Hyung-gun **Chi**

AI Researcher

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Research Interests

AI/ML researcher specializing in vision-language models, multimodal learning, and large-scale AI systems. Extensive experience in foundation models, representation learning, and generative AI applied to computer vision and robotics. Proven track record in top-tier AI research (CVPR, ECCV, ICRA), with multiple patents in multimodal AI, human motion forecasting, and trajectory prediction. Passionate about pushing boundaries in AI and translating research into scalable real-world applications.

Education

Purdue University — *West Lafayette, IN, USA*

PhD in Electrical and Computer Engineering — *Aug. 2018 - Dec. 2023*

- **Thesis**: Towards Improved Representations on Human Activity Understanding
- **Advisor**: Dr. Karthik Ramani

Purdue University — *West Lafayette, IN, USA*

MS in Electrical and Computer Engineering — *Aug. 2018 - Dec. 2022*

Yonsei University — *Seoul, South Korea*

BS in Mechanical Engineering — *Mar. 2010 - Feb. 2017*

Professional Experience

Apple Inc. — *Cupertino, CA, USA*

AIML Resident — *Jul 2024 -*

- Conducted knowledge distillation research on speech foundation models to enhance Siri's performance and efficiency.

Hanwha Vision America — *Santa Clara, CA, USA*

AI Researcher — *Jan - June 2024*

- Researched human pose estimation and activity recognition to enhance surveillance AI.
- Developed and deployed AI models, significantly increasing detection accuracy while reducing false positives.

Toyota Research Institute — *Los Altos, CA, USA*

ML Research Intern — *May - Aug 2023*

- Led a project on multi-modal representation learning for robotics, integrating vision, language, and tactile sensors.
- Published a large-scale vision-language-tactile dataset, facilitating enhanced robotic perception.

Honda Research Institute — *San Jose, CA, USA*

CV Research Intern — *Jan - May 2023 & May - Aug 2022*

- Developed a VQ-Diffusion model for text-to-human-motion generation, setting a new benchmark in the field.
- Created LLM-based human motion prediction models, deployed in autonomous vehicle safety systems.
- Proposed a NeuralODE based Transformer model for trajectory prediction, significantly improving action forecasting accuracy.

Convergence Design Lab, Purdue University — *West Lafayette, IN, USA*

Graduate Research Assistant — *Aug 2018 - Dec 2023*

- Pioneered vision-language representation learning for 3D human action recognition.
- Developed a self-attention-based skeleton recognition model integrating graph convolutional networks.
- Published extensively in CVPR, ECCV, ICRA, with multiple patents in motion prediction and multimodal AI.

HeumLabs Corporation — *Seoul, South Korea*

Software Engineer & CEO — *Sep 2016 - Dec 2017*

- Founded and led a startup developing an office automation system, securing initial funding and overseeing the product development lifecycle.
- Achieved a successful market entry, with the system adopted by over 150 businesses within the first year.

Skills

Research and Development Stacks

Major Languages	**Python**, **C/C++**
Machine Learning	**PyTorch**, **TensorFlow**
Computer Vision	**OpenCV**, OpenGL

Other Tools and Skills

Text Editors	**Neovim & Vim**
Other Langauges	Shell Scripts(bszh, zsh), MATLAB, R
VCS	**Git**

