Youngwook Paul Kwon

Ph.D. · Senior Principal Engineer

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Education

University of California at Berkeley — *Berkeley, CA*

Ph.D. in Mechanical Engineering (concentration in Computer Vision) — *2017*

M.S. in Computer Science (concentration in AI/CV/ML) — *2014*

Seoul National University — *Seoul, Korea*

B.S. (Dual Degree) in Computer Science and Mechanical Engineering (cum laude) — *2008*

Experience

Sambanova Systems — *Palo Alto, CA*

Senior Principal Engineer — *2024 – present*

- Contributed to the integration of multimodal LLaMa 3.2 on Sambanova chips; resolved a deep-rooted architecture bug and validated outputs through rigorous numerical accuracy testing.
- Extended a state-of-the-art scientific climate model, achieving successful deployment for a national laboratory customer.
- Integrated next-generation multimodal models such as Wan2.1 (video generation), HumeAI/Chatterbox (text-to-speech), and GPT-OSS by analyzing and modifying their architectures for seamless SambaNova chip onboarding.

Phantom AI — *Mountain View, CA*

Staff Deep Learning Engineer · Team Lead — *2017 – 2024*

- Achieved 10th place in KITTI 2D vehicle detection, 2nd place in KITTI 3D vehicle detection (Jul 18)
- Extended an existing deep-learning-based 3D pose estimation algorithm from monocular image to be more efficient.
- Developed successful traffic light detection module for actual self-driving demo.
- Utilized NVIDIA TensorRT to inference Tensorflow models within C++ framework with custom layers in CUDA codes.
- Published 3 self-driving-related papers and 3 patents.

UC Berkeley — *Berkeley, CA*

Graduate Research Assistant — *2011 – 2017*

- Machine learning (using Word2Vec) based clustering on design concept descriptions.
- Proposed a modified design of Siamese CNN network (deep learning) for challenging input. Increased performance by introducing a new way of data augmentation. (Siamese network Github repository got over 250 ★)
- Proposed an image feature descriptor system using line segments. Captured the distribution of lines in a novel way because challenging input includes severe changes in image intensity.

Lawrence Livermore National Laboratory — *Livermore, CA*

Summer Internships (5 consecutive years) — *Summers in 2012 – 2016*

- Participated in an aerial image registration project to find a transformation between two aerial images of different sensors. (e.g., across EO, IR and SAR)
- Received Outstanding Achievement Award in 2015 Summer Poster Symposium (28 winners out of 250).

Realgain — *Seoul, Korea*

Lead Software Developer — *2003 – 2006*

- Participated in a 10-year-old project developing a computational package similar to MATLAB, and lead the team.
- Improved its compiler grammar, calculation speed, and GUI. Added trace debugging functionality.

Skills

Deep Learning	Pytorch, Tensorflow, TensorRT, CUDA
Programming	Python (+Cython), Matlab, C/C++, CUDA, LaTex
Languages	English, Korean

