Tulga-Erdene **Sodjargal**

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Education

KAIST(Korea Advanced Institute of Science and Technology)

Daejeon, S.Korea

B.S. in Bio and Brain Engineering with double major in Chemistry & AI Specialized major — *Aug. 2021 -*

- GPA: 93.5/100 (as of January, 2024)
- Relevant coursework: Bioengineering Lab I and II, Big Data and ML in Biotechnology, Bio-Data Engineering, Bio-Information Processing, Bio-Data Structures, Molecular and Cellular Biology, Statistical ML, Statistical Methods with Computer, ML for Molecules and Materials (graduate), Computational Chemistry, AI Chemistry, Chemistry Major Lab I and II, Physical Organic Chemistry, Organic Chemistry II
- Activities: Country Representative at KAIST (for Mongolia), Kumdo (Kendo) club

Work Experience

Taras V. Pogorelov Lab

UIUC

Undergraduate Researcher — *Feb. 2024 -*

- Ongoing project on cell membrane simulations

Reverse Translation Lab (Prof. Rajib Schubert)

KAIST

Undergraduate Researcher — *Nov. 2023 -*

- Ongoing project on liquid biopsy methods

Therapeutic Protein Design and Structural Biology Lab (Prof. Byung-Ha Oh)

KAIST

Undergraduate Researcher — *Jun. 2023 - Nov. 2023*

- Professor-guided study of physics- and ML-based methods to design therapeutic proteins
- Designed monomeric Fc and FcRn-binding proteins using DL-based de novo design and validation
- Wrote bash scripts for automating design and validation process

Sustainable Catalysis Lab (Prof. Yoonsu Park)

KAIST

Undergraduate Researcher — *Mar. 2022 - Jun. 2023*

- Contributed to an externally-funded project on designing reactions to synthesize biodegradable polymers
- Diversified catalyst library scope by exploring different scaffolds
- Executed air- and water-sensitive reactions using Schlenk line or glovebox techniques
- Analyzed reaction products using 1D and 2D NMR techniques

Projects

Predicting Demand for Electronic Parts

Nov. 2023 - Jan. 2024

3rd POSTECH-UNIST-KAIST Data Science Competition

- Implemented exploratory data analysis, data cleaning and forecasting to predict demand for different electronic parts
- Won 5th place (Silver Award) among 20+ teams from leading Korean universities

Analyzing Workplace Discrimination

Apr. 2023 - Jun. 2023

MAS456 Statistical Methods with Computer Final Project

- Conducted a statistical study on workplace discrimination in Korea
- Implemented exploratory data analysis, hypothesis testing and clustering to identify trends in workplace discrimination

Biomedical Information Systems for Future Healthcare

Apr. 2023 - Jun. 2023

BIS336 Bio-Information Processing Final Project

- Designed a biomedical and pharmacokinetics database systems using PostgreSQL and Python in a team.
- Designed and developed a wrapper program for easy access to the databases using Python

Housing Price Prediction

May 2023 - Jun. 2023

IE343 Statistical ML Final Project

- Developed a model to predict housing prices based on open-source databases
- Implemented exploratory data analysis, data preprocessing, feature engineering and hyperparameter tuning
- Resulting model had >90% accuracy, and was ranked 7th out of 60 in the class

Prediction of pK_{BHX} Based on a Small Dataset

Nov. 2022 - Dec. 2022

CH453 AI Chemistry Final Project

- Developed a graph convolutional neural network (GCNN) model to predict hydrogen bond basicity (pK_{BHX}) on a small dataset (~350 datapoints)
- Implemented data preprocessing, feature engineering, regularization techniques and hyperparameter tuning
- Resulting model had >65% accuracy, and was ranked 4th out of 13 in the class (1st among undergraduates)

Analysis of Single-Nucleotide Polymorphisms to Identify the Delta Variant Surge *Dec. 2022*

BiS232 Bio-Data Structures Final Project

- Implemented a heuristic algorithm for global sequence alignment to identify single-nucleotide polymorphisms (SNP)
- Analyzed the resulting data to identify the SNPs that coincide with the Delta variant surge in England
- Conducted literature search to interpret the role of identified SNPs in a biological sense

Skills

Programming Languages	Python, MATLAB, bash scripting
ML and Statistics	PyTorch, scikit-learn, pandas, Nixtla (time series), data cleaning, EDA
Computational Modeling	RFdiffusion, ProteinMPNN, Alphafold2, Density Functional Theory (DFT)
Database and Data Handling	pSQL, psycopg2
Chemistry Expertise	Schlenk line and glovebox reactions, flash chromatography, 1H and 13C NMR Spectroscopy (1D, 2D)
Languages	English (proficient, TOEFL iBT 116/120), Russian (bilingual), Mongolian (native)

Honors & Awards

2024	**Silver Award,** 3rd POSTECH-UNIST-KAIST Data Science Competition	*Online*
2022	**Participant (National Team Member),** 55th International Mendeleev Chemistry Olympiad	*Online*
2020	**Participant (National Team Captain),** FIRST Global 2020 (int'l robotics competition)	*Online*
2019	**Silver Medal,** 30th National Chemistry Olympiad	*Mongolia*