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Research Interests

My research focuses on human-centered AI for comics and webtoon creation, particularly creativity support tools (CSTs) that reduce repetitive work while preserving creators' intent, visual style, and creative control. I bring over two years of building and shipping generative image systems in industry, and an active practice as a webtoon artist.

Keywords Human-AI interaction · creativity support tools · controllable image generation · webtoons

Education

2020–2028 **Ulsan National Institute of Science and Technology (UNIST)** Ulsan, Korea
B.S. in Industrial Engineering and Design (*double major*), expected Feb 2028
GPA 3.86/4.3 (95.6/100) · Presidential Science Scholar · Talent Award of Korea
Leave of absence for mandatory military service in industry, Sep 2023 – Aug 2025

2021–2022 **Korea Advanced Institute of Science and Technology (KAIST)** Daejeon, Korea
Cross-registered student, winter session · Pre-Law Studies (3 credits)

2020–2021 **Seoul National University** Seoul, Korea
Cross-registered student, winter session · Introduction to Psychology (3 credits)

Publications

* equal contribution

International Conference Papers

[C2] EMNLP '25 Taebaek Hwang*, Minseo Kim*, Gisang Lee, **Seonuk Kim**, Hyunjun Eun.
KRETA: A Benchmark for Korean Reading and Reasoning in Text-Rich VQA Attuned to Diverse Visual Contexts. *Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing* (EMNLP 2025, Main Conference). Acceptance rate 22.2% (1,811 of 8,174).

[C1] IASDR '23 **Seonuk Kim**, Taeyoung Ko, Yousang Kwon, Kyungho Lee.
Designing Interfaces for Text-to-Image Prompt Engineering Using Stable Diffusion Models: A Human-AI Interaction Approach. *Proceedings of the 10th Congress of the International Association of Societies of Design Research* (IASDR 2023). Acceptance rate 56.4% (241 of 427).

Posters

[P1] UIST '23 Adjunct Yousang Kwon, **Seonuk Kim**, Taeyoung Ko, Juhyeok Yoon, Kyungho Lee.
Representing the Timbre of Traditional Musical Instruments Based on Contemporary Instrumental Samples Using DDSP. *Adjunct Proceedings of the ACM Symposium on User Interface Software and Technology* (UIST 2023), poster.

Domestic Conference Papers (in Korean)

[D3] HCIK '24 Yousang Kwon, Jonghoon Byun, **Seonuk Kim**, Taeyoung Ko, Juhyeok Yoon, Kyungho Lee.
Representing the Timbre of Traditional Musical Instruments Based on Contemporary Instrumental Samples Using DDSP. *Proceedings of HCI Korea* (HCIK 2024).

[D2] HCIK '23 **Seonuk Kim**, Yousang Kwon, Kyungho Lee.
#taggenerator: How an Online Community Designs an Interface for Text Prompt Inputs Using NovelAI's Diffusion Model. *Proceedings of HCI Korea* (HCIK 2023), pp. 642–647.

[D1] KSDS '22 **Seonuk Kim**, Kyungho Lee.
A Study on the Use of AI as Creative Support Tool for Line Drawing in Manga Production. *Korea Society of Design Science* (KSDS 2022). Best Student Paper Honorable Mention.

Research Experience

2026–Present **Human-Data Interaction Lab (HDIL)**, Yonsei University — Seoul, Korea
Undergraduate Researcher, iDea Team · Advisor: Prof. Dae Hyun Kim
Human-AI interaction and visualization research for multimodal data communication.

2026–Present **Epictive Lab**, Center for Digital Humanities, UNIST — Ulsan, Korea
Undergraduate Research Assistant · Advisor: Prof. Jae-Yon Lee
Digital humanities research on Korean literature through computational literary analysis.

2024–2025 **AttentionX**, AI research group and startup accelerator
VLM Researcher (Cohort 4)
Co-developed KRETA, a Korean text-rich VQA benchmark for vision-language models [C2].

2021–2024 **Expressive Computing Lab (EXPC)**, UNIST — Ulsan, Korea
Undergraduate Researcher · Advisor: Prof. Kyungho Lee

- Analyzed forum data from an online text-to-image community to learn how users design prompt interfaces, and proposed new prompt-engineering interfaces [C1, D2].
- Built xDiffusers, a tangible interface that poses ControlNet-guided Stable Diffusion with a ball-jointed doll, funded by the UNIST AI Challenge Program.
- Co-developed DDSP timbre modeling of traditional instruments [P1, D3].
- Studied AI support for manga line drawing; built a sketch-to-line-art pipeline [D1].
- Built a style-transfer pipeline for the Print.ly tattoo printer, LG H&H (2022).
- Converted multilingual conversation recordings (20 languages) to text with AWS Transcribe in an industry–academia project with bbb Korea (2021–2022).

