GPT is applied for spreadsheet-based tasks such as cleaning, normalization, and pattern analysis. The curriculum then delves into advanced statistical analysis, including regression and correlation, with an introduction to Python libraries like Pandas and Matplotlib for visualization and computation. Finally, the lecture covers **Google Colab integration**, demonstrating how researchers can automate data workflows—loading, preprocessing, modeling, and saving results—by combining Colab notebooks with GPT-generated code snippets.

Throughout the session, real-time demonstrations and hands-on activities will provide participants with the skills necessary to apply generative AI tools effectively in their own academic research. By the end of the lecture, attendees will gain not only technical know-how but also strategic insights into the ethical and practical use of AI in scholarly environments.

This session is ideal for early-career researchers, graduate students, and academic professionals seeking to leverage AI for enhanced productivity, creativity, and data-driven insight in their research processes.

SL-1

# Integrating Generative AI in Academic Research: From Idea Generation to Data Analysis Automation

**안현수** 대표

㈜알앤비디파트너스

■ **학력 / 경력**

| 연 도 | 학교/기관 | 전공/직위 | 학위/비고 |
|---|---|---|---|
| 2000.03 ~ 2005.02 | 고려대학교 (Korea University) | 재료공학과 (Material Science and Engineering) | 학사 (Bachelor) |
| 2014.03 ~ 2016.02 | 한양대학교 (Hanyang University | 기술경영전문대학원 (Management of Technology) | 석사 (Master) |
| 2005.02 ~ 2013.09 | 삼성코닝정밀소재 | 과장 | |
| 2014 ~ 현재 | 알앤비디파트너스 | 대표 | |
| 2023 ~ 현재 | 한국GPT협회 | 상임이사 | |

■ **주요 연구 분야 및 업적**

1. 생성형 인공지능을 활용한 연구 아이디어 발굴 및 논문 작성 자동화 연구
   Research on Automating Research Ideation and Academic Writing using Generative AI

2. AI 기반 학술 문헌 탐색 및 문서 구조화 기법 개발
   Development of AI-based Academic Literature Search and Document Structuring Techniques

3. 구글 코랩 및 파이썬을 활용한 데이터 분석 및 통계처리 자동화 실습 교육
   Hands-on Education on Data Analysis and Statistical Automation using Google Colab and Python

# Special Lectures

**June 30 (Mon), Halla Hall A**

**Chair:** **Hyung Won Ryu** (Korea Research Institute of Bioscience and Biotechnology)

SL-2 15:00-15:40

## Knowing, Synthesizing, Applying Bugs for Creativity

Eungbin Kim

*Department of Systems Biology, Yonsei University, Seoul 03722, Republic of Korea*

Microorganisms are increasingly recognized not only as subjects of scientific investigation but also as catalysts for creative expression across disciplines. This presentation explores how microbiological knowledge and techniques are being integrated into artistic, educational, and design contexts, reframing microbes as active participants in cultural production. Recent developments in synthetic biology and microbial engineering have enabled novel applications such as agar art, which utilizes pigment-producing bacteria as living media, and bacterial sound research, which translates microbial activity into auditory forms through biosensing and sonification. These examples highlight the potential of microorganisms to serve as both material and metaphor in creative processes. By emphasizing the role of microbes in transdisciplinary innovation, this work proposes a new paradigm that bridges science and the arts. Such convergence not only broadens the scope of microbiological engagement but also encourages new ways of thinking about sustainability, collaboration, and the invisible networks that shape life and culture.

SL-2

# Knowing, Synthesizing, Applying Bugs for Creativity

## 김응빈 교수

연세대학교 시스템생물학과

■ **학력 / 경력**

| 연 도 | 학교/기관 | 전공/직위 | 학위/비고 |
|---|---|---|---|
| 1987 | 연세대학교 (Yonsei University) | 생물학 | 이학사 |
| 1989 | 연세대학교 (Yonsei University) | 미생물학 | 이학석사 |
| 1996 | 럿거스대학교 (Rutgers University) | 환경미생물학 | 이학박사 |
| 1996 ~ 1998 | 미국 식품의약국 국립독성연구소 (NCTR US FDA) | 환경미생물학 | 박사후연구원 |
| 1998 ~ 현재 | 연세대학교 (Yonsei University) | 조교수, 부교수, 정교수 (Assistant, Associate, Full Professors) | |

■ **주요 연구 분야 및 업적**

1998년부터 연세대학교에서 미생물을 연구하며 학생을 가르치면서 SCI 논문 70여 편을 발표했다. 연세대 입학처장과 생명시스템대학장, 한국 환경생물학회 부회장 등을 역임했으며, 2005년 연세대학교 '최우수 강의교수상'을 받았다. 인문예술학자와 융합 연구를 수행하고 있으며, 유튜브 채널 〈김응빈의 응생물학〉을 통해 흥미진진한 생물 이야기를 들려주고 있다. 지은 책으로 〈오늘은 유전자가위〉, 〈생물학의 쓸모〉, 〈온통 미생물 세상입니다〉, 〈술, 질병, 전쟁: 미생물이 만든 역사〉, 〈나는 미생물과 산다〉, 〈미생물이 플라톤을 만났을 때〉(공저) 등 다수 있다.