RESUME

Industrial & Systems Engineer (Ph.D.) | Simulation Solution Consultant | AI Solution Architect

JEHUN LEE

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Professional Profile

I am a proactive Ph.D. leader and AI strategist who bridges the gap between academic depth and industrial execution. My work is fundamentally rooted in the philosophy of 'Systemic Excellence', where AI-native engineering is utilized not just for marginal efficiency, but to liberate human potential from repetitive complexity.

As an AI Engineer and Scheduling Solution Consultant, I have led high-impact programs, including the Digital Twin platform construction for SK Hynix and real-time scheduling systems for Micron. These experiences, along with my leadership in over 24 major projects, have sharpened my ability to translate intricate industrial constraints into robust, scalable technical requirements. I possess a global perspective on the semiconductor market and a proven capacity to deliver measurable business impact through technical mastery.

Beyond my technical background in Systems and Industrial Engineering, I am committed to a leadership style that fosters both individual growth and meaningful social contribution. My ultimate goal is to guide the industry toward an intelligent, purposeful future where technological innovation serves as a catalyst for a more advanced and human-centric industrial ecosystem.

Education

2021.03 - 2025.02	**Ph.D. in Industrial & Systems Engineering**	Korea Advanced Institute of Science and Technology (KAIST)
2016.09 - 2021.02	**M.S. in Industrial Engineering**	Sungkyunkwan University (SKKU)
2013.03 - 2016.08	**B.S. in Systems Management Engineering**	Sungkyunkwan University (SKKU)
2011.03 - 2013.02	**High School in Math & Science Track**	Sejong Science High School

Work Experience

2025.08 - Present
Planning & Scheduling Solution Consultant
VMS Solutions Inc. | Solution Division | Consultant Part
System designer & PMO: digital twin platform, production-logistics integrated simulator, simulation-based AI scheduler, SaaS product
SK Hynix Digital Twin Platform: production-logistics simulator PM, use-case discovery, KPI definition, data consistency metrics, MES legacy data analysis & simulator integration, AI prediction model data specification
Production-logistics integrated simulation design
Production simulation engine architecture redesign & development participation
Planned and authored 2 government R&D proposals on Agentic AI (manufacturing-specific Agentic AI, LLM-based production plan explanation module / with University of Toronto)
AI extensibility review & design for simulation-based APS, new engine feature definition, participation in GenAI-based development
LLM-based schedule analysis & report generation system performance review and feedback

2025.02 - 2025.07
Planning & Scheduling Solution Consultant
VMS Solutions Inc. | Solution Division | Micron Part
Solution consultant: simulation-based real-time APS maintenance, system configuration remote support
Micron global fab simulation-based real-time APS (advanced production and scheduling) system logic maintenance and remote system configuration support

2023.03 - 2026.02
Technical Research Personnel
South Korea (KAIST, VMS Solutions Inc.) | Ministry of National Defense
Industrial R&D (alternative military service)

2021.03 - 2025.02
Researcher
KAIST | MSS (Manufacturing Service Systems) Lab.
Lead researcher: AI-based dynamic schedulers, optimization-based heuristics, autonomous manufacturing scheduling systems
Led full project lifecycle (planning-to-validation): 9 industry-academia projects (planned 5, PM 4), 4 government projects (planned 3, PM 4)
Fundamental research on Neural Combinatorial Optimization based on GNN and RL
Designed general-purpose scheduling agent and Meta-RL methodology for flexible adaptation to manufacturing environment changes
Designed AI-based demand forecasting, production planning, and job scheduling optimization algorithms; validated business impact using real production data (Samsung Electronics, LG Electronics, Samsung Heavy Industries, etc.)
Provided technical review supporting client executives' strategic decisions and delivered system design proposals
Introduced structured project management processes (OneDrive & Notion-based) to the lab for the first time
First Ph.D. graduate of the lab; led project planning, proposal writing, and research beyond typical researcher scope
Won 10-year NRF 'Hanwoomul' long-term project after analyzing rejection feedback and reinforcing proposal logic
2 first-author IEEE journal papers, 7 international conference presentations

2016.04 - 2021.02
Researcher
SKKU | SCO (Systems Control & Optimization) Lab.
Scheduling algorithm developer: meta-heuristics, optimization; System designer: digital twin for manufacturing, dynamic rescheduling systems
5 industry-academia projects (planned 2, PM 2), 4 government projects (planned 2, PM 1)
Led foundational design and operations optimization research for 3D printer-based smart factory digital twin systems
Developed rescheduling algorithms for handling disruptions (machine failures, order cancellations) in flexible manufacturing systems (FMS)
Translated physical manufacturing constraints into mathematical models and validated in virtual environments
Defined virtual factory operation scenarios and conducted simulation-based operational efficiency reviews
Designed and verified real-time scheduling methodologies using genetic algorithms and heuristics

