

Curriculum Vitae : Sungjun Hong

Ph.D. Candidate

Biomedical Data Science Lab
Department of Digital Health
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Research Scientist

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Samsung Medical Center

Researcher

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EDUCATION

Ph.D. Candidate

2020 – Present

Department of Digital Health

Sungkyunkwan University, South Korea

Ph.D. Program

2018 – 2019

Department of Digital Health

Sungkyunkwan University, South Korea

M.S.

2016 – 2017

Department of Statistics

University of Seoul, South Korea

B.S. & B.A.

2011 – 2014

Department of Statistics

Department of Economics & Finance (Double Major)

University of Suwon, South Korea

EMPLOYMENT

Research Scientist (January 2018 – Present)

Research Institute for Future Medicine, Samsung Medical Center.

Researcher (March 2023 – Present)

Medical Research Institute, School of Medicine, Sungkyunkwan University.

RESEARCH INTERESTS

- Digital Healthcare; Medical Informatics; Machine Learning
- Statistical Modeling; Clinical Predictive Modeling
- Biomedical Big Data Analysis; Biomedical Statistics
- Real World Data; Propensity Score

PUBLICATIONS**Papers at Refereed Journals in 2022** (*Co-first author, **Co-corresponding author)

- Yu J.*, S. Hong*, Y.C. Lee, K.H. Lee, I. Lee, Y. Seo, M. Kang, K. Kim, W.C. Cha, S.Y. Shin (2022) Stakeholders' Requirements of Artificial Intelligence for Healthcare in Korea. *Healthcare Informatics Research*, 28(2), 143-151. 2022-04-30

Papers at Refereed Journals in 2021 (*Co-first author, **Co-corresponding author)

- Jang H.R.*, M. Kim*, S. Hong, K. Lee, M.Y. Park, K.E. Yang, C. Lee, J. Jeon, K.W. Lee, J.E. Lee, J.B. Park, K. Kim, G.Y. Kwon, Y.G. Kim, D.J. Kim, W. Huh (2021) Early postoperative urinary MCP-1 as a potential biomarker predicting acute rejection in living donor kidney transplantation: a prospective cohort study. *Scientific Reports*, 11(1), 1-14 (SCIE, IF: 4.379). 2021-09-22
- Kwon M.J.*, J.M. Ryu*, S.Y. Cho, S.J. Nam, S.W. Kim, J. Lee, S.J. Lee, J. Park, H.Y. Park, S. Hong, K. Kim, J. Han, Y. Moon, Y.K. Shin, J.E. Lee (2021) Validation of the GenesWell BCT Score in Young Asian Women with HR+/HER2- Early Breast Cancer. *Frontiers in Oncology*, 11, 167 (SCIE, IF: 4.848). 2021-02-23

Papers at Refereed Journals in 2020 (*Co-first author, **Co-corresponding author)

- Hong S., S. Lee, J. Lee, W.C. Cha**, K. Kim** (2020) Prediction of Cardiac Arrest in the Emergency Department Based on Machine Learning and Sequential Characteristics: Model Development and Retrospective Clinical Validation Study. *JMIR Medical Informatics*, 8(8), e15932 (SCIE, IF: 3.188). 2020-08-04
- Lee S., S. Hong, W.C. Cha**, K. Kim** (2020) Predicting Adverse Outcomes for Febrile Patients in the Emergency Department Using Sparse Laboratory Data: Development of a Time Adaptive Model. *JMIR Medical Informatics*, 8(3), e16117 (SCIE, IF: 3.188). 2020-03-26

Papers at Refereed Journals in 2019 (*Co-first author, **Co-corresponding author)

- Kim Y.*, C.H. Kim*, H.Y. Lee*, S.H. Lee*, H.S. Kim, S. Lee, H. Cha, S. Hong, K. Kim, S.W. Seo, J.M. Sun, M.J. Han, J.S. Ahn, K. Park (2019) Comprehensive Clinical and Genetic Characterization of Hyperprogression Based on Volumetry in Advanced Non-Small Cell Lung Cancer Treated With Immune Checkpoint Inhibitor. *Journal of Thoracic Oncology*, 14(9), 1608-1618 (SCI, IF: 12.460). 2019-09-14

PUBLICATION IN PROGRESS**Submitted Paper** (*Co-first author, **Co-corresponding author)

Park Y.J., S. Lee, S. Hong, K. Kim, J.Y. Kim, K. Park, Y.K. On, J.S. Kim, S. Park (2022) Risks and Long-term Prognosis of Pacemaker-Associated Heart Failure: a Nationa Wide Cohort Study. Under revision at *European Heart Journal*. (SCIE, IF: 35.855) 2022-12-22