2020–2021 **Service Engineering and Knowledge Discovery Lab**, UNIST — Ulsan, Korea
Undergraduate Research Collaborator · Advisor: Prof. Chiehyeon Lim

- Built a 9-axis IMU sensing device and collected cat-movement data to predict arthritis, funded by a UNIST AI Graduate School Creative Independent Project grant.
- Led Campus Patent Universiade entries on a smart healthcare refrigerator (2020, Samsung Electronics Vice-Chairman Prize) and CCTV-based accident prevention (2021).

Industry Experience

2025 **LionRocket**, generative-AI startup for webtoon creation — Seoul, Korea
MLOps Engineer (alternative military service)

- Built an image-to-video pipeline (Wan 2.1, VLM-written prompts) for webtoon stills.
- Trained a GAN super-resolution model that adjusts the thickness of comic line art.
- Deployed speech-balloon removal (YOLO, inpainting) and character segmentation.
- Built a Blender add-on that converts TokenHMR output to SMPL for 3D pose editing.

2023–2024 **thingsflow**, AI content startup, a KRAFTON subsidiary — Seoul, Korea
Machine Learning Scientist, 2023–2024 (alternative military service)
Machine Learning Scientist Intern, 2023 · Mentors: Dr. Joonhee Kim, Prof. Jooyeon Kim

- Developed and launched the Hellobot Pet AI Profile Generator with SDXL, LoRA, and depth ControlNet, contributing $150K in revenue and 25K sales in four months.
- Built StorySnap, an interactive-novel generator with character art and sound.
- As an intern, built a web-novel cover generator and a trailer-to-webtoon adaptation.

Honors and Awards

Scholarships and National Honors

2026–2027 Forest of Talent Fellowship, Korea Foundation for Advanced Studies (KFAS)
Sixth cohort of the one-year KFAS Injaerim program; $6,000 scholarship plus full program costs.

2023–2027 Presidential Science Scholarship, Korea Student Aid Foundation (KOSAF)
One of 60 enrolled undergraduates nationwide (2023); full tuition and a $1,900 stipend per semester.

2024 Talent Award of Korea, Deputy Prime Minister and Minister of Education
One of 50 university students and young adults nationwide, for AI tools for creators; $1,500 prize.

2020–2023 Academic Performance Scholarship, UNIST
Merit-based full-tuition scholarship with a monthly stipend.

Competitions

2026 First Place (team leader), 5th KAIST–POSTECH–UNIST AI & Data Science Competition
83 teams, 238 participants; UNIST's first top prize; $2,300. Tire defect prediction and decision-making.

2025 Second Place (team leader), 4th UNIST–KAIST–POSTECH AI & Data Science Competition
62 teams, 237 participants; $1,500 prize. Financial RAG for U.S. financial disclosures.

2024 Third Place (team leader), 3rd POSTECH–UNIST–KAIST Data Science Competition
46 teams, 172 participants; $1,500 prize. LG Electronics parts production and inventory planning.

2023 Second Place (team leader), 2nd KAIST–POSTECH–UNIST Data Science Competition
43 teams, 177 participants; $1,500 and a MakinaRocks internship offer. Hana Bank ad decisions.

2022 Fourth Place (team leader), 1st UNIST–POSTECH–KAIST Data Science Competition
38 teams, 144 participants; $800 prize. Shale-gas production forecasting and decisions for KNOC.

2022 Excellence Prize, 9th IEEE Quiz Contest for Undergraduates
Online IEEE Xplore literature-search contest run by KITIS, the IEEE authorized dealer in Korea.

2021 Second Place, Lee Soo-hyun 20th Anniversary Memorial Book Review Essay Contest
32 undergraduate participants; led to selection for Japan's JENESYS exchange program.

2020 Samsung Electronics Vice-Chairman Prize, Campus Patent Universiade
Invention commercialization division; team leader and presenter; smart healthcare refrigerator; $2,300 prize.

Research Awards and Grants

2023 UNIST AI Challenge Program research grant, $3,000
For xDiffusers, a tangible interface for image generation.

2022 Best Student Paper Honorable Mention, Korea Society of Design Science
Third award tier, for research on AI-assisted comic line drawing [D1].