Projects

2025.06 - 2025.12
7m
Digital twin platform construction: production-logistics simulation-based operation twin for semiconductor fab
Discovered real operation use-cases for the process twin through stakeholder interviews
Planned and designed production-logistics integrated simulator: unified modeling of process flows and material movement
Integrated real semiconductor fab operational data and performed process twin consistency validation (MES data analysis, SQL)
Defined simulation result consistency metrics and designed/developed automated computation pipeline
WEB UI design participation and feedback
Use-case discovery, KPI definition, consistency metrics definition, automated validation pipeline
VMS Solutions Inc. (with SK Hynix, SKT, SK AX, Calro)

2025.03 -
Software product design/development: simulation-based scheduling for semiconductor manufacturing
User scenario definition and data schema design
VMS Solutions Inc.

2025.02 - 2025.06
5m (5y)
Simulation-based real-time scheduler for semiconductor fab
Logic design and review for new real-time scheduler: equipment state changes, priority recalculation, and other core algorithm specification
Abstracted semiconductor process-specific constraints (machine eligibility, batching rules) for improved product generality
Remote solution environment configuration support
Resolved Mozart environment issues; designed logic based on customer requirements
VMS Solutions Inc. (with Micron)

2024.05 - 2025.02
10m (10y)
Autonomous scheduling for swift and efficient adaptation to dynamic manufacturing environments
Led 10-year project planning and execution
Defined progressive extension cases with process constraints and multi-objective functions
Year 1: Developed GNN-based imitation learning methodology for multi-process mixed-flow production that adapts to varying problem sizes
Makespan optimal gap improved by 42.0% (vs. previous SOTA AI); 1 SCI journal paper (1st author)
KAIST (with NRF of Korea)

2024.03 - 2025.02
1y
AI-based algorithm for optimal operation plans for various scenarios
Identified decision-making processes through on-site engineer interviews
Defined problem scope and resolution boundaries
Data preprocessing and calibration
Forecasting model conceptualization, discussion, and refinement
Data segmentation
Demand forecasting model accuracy: 89.3% / 80% / 80%
KAIST (with Samsung Electronics)

2023.07 - 2024.06
1y
Reinforcement learning for unrelated parallel machine scheduling problems with sequence-dependent setup times and machine eligibility
KAIST (with VMS Solutions)

2023.07 - 2024.02
8m

Production planning with AI
Identified on-site constraints and defined problem through engineer interviews (objective: minimize setup count, maximize on-time production and equipment utilization)
Data analysis and calibration (Excel → Python)
Developed optimal production planning algorithm (optimization engine-based heuristic)
Defined algorithm-based production planning process
7-day plan with 20min runtime limit: setup reduced 5.1%, on-time production improved 25.8%, idle time reduced 37.6% (vs. on-site manual plan)
KAIST (with LG Electronics)

2022.05 - 2023.02
10m

Graph-based reinforcement learning algorithm for real-time job shop scheduling
KAIST (with NRF of Korea)

2022.04 - 2023.03
1y

Reinforcement learning for job shop scheduling
KAIST (with VMS Solutions)

2022.03 - 2022.03
1m (7m)

Development of a wiring optimization algorithm for X-DEC slim layout
KAIST (with SK Hynix)

2022.03 -
3y

Reinforcement learning-based meta-scheduling for manufacturing systems
KAIST (with NRF of Korea)

2022.03 - 2023.07
1y5m (2y)

Reinforcement learning for project scheduling
Led project planning and proposal writing
Defined problem and resolution scope (objective: minimize daily worker employment deviation)
Enhanced ship production simulator
Enhanced RL-based schedule adjustment algorithm
Proposed iterative greedy algorithm
Discussed spatial layout algorithm methodology
Year 1 schedule adjustment: daily manpower std. dev. reduced by 41.60% (RL, 20.27s), 44.53% (greedy, 49.86s), 47.69% (greedy+RL) vs. existing 6-month schedule
KAIST (with Samsung Heavy Industries)

2021.07 - 2021.11
5m

Development of a reinforcement learning algorithm for workload balancing of ship cargo production
KAIST (with Samsung Heavy Industries)

2020.06 - 2021.02
9m

Optimal machine assignment with machine learning algorithms
KAIST (with VMS Solutions)

