Research / Project Interests

My research focuses on two interconnected areas at the interface of food science, biotechnology, and artificial intelligence:

1. **Bioactive peptide production and discovery from agricultural products and byproducts** — leveraging AI-driven approaches to accelerate the identification and characterisation of bioactive compounds with potential sustainability and health applications.
2. **Predictive biomanufacturing with large language models** — applying LLMs and machine learning tools to model, optimise, and scale biological manufacturing processes, contributing to more efficient and sustainable production pipelines.

I am also open to collaborating on projects in adjacent areas where AI integration can serve as a driver for innovation and sustainability — particularly those aligned with the EU Green Deal themes of sustainable food systems, circular bioeconomy, or clean production.

CV

Zhenjiao Du

Assistant Professor – Ad Astra Fellow

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1. EDUCATION

Ph.D. Grain Science & Industry, Kansas State University, Manhattan, KS, USA
Dec 2024

M.E.   Processing and Storage of Agriculture Products, China Agricultural University, Beijing, China   Jun 2020

B.E.   Food Science and Engineering, Wuhan Polytechnic University, Wuhan, China
Jun 2018

2. RESEARCH INTEREST

Biomanufacturing, artificial intelligence, bioactive compound discovery, valorization of agricultural products and byproducts

3. ACADEMIC APPOINTMENTS

Assistant Professor, University College Dublin   Sep 2025 – present

Postdoctoral Associate, Duke University   Jan 2025 – Jul 2025

4. PUBLICATIONS

1. **Du Z.**, Fu, W., Guo, X., Caragea, D., Li, Y. (2024). FusionESP: Improved enzyme-substrate pair prediction by fusing protein and chemical knowledge. *Journal of Chemical Information and Modeling.*
2. **Du, Z.**, Ding X., Hsu, W., Munir, A., Xu, Y., Li, Y. (2024). pLM4ACE: A protein language model-based deep learning predictor for screening peptide with high antihypertensive activity. *Food Chemistry,* 137162.
3. **Du Z.**, Xu Y., Liu C., Li Y. (2024). pLM4Alg: Protein language model-based predictors for allergenic proteins and peptides. *Journal of Agricultural and Food Chemistry*, 752-760.
4. **Du, Z.**, Ding X., Xu, Y., Li, Y. (2023). UniDL4BioPep: A universal deep learning architecture for binary classification in peptide bioactivity. *Briefing in Bioinformatics*, 1-10. **[Top 1% in ESI]**
5. **Du, Z.**, Comer J., Li, Y. (2023). Bioinformatics approaches to discovering food-derived bioactive peptides: Reviews and perspectives. *Trends in Analytical Chemistry,* 117051. **[Top 1% in ESI]**
6. **Du, Z.,** & Li, Y. (2022). Computer-aided approaches for predicting, screening, and designing antioxidative dipeptides and application to sorghum proteins. *ACS Food Science & Technology,* 2(11), 1781-1788.

    More available at https://scholar.google.com/citations?user=JSRi5xEAAAAJ&hl=zh-CN&oi=ao

5. CONFERENCES

- ➢ Protein language model-based universal deep learning architecture for bioactive peptide discovery, American Chemical Society (ACS) FALL 2023
- ➢ EnzyRxn-GPT: A generative platform for enzymatic reaction prediction by fusing protein and chemical language models, ACS FALL 2024
- ➢ UniDL4BioPep: A universal deep learning architecture for binary classification in peptide bioactivity, 2023 Institute of Food Technologists (IFT) Annual Meeting & Food Expo

6. PROFESSIONAL SERVICE

- ➢ Editorial board member of Scientific Reports, 2025/10
- ➢ Editorial board member of Discover Food, 2025/03
- ➢ IFT FIRST Technical Research Paper Reviewer, Volunteer reviewer, 2024/01
- ➢ Journal Reviewer: Briefings in Bioinformatics, Trends in Food Science & Technology, Journal of Food Science; Journal of Agriculture and Food Research, Food Chemistry-X, Cereal Chemistry, Journal of food science, Food bioscience, ACS Food Science & Technology, International Journal of Biological Macromolecules, International Journal of Molecular Sciences, Critical Reviews in Food Science and Nutrition