2020 UNIST AI Graduate School Creative Independent Project grant, $3,800
For IMU-based cat arthritis prediction.

Other Competitions and Recognition

2026 Ranked 6th of 33 teams (team leader), IISE QCRE Data Challenge Competition
2025 Student Merit Award, UNIST 18th Anniversary Ceremony (one of 15 students)
2023 JENESYS 2022 Certificate, Ministry of Foreign Affairs of Japan
2023 Student Ambassador Certificate, Consulate-General of Japan in Busan
2021 Advanced to presentation round, Campus Patent Universiade (ETRI patents)

Talks and Conferences

Talks

2026 "ComfyUI: Technical Introduction and Implementation Guide"
Tightsaju · technical talk

2026 "Lesson 5: The Shortest Path Is the Long Way Around"
Young Engineers Honor Society, National Academy of Engineering of Korea · mentoring talk

2025 "After JENESYS: From Network to Chance, From Chance to Career"
Consulate-General of Japan in Busan · mentoring talk

Conferences

2023 *IASDR 2023*, Milan, Italy · paper presentation [C1]
2023 *HCI Korea 2023* · paper presentation [D2]
2022 *SIGGRAPH Asia 2022*, Daegu, Korea · attended
2022 *KSDS 2022 Spring Conference*, online · paper presentation [D1]

Teaching and Mentoring

2026 Teaching Assistant, ITP117 Introduction to AI Programming II, UNIST
2023 Teaching Assistant, ITP107 Introduction to AI Programming I, UNIST
2024 Career Mentor, Motgol Hanok Children's Library, Seoul
2023 Tutor in AI and Software, 1784 School Revolution Program, NAVER Connect Foundation
2022 Head Tutor in Python, Ulju The Dream Campus Program, UNIST
2021 Head Tutor in 3D Printing and Arduino, Ulju The Dream Campus Program, UNIST

Leadership and Activities

2024–Present Member, Young Engineers Honor Society, National Academy of Engineering of Korea
UNIST representative for 2025–2026

2020–Present President, HeXA, UNIST programming and information security club
Executive board 2021–2024, president 2022–2023; hosted NEXUS 2023 (70 participants)
Club selected as a Hyundai Mobis Outstanding Software Club, with funding

2021–2023 Co-President, brAIns, student AI research club at the UNIST AI Graduate School
Member from 2021, co-president 2022–2023; paper reviews and model implementations

2022–2023 Student Ambassador, Consulate-General of Japan in Busan
Japan-East Asia Network of Exchange for Students and Youths (JENESYS) program
Promoted Korea–Japan exchange with card news and vlogs; visited Japan in Jan 2023

2020–Present Member, Young Intellectual Property Leaders, Korea Invention Promotion Association

2024–2025 Podcast Collaborator on webtoon creation, SideB, Seoul Webtoon Academy

Student Government

2023 Policy Team Member, Emergency Committee, UNIST Undergraduate Student Council
2023 Chair, UNIST Club Union Election Commission
2021 Legal Support Task Force Member, 11th UNIST Undergraduate Student Council (WE:TH U)

Creative Practice

Comics and Webtoons

2025–Present *Academic Leave Letter from Science High School*, autobiographical webtoon series
Serialized on Naver Webtoon Best Challenge after first appearing on Instagram

2023 *Barbie Webtoon*, AI-assisted webtoon adaptation of a movie trailer
Stable Diffusion with LoRA and ControlNet to keep characters consistent across panels

Animation

2024 *LUCiD*, AI-generated animation trailer
Images with Stable Diffusion XL, video with Luma Dream Machine, and music with Suno

2024 *Byte*, AI-animated digital comic on memory and machine consciousness
Made in six hours with Stable Diffusion XL and I2VGen-XL

Writing

2023 "Snow Flowers, Poetry of Life and Connection," essay
Outstanding essay of the JENESYS program, Consulate-General of Japan in Busan

2021 "Swings and Blossoms," short story in *The Moment When the Star Is Born*
Anthology by writers including people with disabilities, egowriting, pp. 133–166

2021 "Expansion," book review essay
Second place, Lee Soo-hyun 20th Anniversary Memorial Book Review Essay Contest

Skills

Technical Python, PyTorch, Diffusers, ComfyUI, LoRA, ControlNet, YOLO, FastAPI, Blender add-ons
Design Clip Studio Paint, Photoshop, Illustrator, InDesign, Premiere Pro
Languages Korean (native), English, Japanese (JLPT N3)

References

Available upon request.