2019.06 - 2022.05
3y

Cyber-physical assembly and logistics systems in global supply chains
Identified on-site constraints through field interviews
Defined problem and resolution scope
Developed automotive parts production simulator and real-time worker allocation/reallocation algorithm
Developed conveyor belt speed determination algorithm for semi-automated assembly processes
Defined user scenarios and program screen specifications
Cycle time reduced 5.6% (real on-site data, actual operation method) / 2-5% (vs. meta-heuristic algorithm); Patent registered: KR1020210070359; 1 SCI journal paper (2nd author); 2 conference papers
KAIST (with MOTIE of Korea, Yura)

2019.09 - 2020.02
6m

Optimal weight sets for dispatching rules with multiple KPIs
KAIST (with VMS Solutions)

2019.04 - 2019.12
9m (1y9m)

Big data-based simulation and optimization technology for smart manufacturing
SKKU (with MOTIE of Korea, Samsung SDI)

2019.03 - 2022.02
3y

Development of scheduling theory and algorithms with reinforcement learning for manufacturing systems
SKKU (with NRF of Korea)

2018.07 - 2018.09
3m

Methodology for dispatching rules' weights
SKKU (with SK Hynix)

2018.07 - 2019.02
8m

Framework development for KPI analysis with various weights on dispatching rules
SKKU (with VMS Solutions)

2017.07 - 2018.02
8m

Analysis of KPIs according to weights on dispatching rules for LCD manufacturing
SKKU (with VMS Solutions)

2017.07 - 2018.01 (7m)
Design and analysis for operations optimizations of smart factory testbed
SKKU (with MSIP of Korea)

2016.11 - 2019.10 (3y)
Development of scheduling and rescheduling algorithms for 3D printer-based smart factory
SKKU (with NRF of Korea)

2016.07 - 2017.02 (8m)
Development of algorithms for detecting and improving inefficient schedules in LCD processes
SKKU (with VMS Solutions)

2016.04 - 2018.05 (2y2m (3y))
Development of open FaaS IoT service platform for mass personalization
SKKU (with MSIP of Korea)

Academic Works

2024	**Graph-based imitation learning for real-time job shop dispatcher** IEEE Transactions on Automation Science and Engineering	1st Author [LINK]
2024	**Tree-based Dispatcher for Job Shop Scheduling** IEEE International Conference on Automation Science and Engineering (CASE)	1st Author
2024	**Tree-based dispatcher for solving job shop scheduling problems** the Spring Conference of Korean Institute of Industrial Engineers	1st Author
2023	**Active schedule-based imitation learning for job shop scheduling** the Spring Conference of Korean Institute of Industrial Engineers	1st Author
2022	**Imitation learning for real-time job shop scheduling using graph-based representation** Winter Simulation Conference	1st Author [LINK]
2022	**Job shop scheduling using graph-based imitation learning** INFORMS Annual Meeting	1st Author
2022	**A multi-manned assembly line worker assignment and balancing problem with positional constraints** IEEE Robotics and Automation Letters	Co-Author [LINK]
2022	**Reinforcement learning for resource leveling in multiple projects** the Spring Conference of Korean Institute of Industrial Engineers	1st Author
2022	**Dynamic job shop scheduling using graph-based imitation learning** the Spring Conference of Korean Institute of Industrial Engineers	1st Author
2021	**Machine learning-based periodic setup changes for semiconductor manufacturing machines** Winter Simulation Conference	1st Author [LINK]
2021	**Resource leveling in shipyard cargo hold process through reinforcement learning** the Autumn Conference of Korean Institute of Industrial Engineers	Co-Author
2021	**Assembly line worker assignment and balancing problem with positional constraints** Advances in Production Management Systems (APMS)	Co-Author [LINK]
2021	**Operation and optimization of the automotive parts assembly line considering worker skill levels** the Summer Conference of Korea CDE	Co-Author
2020	**A sequential search method of dispatching rules for scheduling of LCD manufacturing systems** IEEE Transactions on Semiconductor Manufacturing	1st Author [LINK]
2020	**A simulation-based sequential search method for multi-objective scheduling problems of manufacturing systems** Winter Simulation Conference	1st Author
2020	**Workforce assignment for automotive parts assembly lines** the Winter Conference of Korea CDE	Co-Author
2020	**Digital twin-based cyber physical production system architectural framework for personalized production** The International Journal of Advanced Manufacturing Technology	Co-Author [LINK]
2020	**Workforce assignment with a different skill level for automotive parts assembly lines** Advances in Production Management Systems (APMS)	Co-Author [LINK]