Publications and Patents

Conference Proceedings

- [**C17**] Chi et al, "DiceHuBERT: Distilling HuBERT with a Self-Supervised Learning Objective", **Interspeech**, 2025, submitted.
- [**C16**] Chi et al, "Adaptive Knowledge Distillation for Device-Directed Speech Detection", **Interspeech**, 2025, submitted.
- [**C15**] Kim et al, "Context-Enriched Voxel Queries for Camera-based 3D Occupancy Prediction", **CVPR**, 2025.
- [**C14**] Shi et al, "CARING-AI: Context-aware Augmented Reality INstruction through Generative Artificial Intelligence", **CHI**, 2025.
- [**C13**] Seo et al, "Egocentric View Hand Action Recognition by Leveraging Hand Surface and Hand Grasp Type", *ICPRAI*, 2024.
- [**C12**] Chi et al, "M2D2M: Discrete Diffusion Model for the Multi-Motion Generation from the Text", **ECCV**, 2024.
- [**C11**] Kim et al, "Enhanced Motion Forecasting with Visual Relation Reasoning", **ECCV**, 2024.
- [**C10**] Moon et al, "VisionTrap: Vision-Augmented Trajectory Prediction Guided by Textual Descriptions", **ECCV**, 2024.
- [**C9**] Chi et al, "Multi-Modal Representation Learning with Tactile Modality", **IROS**, 2024.
- [**C8**] Kim et al, "Higher-order Relation Reasoning for Trajectory Prediction", **CVPR**, 2024.
- [**C7**] Roh et al, "Functional Hand Type Prior for 3D Hand Pose Estimation & Action Recognition from Egocentric View Monocular Videos, **BMVC** (Oral), 2023.
- [**C6**] Chi et al, "AdamsFormer for Spatial Action Localization in the Future", **CVPR**, 2023.
- [**C5**] Xu et al, "Uncovering the Missing Pattern: Unified Framework Towards Trajectory Imputation and Prediction", **CVPR**, 2023.
- [**C4**] Chi et al, "Pose Relation Transformer: Refine Occlusions for Human Pose Estimation", **ICRA**, 2023.
- [**C3**] Chi et al, "InfoGCN: Representation Learning for Human Skeleton-based Action Recognition", **CVPR**, 2022.
- [**C2**] Chi et al, "A Large-scale Annotated Mechanical Components Benchmark for Classification and Retrieval Tasks with Deep Neural Networks", **ECCV**, 2020.
- [**C1**] Kim et al, "First-Person View Hand Segmentation of Multi-Modal Hand Activity Video Dataset", **BMVC**, 2020.

Journal Papers

- [**J9**] Kim et al, "Enhanced fringe-to-phase framework using deep learning", **Image and Vision Computing**, 2024.
- [**J8**] Chi et al, "InfoGCN++: Learning Representation by Predicting the Future for Online Skeleton-based Action Recognition", **TPAMI** 2024.
- [**J7**] Lee et al, "Deep Learning-Assisted Design of Bilayer Nanowire Gratings for High-Performance MWIR Polarizers, **Advanced Materials Technologies**, 2024.
- [**J6**] Lee et al, "Robust Sound-Guided Image Manipulation", **Neural Networks**, 2024.
- [**J5**] Unmesh et al, "Interacting Objects: A dataset of object-object interactions for richer dynamic scene representations", **RA-L**, 2024.
- [**J4**] Kim et al, "3D CAD Model Simplification for Mechanical Parts Using Generative Adversarial Networks", **Computer-Aided Design**, 2023.
- [**J3**] Kim et al, "Object synthesis by learning part geometry with surface and volumetric representations", **Computer-Aided Design**, 2021.
- [**J2**] Kim et al, "Latent transformations neural network for object view synthesis", **The Visual Computer**, 2019.
- [**J1**] Hwang et al, "An Evaluation Methodology for 4D Deep Neural Network using Visualization in 3D Data Classification", **JMST**, 2019.

Patents

- [**P7**] "Multi-Motion Generation", US Patent App.
- [**P6**] "System and Method for Authoring Context-augmented Reality Instruction through Generative Artificial Intelligence", US Patent App.
- [**P5**] "Pose Relation Transformer Refine Occlusions for Human Pose Estimation", US Patent App. 18/584,191.
- [**P4**] "Spatio Action Localization in the Future", US Patent App. 18/300,844.
- [**P3**] "Trajectory Imputation and Prediction", US Patent App. 18/182,195.
- [**P2**] "Pixel-wise Hand Segmentation of Multi-modal Hand Activity Video Dataset", US Patent 11,562,489.
- [**P1**] "Computer Input System for Office/Factory Automation", WO Patent 2018/074729 A1.

Academic Services

Reviewer

- Conferences: **CVPR**(2023-2025), **ECCV**(2024), **ICCV**(2023, 2025), **ICML**(2024-2025), **ICLR**(2024-2025), **NeurIPS**(2023), **AAAI**(2025), **BMVC**(2021-2023), **ACCV**(2024), **ICRA**(2025),**IROS**(2024), **ICPR**(2025), **ICASSP**(2025).
- Journals: **TPAMI**, **PR**, **TIP**, **IJCV**, **TNNLS**, **JVCI**, **CVIU**,**TOMM**, **R-AL**, **TETCI**, **JCISE**.

Awards and Honors

2024	**Doctoral Consortium,** IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)	*Seattle, WA, USA*
2023	**Conference Travel Funds,** Purdue Engineering Graduate Program	*West Lafayette, IN, USA*
2023	**Travel Grants,** Purdue Graduate Student Government	*West Lafayette, IN, USA*

References

Available upon request.