Early Experience (Before Undergraduate)

During high school, I studied psychology, neuroscience, and data science to better understand how people think, behave, and form relationships, with a particular interest in applying these insights to character creation and interpersonal dynamics in comics. I also explored how AI could enable next-generation comic creation tools, beginning with TensorFlow in 2016 and closely following early AI-assisted art systems such as PaintsChainer by Preferred Networks.

Education

2019–2020 **Baron Academy of Manga and Webtoon** Busan, Korea
Full-time specialized training (*non-degree*), gap year · mentored by professional webtoon artists

2015–2019 **Busan Science High School (BSS)** Busan, Korea
High School Diploma, selective public science high school
Leave of absence for health reasons, Sep 2015 – Aug 2016

Research

2016–2019 **Independent Research**
Computational social psychology · conformity in movie ratings and reviews
Python opinion mining, sentiment analysis, and visualization [ER5, ER6]

2015–2018 **Busan Science High School** Busan, Korea
High School Researcher, school research programs
- Research and Education (R&E) in information science: a telecommunication drone [ER3]
- Field Science Inquiry: damage and conservation of granite stone heritage [ER1]
- Art Science: antifungal effects of snail mucus [ER2]
- OceanICT (2018): real-time ocean information visualization and global warming

2017 **Pusan National University** Busan, Korea
High School Researcher, R&E Program in Mathematics · Advisor: Prof. Young-Ho Im
The set of virtual knot polynomial invariants [ER4]

Papers

authors listed alphabetically by given name

[ER6] 2018 **Seonuk Kim**.
A Study of Conformity Effects Induced by Movie Ratings and Online Review Comments: Opinion Mining, Data Collection, and Analysis Automation with Python. *Journal of the 9th Korea Scholar's Conference for Youth* (KSCY 2018), psychology session.

[ER5] 2017 **Seonuk Kim**.
A Study of Conformity Effects Induced by Movie Ratings and Online Review Comments. *Proceedings of the 7th International Youth Creative Research Contest*.

[ER4] 2017 Dowoon Lee, Jungyo Jung, **Seonuk Kim**, Sunwoo Hwang.
The Set of Virtual Knot Polynomial Invariants. *BSS Journal of Science R&E*.

[ER3] 2016 Dowoon Lee, Ki-Beom Park, **Seonuk Kim**, Tae-Hyun Song, Yeon-Su Jeong.
Research on Telecommunication Drone Using HTTP and Bottle. *BSS Journal of Science R&E*.

[ER2] 2017 Chae-eun Lee, **Seonuk Kim**, Sojeong Park.
The BSS Mold Eradication Project: Investigating the Antifungal Effects of Snail Mucus. *Art Science* program, Busan Science High School.

[ER1] 2016 Junyeop Ha, **Seonuk Kim**.
Damage, Conservation Treatment, and Restoration of Granite Stone Cultural Heritage. *Proceedings of the Field Science Inquiry*, Busan Science High School.

Honors and Awards

2019 Principal's Award for Excellence in Research, BSS, at graduation
2018 First Prize (first of 99), STEAM Essay Writing Competition, BSS
2018 Excellent Youth Scholars Award, 9th Korea Scholar's Conference for Youth [ER6]
2018 Finalist (national interview round), Talent Award of Korea
2017 Best Student Paper Award, 7th International Youth Creative Research Contest [ER5]
2017 Silver Prize (25 teams), 30th Seoul National University Data Mining Camp
2017 Excellence Prize, Nobel Prize Youth Festival Busan Review Essay Contest
2017 Bronze Prize, Creative Project Presentation Competition, BSS [ER4]
2016 Silver Prize, Field Science Inquiry Competition, BSS
2015 Korean Red Cross President's Award, for youth volunteer service

Activities and Service

2017–2020 Founding Member and Vice President, Korean Youth Society of Neuroscience (KYSN)
2017–2019 Founding President, Neuro, the neuroscience club at BSS
2018 Student Ambassador, 10th Korea Scholar's Conference for Youth
2018 Neuroscience Booth Organizer, Dongnae-gu Youth Culture Festival, Busan
2017–2018 Volunteer in elder care for neurological conditions, Daerim Welfare Center, Busan
2017 Math Tutor, education-donation volunteer program, BSS
2013–2019 Member, Red Cross Youth (RCY), Korean Red Cross
2017 Student Member, Korean Society for Molecular and Cellular Biology
2015–2019 Member, Explorer (mathematics), library and newspaper, and photography clubs, BSS

Programs and Camps

certificate of completion for each

2018 High School Psychology Class, Korean Psychological Association Conference
2017 13th Kyung-Ahm Bio-Youth Camp, DGIST
2017 Korea Brain Camp, Seoul National University