# Juseong Jin

Seoul, Korea

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*Introduction*

I am a research engineer with a strong background in working with real-world data aimed at practical applications. I am eager to contribute my skills to a dynamic team dedicated to solving cutting-edge challenges.

*Engineering Skill Sets*

- **Data Engineering:** Python, Airflow, SQL
- **Cloud & MLOps:** AWS, Docker, MLflow, fastAPI, CI/CD, Git

*Research Interests*

- **Multi-modality:** Large language and vision models (LLaVA), CLIP
- **Cost-effective learning:** Self-supervised learning, Domain adaptation
- **AI agent:** Agent with personal preferences

*Work Experiences*

**Research Engineer** Mar 2022 – Present
*Seoul National University Hospital* *Seoul, Korea*

- **AI Research and Data Analytics**
  - Conducted research on AI models and data analytics for medical data.
  - ML development with Docker and deployment and optimization with MLflow.
- **Data Mart and Dashboard Development**
  - Built and optimized data mart for department of urology.
  - Developed and deployed dashboard website for data visualization.
  - ETL automation with Airflow and implemented CI/CD process.

*Education*

**Seoul National University** Mar 2022 – Feb 2024
*M.S in Interdisciplinary Program in Bio-engineering (Advisor: Prof. C.W. Jeong)* *Seoul, Korea*

**Inha University** Mar 2015 – Feb 2022
*B.S in Mechanical Engineering and Software Engineering* *Incheon, Korea*

*Projects*

- **Urology Data Mart Construction and Dashboard Website Development**
  - Implemented and optimized data mart that collect department of urology data.
  - Developed and deployed a dashboard website to visualize data collection and distribution.
  - Skill sets: SQL, Airflow, Python, fastAPI, Streamlit, Dash

- **Surgical scenario understanding via large language and vision assistant**
  - Constructed instruction-following data for surgical VQA captions using GPT-3.5, and fine-tuned a vision-language model based on LLaVA to specialize in surgical scenario understanding.
- **Multi-modal survival scoring system of clear cell renal cell carcinoma**
  - Developed a multi-modal survival prediction model for kidney cancer patients on clinical information and pathology images.
  - The model integrates clinical data and pathology images using text conditioning to enhance prognostic accuracy, suggesting the possibility of personalized treatment.
- **Self-supervised domain adaptation in 6DoF pose estimation**
  - Collaborated with ETRI, developed vison module for robotic arm object grasping.
  - Applied contrastive learning and adversarial training to bridge the domain gap between real and synthetic environments, improving 6DoF pose estimation performance.
- **Predicting postoperative hypoxia through Spirometry signals**
  - Developed a CNN model that processes airway pressure and lung volume signals, as captured in operating room monitors, to analyze morphological features in surgical patients. Extracted significant morphological features using Grad-CAM and proposed a novel PHP index based on these insights.

*Publications*

[1] **J. Jin**, C.W. Jeong. "Surgical-LLaVA: Toward Surgical Video Understanding via Large Language and Vision Models", *NeurIPS 2024 AIM-FM*

[2] **J. Jin***, E. Jeong*, J. Cho, Y.G Kim, "Self-supervised Domain Adaptation for 6DoF Pose Estimations", *2024, IEEE ACCESS*

[3] **J. Jin**, J.H. Han, K.C. Moon, S.S. Moon, Y.G Kim, C.W. Jeong "Development and Validation of Multi-modal Survival Prediction Model Using Clinical Information and Pathology Images in Renal Cell Carcinoma Patients", *2024, Korean Society of Medical Informatics (KOSMI)*

[4] **J. Jin***, E. Jeong*, J. Cho, J.H. Park, Y.G. Kim. "DAPO: Self-supervised Domain Adaptation for 6DoF Pose Estimation," *NeurIPS 2023 SSLTheoryPractice*.

[5] **J. Jin**, Y.J. Kim, Y. Shin, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Deep Learning Models and Index Predicting Postoperative Desaturation using Spirometry Signal," *2023, Korean Society of Medical Informatics (KOSMI)*. ***Best Oral Presentation**

[6] Y. Shin, Y.J. Kim, **J. Jin**, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Machine Learning Model for Predicting Immediate Postoperative Desaturation Using Spirometyr Signal Data," *2023, Scientific Reports*.

[7] **J. Jin**, J.H. Han, K.C. Moon, S.S. Byun, Y.G. Kim, C.W. Jeong. "Development of Large-scale digital pathology images-based Deep Learning model for Fuhrman Nuclear Grading Aid in Clear cell Renal Cell Carcinoma," *2023, Korean Urological Association (KUA)*.

*Under review papers*

[1] **J. Jin***, J.H. Han*, K.C. Moon, S.S. Moon, Y.G Kim, C.W. Jeong "Development and Validation of Multi-modal Survival Scoring Model of Clear Cell Renal Cell Carcinoma", *Under review*

[2] J. Kim, A. Jeong, **J. Jin**, H.W. Woo, S. Lee, D. Yoon, G. Lee, S. Kim, "Temporal correlation between Internet search volumes for diarrhea and its synonym using Chat Generative Pre-Trained Transformer and emergency department.", *Under review*

[3] Y.J. Kim*, **J. Jin***, Y. Shin, C.H. Koo, S.B. Lee, H.S. Kim and Y.G. Kim. "Deep Learning-Based Postoperative Desaturation Prediction Using Spirometry Image Data.", *Under review*

[4] **J. Jin***, Y.H Kim*, S.B. Hong and Y.G. Kim. "Machine Learning Model for Predicting ADHD Using Brain Volume via Structure MRI.", *Under review*

*Patents*

"Method and apparatus for self-supervised 6D object pose estimation", Y. G. Kim, E. J. Jeong, **J. S. Jin**, J. H. Park, J. M. Cho, US Patent, 2024.04.25, US 18491051

"Real-time hypoxemia prediction system using spirometry signal during surgery", H. S. Kim, Y. G. Kim, Y. M. Shin, Y. J. Kim, **J. S. Jin**, S. B. Lee, KR Patent, 2023.03.03, KR 10-2023-0028285