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Seokju Park

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EDUCATION

Ph.D. in Life Science · Hanyang University · Republic of Korea Sep. 2016 - Aug. 2023
Major: Life Science (bioinformatics)
Advisor: Prof. Jin-Wu Nam, Department of Life Science
Dissertation: AI-guided Design of Artificial Short-Hairpin RNAs and Messenger RNAs: Lessons from Nature
Cumulative GPA: 3.94/4.0

B.S. · Hanyang University · Republic of Korea Mar. 2010 - Aug. 2016
Major: Life Science
Cumulative GPA: 3.73/4.0 (graduated Summa Cum Laude)

RESEARCH EXPERIENCE

Postdoctoral Researcher· Department of Life Science, Hanyang University Sep. 2023 - Present
- · Studying translation-related dysfunctions that occur in diseases and aging.
- · Developing deep models to optimize mRNA at the sequence level.

Ph.D. Candidate · Hanyang University Sep. 2016 - Aug. 2023
- · Devised a deep learning-based algorithm that can accurately predict shRNA potency using miRNA-related features including biogenesis and targeting mechanism (Park *et al.*, *In prep*.)
- · Identified a novel trans-factor that regulates Drosha processing accuracy and further investigated the role of dysregulated Drosha cleavage in hepatocellular carcinoma (Park et al., *EMM* 2022).

PROFESSIONAL COMPETENCIES

- *Proficient* in software tools using Python and R. Skilled at building pipelines for multifaceted analysis on biological big data including next generation sequencing data (RNA-seq, miRNA-seq, CLIP-seq, Ribo-seq, and WGS) and genomic sequences.
- *Competent* in developing deep learning models (CNN, LSTM, and Transformer) using TensorFlow and Pytorch. Skilled at developing large-scale deep learning models (LLM) with multi-GPU usage and memory-friendly input processing.
- *Experienced* at designing webserver using HTML and JavaScript (http://big2.hanyang.ac.kr/shRNAI).
- *Experienced* at conducting basic biological experiments (cloning, DNA electrophoresis, transfection: electroporation and lipofection, and western blot)
- *Confident* problem-solving abilities in biology to overcome the limitations of previous research
- *Creative* solutions strategically designed to solve using bioinformatic approach.

PUBLICATIONS

Seokju Park*, Sung-Ho Park*, Junho K Hur, and Jin-Wu Nam.
“shRNAI:a deep neural network for the design of highly potent shRNAs”
***BioRxiv* (Preprint)**; January 2024.
- https://www.biorxiv.org/content/10.1101/2024.01.09.574789v1

Seokju Park*, Hee Doo Yang*, Jwa-Won Seo, Jin-Wu Nam, and Suk Woo Nam.
"hnRNPC induces isoform shifts in miR-21-5p leading to cancer development."
Experimental & Molecular Medicine (EMM); June 2022
• https://doi.org/10.1038/s12276-022-00792-2

Jungyun Park, Jwa-Won Seo, Narae Ahn, **Seokju Park**, Jungwook Hwang, and Jin-Wu Nam.
"UPF1/SMG7-dependent microRNA-mediated gene regulation."
Nature communications; September 2019
• https://doi.org/10.1038/s41467-019-12123-7

**denotes equal contribution*

PATENTS & COPYRIGHTS

Patent (Republic of Korea, #10-2023-0116096, PCT/KR2024/013166) Sep. 2024
"Feedback GAN model for generating artificial 5'UTR sequences and the optimized artificial 5'UTR sequence."

Patent (Republic of Korea, #10-2023-0110722, PCT/KR2024/012535) Aug. 2024
"Deep Learning Model for Designing Translationally-efficient 5'UTRs using Interaction between 5'UTRs and its downstream sequence."

Patent (Republic of Korea, #10-2022-0105172, PCT/KR2023/012449) Aug. 2023
"A convolution neural network (CNN)-based algorithm for the efficient guide RNA of short hairpin RNA (shRNA)."

Patent (Republic of Korea) In progress
"CNN-based design of efficient single guide RNAs for CRISPR-Cas9 using the secondary structure of single guide RNAs."

Patent (Republic of Korea) In progress
"The consecutive base-pairing between spacer and scaffold that affect the efficiency of CRISPR-Cas9."

PRESENTATIONS

Invited Talks

• "hnRNPC induces isoform shifts in miR-21-5p leading to cancer development"
BIOINFO, Deajeon, Republic of Korea, *October* 2022.

Poster Presentations

• "shRNAI: Highly Accurate Prediction of shRNA Potency with a Deep Neural Network"
KSMCB, Busan, Republic of Korea. *July 2023.*

• "shRNAI: Highly Accurate Prediction of shRNA Potency with a Deep Neural Network"
BIOINFO, Daejeon, Republic of Korea. *October 2022.*

• "shRNAI: Highly Accurate Prediction of shRNA Potency with a Deep Neural Network"
KSMCB, Busan, Republic of Korea. *June 2022.*

• "Abnormal microprocessor processing of has-mir-21 leads to downregulation of a tumor suppressor, GHR, in hepatocellular carcinoma"
BIOINFO, Seoul, Republic of Korea. *August 2019.*

• "Abnormal microprocessor processing of has-mir-21 leads to downregulation of a tumor suppressor, GHR, in hepatocellular carcinoma"
Keystone symposia, Daejeon, Republic of Korea. *April 2019.*

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• “Abnormal microprocessor processing of has-mir-21 leads to downregulation of a tumor suppressor, GHR, in hepatocellular carcinoma”

AACR, Atlanta, USA. *April 2019.*

• “Dysregulation in microprocessor processing of a primary miRNA, mir-21, leads to downregulation of a tumor suppressor, GHR, progressing hepatocellular carcinoma”

KSMCB, Seoul, Republic of Korea. *September 2018.*

RESEARCH GRANTS

• Ph.D. student research support program.

NRF (the National Research Foundation of Korea)-2021R1A6A3A13046250 Jun. 2021 - May. 2023

AWARDS & HONORS

• Best Paper Award · Korean Society for Bioinformatics (BIOINFO) Oct. 2022

• Best Poster Award · The Genetics Society of Korea (GSK) Nov. 2018

• Best Poster Award · Korean Society for Molecular and Cellular Biology (KSMCB) Sep. 2018

• Academic Excellence Scholarship · Joint Course support program of Hanyang University Sep. 2016

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