Kim M.*, M. Cho*, S. Hong, J.H. Song, E.R. Kim, S.N. Hong, D.K. Chang, Y. Kim, J.E. Kim (2022) The Impact of Difference in Weight Change from Diagnosis of Crohn's Disease to One Year Post-Diagnosis on Disease Prognosis. Submitted to *Scientific Reports*. (SCIE, IF: 4.379) 2023-03-03

Ko. E.S.**, M. Jang*, H.W. Lee, S. Hong, I.S. Lee, J.H. Lee, W.J. Lee** (2022) Evaluation of Residual Disease after Neoadjuvant Chemotherapy Using Manganese-Enhanced Magnetic Resonance Imaging in an Orthotopic Mouse Model.

Working Papers

Hong S., K. Kim, J. Hwang, J. Hur, J.K. Ahn**, M. Kang** (2023) **Uric acid & alcohol intake~~~**

Hong S*, S. Hong*, W.K. Jeong, K. Kim (2023) **Feature Selection ~~~**

OTHER PUBLICATIONS**Book**

- Sungjun Hong, Sungsoo Hong, Don Kim, Kyungtae Kim (2022) Data Visualization and Interactive Dashboards with Python (English Language), Amazon KDP, United States.
- Hong Sungsoo, Hong Sungjun (2022) Big-Data Modeling and Visualization with QlikSense (Korean Language), BOOKK, South Korea.
- Hong Sungsoo, Hong Sungjun (2021) Big-Data Analysis and Visualization with QlikSense (Korean Language), BOOKK, South Korea.
- Hong Sungjun, Hong Sungsoo (2021) Interactive Dashboards with Plotly & Dash (Korean Language), BOOKK, South Korea.

RESEARCH PROJECTS

- A Comparative Study of the Correlation between Insulin Resistance or Diabetes and Dietary Patterns applying Machine Learning and Statistical Techniques (Sep. 2022 – **Present**)
 - PI: Yoong Jung Yang @ DWU, Kyunga Kim @ SMC
 - The Korea national health and nutrition examination survey
 - Exploring the dietary patterns of intake using Clustering methods
- A Study on Non-parametric Propensity Score Method in Unbalance Multiple Treatment Groups (Jun. 2021 – **Present**)
 - National Research Foundation of Korea (No. 2021R1F1A105480612, PI: Kyunga Kim @ SMC)
 - Developing statistical methodologies for PS matching for multiple-treatment groups
- Development of Bacteremia Prediction Model in Pediatric Cancer Patients with Persistent Neutropenic Fever (Jan. 2022 – **Present**)
 - Samsung Medical Center (PI: Yae Jean Kim @ SMC)
 - Analysis and investigation that risk factors of the bacteremia
 - Developing prediction model of bacteremia in pediatric cancer patients
- Converged Image-based Precision Oncology AI Solution for Gastrointestinal Malignancies (May 2021 – **Present**)
 - Samsung Medical Center, Future Medicine 20*30 Project (PI: Woo Kyoung Jeong @ SMC)
 - Design and Validation: Clinical prediction model for Radio-Genomics
- The Impact of Difference in Weight Change from Diagnosis of Crohn's Disease to One Year Post-Diagnosis on Disease Prognosis (Jul. 2022 – Dec. 2022)
 - Samsung Medical Center (PI: Ji Eun Kim @ SMC)
 - Risk factor analysis of Crohn's disease between body weight loss
 - Subgroup analysis using propensity score matching
- Development of an Automated Framework for Optimal Feature Selection in Radiomics-based Prediction Model (Jan. 2022 – Dec. 2022)
 - PI: Kyunga Kim @ SMC
 - Developing feature selection automated framework in Radiomics research
 - Screening prediction performance depending on selected optimal features
- A Study on the Effects of Alcohol intake on Uric Acid Estimation using Health Promotion Center Data (Jul. 2022 – Dec. 2022)
 - Samsung Medical Center (PI: Mira Kang @ SMC)
 - Analysis and exploration that association between the alcohol intake and uric acid
- Development and Validation of Uric Acid Prediction Model using Health Promotion Center Data (Mar. 2021 – Jun. 2022)
 - Samsung Medical Center (PI: Mira Kang @ SMC)
 - Developing prediction model of uric acid in the health check-up programme
 - Risk factor analysis of uric acid depending on alcohol intakes

RESEARCH PROJECTS (CONT.)