2019 **A sequential search framework for selecting weights of dispatching rules in manufacturing systems** — 1st Author [LINK]
Winter Simulation Conference

2019 **A genetic algorithm for hybrid flow shop scheduling with multiple assembly stages** — 1st Author
the Autumn Conference of Korean Institute of Industrial Engineers

2018 **Vulnerability analysis of evacuation transportation networks** — Co-Author
International Journal of Industrial Engineering-Theory Applications and Practice

2018 **A framework for performance analysis of dispatching rules in manufacturing systems** — 1st Author
Winter Simulation Conference

2018 **Rescheduling algorithms for 3D printer-based manufacturing systems** — 1st Author
the Summer Conference of Korea CDE

2018 **Scheduling algorithms for 3D printer-based manufacturing systems** — Co-Author
the Spring Conference of Korean Institute of Industrial Engineers

2017 **Rescheduling of flexible flow shop with sequence-dependent setup times and job splitting** — Co-Author [LINK]
Winter Simulation Conference

2017 **3D printer based assembly process scheduling algorithm development** — Co-Author
the Winter Conference of Korea CDE

Honors & Awards

2025.11 **Second Prize, Ph.D. Thesis Competition ,** Learning Schedulers for Job Shop Scheduling Problems — Korean Institute of Industrial Engineers (KIIE)

2023.12 **First Prize, 2023 Simulation Challenge ,** Gating Control in Semiconductor Fabrication — Winter Simulation Conference (WSC), Micron

2023.09 **Third Prize, 2023 AI Competition: Solving Real-world Problems ,** Integrated Planning Module using AI — Hankook & Company

Ph.D. Candidate Research Incentive Support — National Research Foundation (NRF) of Korea

2022.09 **Second Prize, 2022 Poster Competition: Industry/Social Problems ,** RL for Resource Leveling in Shipbuilding — Korea Advanced Institute of Science and Technology (KAIST)

2022.05 **Certificate of Appreciation: Successful Project ,** Workload Balancing of Ship Cargo Production — Samsung Heavy Industries

Full-tuition Entrance Scholarship , Merit-based Entrance Scholarship (Ph.D.) — Korea Advanced Institute of Science and Technology (KAIST)

2016.07 **Third Prize, 2015-2016 PACE RSMS Competition (Second Year): Customer Insight** — General Motors (GM)

2016.07 **Third Prize, 2015-2016 PACE RSMS Competition (Second Year): Manufacturing Engineering** — General Motors (GM)

Full-tuition Entrance Scholarship , Merit-based Entrance Scholarship (B.S.) — Sungkyunkwan University (SKKU)

Activities & Leadership

2022.03 - 2023.08 **Researcher Representative** — Manufacturing and Service Systems Lab. (KAIST)

2021.10 – 2021.12 **Technical Mentor** — Public Data Internship Program (Korea National Information Society Agency)

2021.03 – 2024.12 **Teaching Assistant (TA)** — Scheduling (KAIST)

2018.09 – 2019.06 **Teaching Assistant (TA)** — Supply Chain Management (SKKU)

2018.03 – 2019.02 **President** — Industrial Engineering Graduate Student Council (SKKU)

2018.03 – 2018.06 **Teaching Assistant (TA)** — Operations Management (SKKU)

2016.10 – 2018.12 **Teaching Assistant (TA)** — Gender Awareness Education (SKKU)

2017.09 – 2017.12	**Teaching Assistant (TA)**	Engineering Economy (SKKU)
2017.03 – 2017.06	**Teaching Assistant (TA)**	Operations Research and Practice 1 (SKKU)
2016.09 – 2016.12	**Teaching Assistant (TA)**	Engineering Economy (SKKU)
2015.03 – 2016.08	**Working Group Member**	Systems Management Engineering Student Council (SKKU)
2015.03 – 2016.08	**President**	Turbo: Basketball Club (SKKU)
2014.08 – 2020.02	**Working Group Member**	Turbo: Basketball Club (SKKU)
2013.03 – 2015.02	**Working Group Member**	College of Engineering Student Council (SKKU)

Skills

Programming	Python, C#, SQL, LaTeX, R
Frameworks & Libraries	PyTorch, Matplotlib, Pandas, NumPy, Gurobi, CPLEX
Simulation & Tools	VMS Mozart (APS), Arena Simulation, AutoMod, MS Office, Photoshop
DevOps & Productivity	Git / GitHub, Docker, Claude Code, n8n, Notion
Languages	Korean (Native), English (Professional)