Publications

- Myoung Hwan Oh, Min Gee Cho, Dong Young Chung, Inchul Park, **Youngwook Paul Kwon**, Colin Ophus, Dokyoon Kim, Min Gyu Kim, Beomgyun Jeong, X. Wendy Gu, Jinwoung Jo, Ji Mun Yoo, Jaeyoung Hong, Sara McMains, Kisuk Kang, Yung-Eun Sung, A. Paul Alivisatos, Taeghwan Hyeon, "Design and Synthesis of Multigrain Nanocrystals via Geometric Misfit Strain," Nature 2020.
- {Kiwoo Shin, **Youngwook Paul Kwon**}*, Masayoshi Tomizuka, "RoarNet: A Robust 3D Object Detection based on RegiOn Approximation Refinement," IEEE intelligent vehicles symposium (IV) 2019.
- Jinkyu Kim, Hyunggi Cho, Myung Hwangbo, Jaehyung Choi, John Canny, **Youngwook Paul Kwon**, "Deep Traffic Light Detection for Self-driving Cars from a Large-scale Dataset," IEEE International Conference on Intelligent Transportation Systems (ITSC) 2018.
- {Donghan Lee, **Youngwook Paul Kwon**}*, Jinkyu Kim, Jongsang Suh, "A Novel Trajectory Prediction of Traffic Participants for Autonomous Lane Change Assistance," IEEE International Symposium on Advanced Vehicle Control (AVEC) 2018.
- {Donghan Lee, **Youngwook Paul Kwon**}*, Sara McMains, and J. Karl Hedrick, "Convolutional Neural network-based Lane Change Intention Prediction of Surrounding Vehicles for Adaptive Cruise Control," IEEE International Conference on Intelligent Transportation Systems (ITSC) 2017.
- Chengwei Zhang, **Youngwook Paul Kwon**, Julia Kramer, Euiyoung Kim, and Alice Merner Agogino, "Using Machine Learning to Support Concept Clustering in Design Teams," Journal of Mechanical Design
- Chengwei Zhang, **Youngwook Paul Kwon**, Julia Kramer, Euiyoung Kim, and Alice Merner Agogino, "Deep Learning for Design in Concept Clustering," ASME International Design Engineering Technical Conferences 2017.
- **Youngwook Paul Kwon**, and Sara McMains, "Artificial Intensity Remapping: Learning Multimodal Image Descriptors without Multimodal Image Data," Neural Information Processing Systems Workshop (NIPSW): Reliable Machine Learning in the Wild 2016.
- **Youngwook Paul Kwon**, Hyojin Kim, Goran Konjevod, and Sara McMains, "DUDE (DUality DEscriptor): A robust descriptor for disparate images using line segment duality," IEEE International Conference on Image Processing (ICIP) 2016.
- Sushrut Pavanaskar, Sushrut Pande, **Youngwook Paul Kwon**, Zhongin Hu, Alla Sheffer, and Sara McMains, "Energy-efficient vector field based toolpaths for CNC pocket machining," Journal of Manufacturing Processes 2015 *(outstanding paper at NAMRC15)*.
- **Youngwook Paul Kwon** and Sara McMains, "An automated grading/feedback system for 3-view engineering drawings using RANSAC," ACM Learning at Scale (L@S) 2015 *(acceptance ratio: 25%)*.
- **Youngwook Paul Kwon**, "Line segment-based aerial image registration," MS thesis, UC Berkeley, May 2014.

Patents

- Youngwook Paul Kwon, Phantom AI Inc, "Data Augmentation Using Computer Simulated Objects for Autonomous Control Systems", US11714424B2, 2021.
- Youngwook Paul Kwon, Phantom AI Inc, "Lane Line Reconstruction Using Future Scene and Trajectory", US10990832B2, 2021.
- Yeonhwa Cha, Myung Hwangbo, Youngwook Paul Kwon, Phantom AI Inc, "Method of predicting trajectory of vehicle", US11210533B1 2021.

Honors & Awards

2015	**Outstanding Achievement,** Summer Poster Symposium at LLNL	*CA, US*
2015	**Outstanding Paper in Manufacturing Process,** Presented at NAMRC/SME 43	*CA, US*
2015	**Graduate Division Block Grant Award + Henry Lurie Family Fund,** Fellowship	*CA, US*
2014, 2011	**Graduate Division Block Grant Award,** Fellowship	*CA, US*
2008	**Full Tuition Scholarships,** Four years at Seoul National University	*Seoul, KOR*
2007	**Top Rank,** Compiler course, the most demanding course in computer science at SNU	*Seoul, KOR*
1997–99	**90 Finalists,** Annual High School Programming Olympiads in Seoul for three years	*Seoul, KOR*
1996	**Excellence Award,** Seoul Education Dept. Programming Contest for Junior School	*Seoul, KOR*

Teaching Experience

2014S	**ME101,** High Mix/Low Volume Manufacturing (Graduate Student Instructor)	*UC Berkeley*
2013F	**E28,** Visualization and Graphics for Design (Reader)	*UC Berkeley*