- Development and Implementation of CDM, FHIR and AI-based Precision Medicine Platform to improve National Medical Quality and Safety for Emergency and Critical Patients (Apr. 2019 – Dec. 2021)
 - Ministry of Health and Welfare (No. HI19C0275, PI: Won Chul Cha @ SMC)
 - Part II. Conducting qualitative research for hospital quality indicators based on CDM and developing a management dashboard program (PI: Kyunga Kim @ SMC)
- The Effect of CRT Upgrade to Overall Survival in Pacing-Associated Heart Failure Patients (Aug. 2020 – May 2021)
 - Samsung Medical Center (PI: Seung Jung Park @ SMC)
 - Design and analysis of the Korea National Health Insurance Claim Data
 - Survival analysis and investigation that the distribution of heart failure group after pacemaker implantation
 - Subgroup analysis using propensity score matching & Time-dependent analysis (Time-varying covariate & coefficient)
- Development and validation of a score model for predicting time-dependent mortality in very low birth weight Infant (VLBWI) (Jun. 2020 – Mar. 2021)
 - National Research Foundation of Korea (No. 2020R1F1A107581711, PI: Myung Hee Lee @ SMC)
 - Developing risk score system and Validating score model
- Development and Implementation of Prediction Model for Cardiac Arrest in Samsung Medical Center Emergency Department (Nov. 2020 – Feb. 2021)
 - Samsung Medical Center (PI: Won Chul Cha @ SMC)
 - Applying prediction model for cardiac arrest
- Strategy Planning of Artificial Intelligence for Public Health and Medicine (Jul. 2020 – Nov. 2020)
 - Korea Health Information Service (PI: SooYong Shin @ SKKU)
 - Conducting expert interview, establishing strategy planning and analyzing trend survey
- Clinical Performance Study of Breast Cancer Prognostic Diagnostics GenesWell™ BCT in Korean Patients with Hormone Receptor-positive, Human Epidermal Growth Factor Receptor 2-negative Early Breast Cancer (Dec. 2017 – Feb. 2020)
 - Ministry of Health and Welfare (PI: JeongEon Lee @ SMC)
 - Survival analysis and investigation that the distribution of high & low risk group and clinical pathologic characteristics according to the GenesWell™ BCT values
- Estimation of Usual Intake with Consideration of Within-Person Variance (Mar. 2017 – Nov. 2018)
 - Ministry of Food and Drug Safety (PI: JungEun Lee @ SNU)
 - Simulating statistical models and methodologies for estimating usual intake using R
- A Study on the Job Administration Statistics by Small Area (Aug. 2017 – Nov. 2017)
 - Statistics Korea (PI: Yongil Jeon @ SKKU)
 - Developing algorithm for estimating job administration statistics using SAS

ACADEMIC PRESENTATIONS

- “Development of Clinical Quality Monitoring System based on Common Data Model in Emergency Department”, Presented at *the Korean Society of Emergency Medicine Fall Conference*, On-Line, South Korea, Nov 4, 2021 (Presenter: **S. Hong**).
- “Development of Clinical Quality Monitoring System based on Common Data Model in Emergency Department”, Presented at *the Korean Society of Medical Informatics Spring Conference*, CHA Bio Complex, South Korea, July 9, 2021 (Presenter: W.C. Cha).
- “Machine Learning Prediction of Cardiac Arrest in Emergency Department: Sequential Characteristics for Clinical Validity”, Presented at *the 3rd Annual SAIHST Symposium*, Hippocrates Hall 9F Irwon Station Building, Seoul, South Korea, December 23, 2019 (Presenter: **S. Hong**).
- “Development of a Cardiac Arrest Prediction Model using sequential vital signs & Machine Learning Algorithm in the Emergency Room”, Presented at *the Korean Society of Emergency Medicine Fall Conference*, Songdo Convensia, Incheon, South Korea, October 19, 2018 (Presenter: **S. Hong**).

POSTERS

- S. Hong, **S. Hong**, W.K. Jeong, K. Kim (2022) Development of an Automated Framework for Optimal Feature Selection in Radiomics-based Prediction Model, Presented at *the 6th Annual SAIHST Symposium*, Hippocrates Hall 9F Irwon Station Building, Seoul, South Korea, December 21, 2022
- **S. Hong**, S. Hong, S. Lee, K. Kim, Won Chul Cha (2021) Development of Clinical Quality Monitoring System based on Common Data Model in Emergency Department, Presented at *the 5th Annual SAIHST Symposium*, Schweitzer Hall 9F Irwon Station Building, Seoul, South Korea, December 20, 2021
- S. Hong, **S. Hong**, K. Kim (2021) Impact of COVID-19 Pandemic on Occurrence Trends of Respiratory Diseases in Korea, Presented at *the Korean Society of Medical Informatics Spring Conference*, CHA Bio Complex, South Korea, July 8-9, 2021
- K.H Lee, **S. Hong**, J.Y. Yu, Y.C. Lee, I. Lee, S.Y. Shin (2020) A survey and Analysis on Healthcare AI-Project, Presented at *the Korean Society of Medical Informatics Fall Conference*, Seoul National University Siheung Campus, South Korea, November 12-13, 2020
- **S. Hong**, W.C. Cha, D. Jang, K. Kim (2018) Development of a Cardiac Arrest Prediction Model using Deep Neural Networks for the Patients in the Emergency Room, Presented at *the Korean Society of Medical Informatics Spring Conference*, Samsung Medical Center, South Korea, June 14-15, 2018

OTHER PROFESSIONAL EXPERIENCE**Public Services**

- Research Consultation (Oct. 2021 – Present)
 - Department of Radiology and Center for Imaging Science, Samsung Medical Center
 - **Research Consulting: 68 cases**
 - **Model Design** (Sample Size, Power Analysis, Study Design, Data, Imbalance Problem, Etc.): 21 cases
 - **Predictive Modeling** (Model Development, Validation, Evaluation, Application, Nomogram, Scoring system, Cutoff Selection, Bootstrap, Etc.): 11 cases
 - **Propensity Score Method** (Matching, Weighting, Sensitivity analysis): 5 cases
 - **Radiomics Research** (Feature Redundancy, Relevance, Selection, Radiomics Scoring, Variable Definition, Agreement test, Subgroup Analysis): 7 cases
 - **Statistical Analysis** (Bootstrap, Linear/Logistic Regression, Longitudinal Analysis, GEE, Meta Analysis, Imbalance Problem, Non-Inferiority test, Data Visualization, Variable selection, Etc.): 17 cases
 - **Survival Analysis** (Cox Regression, PH Assumption, Time-dependent Analysis, Competing Risk, Adjusted Survival Curve, Hierarchical Modeling, Etc.): 7 cases
- Program Student Committee (2020 – 2021)
 - Medical Artificial Intelligence Laboratory, Sungkyunkwan University, South Korea

Guest Lecturer

- Seoul Metropolitan Fire & Disaster Headquarters, South Korea (January 25, 2022)
 - Application of Medical Big Data

Education

- Data Science: Machine Learning – Harvard University (2020)
 - R Programming skill for Machine Learning
 - Verified Certificate: Online course in edX, Inc.

Workshop Assistant

- Digital Health Hackathon co-hosted by SAIHST and Digital Healthcare Partners, South Korea
 - The organizing staff at the 4th Digital Health Hackathon (October 13, 2019)
- Clinical Research Methodology Course, Samsung Medical Center, South Korea (November 17, 2018; August 18, 2018)
 - R Programming
 - Python Programming

Lecture Assistant

- Undergraduate Teaching at Department of Statistics, University of Seoul, South Korea (2016 – 2017)
 - Applied Probability Theory
 - Matrix Algebra I, II

LICENSES AND CERTIFICATES

- Advanced Data Analytics Semi-Professional (2020)
- SAS Analytic
 - SAS Certified Statistical Business Analyst Using SAS 9: Regression and Modeling (2017)
- SAS Foundation
 - SAS Certified Advanced Programmer for SAS 9 (2017)
 - SAS Certified Base Programmer for SAS 9 (2016)
- MS Office (2014)
 - Computer Specialist in Spreadsheet & Database Level-I
- Survey Analyst, Junior (2013)

PROFESSIONAL SKILLS

- Statistical Packages
 - Proficient in R, SAS, SPSS
- Programming Languages
 - Proficient in Python, R, SAS, SQL
- Dashboard Visualization
 - Shiny in R
 - Plotly & Dash in Python

HONORS AND AWARDS

- SAIHSTer Poster Award in the 6th Annual SAIHST Symposium (December 21, 2021) Sungkyunkwan University
- SAIHSTer Poster Award in the 5th Annual SAIHST Symposium (December 29, 2021) Sungkyunkwan University
- Best Poster Award in the Spring Conference (July 9, 2021) Korean Society of Medical Informatics
- SAIHSTer AQUA Award in the 3rd Annual SAIHST Symposium (December 23, 2019) Sungkyunkwan University
- Academic Scholarship (2018 - 2019) Sungkyunkwan University
- Academic Scholarship (2015 - 2017) University of Seoul
- National Scholarship (2011 - 2014) Korea Student Aid Foundation
- Academic Scholarship (2011 - 2014) University of Suwon