

# Hyung-gun Chi

AI RESEARCHER

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## Research Interests

AI/ML Researcher with a PhD in Computer Engineering and experience at Apple AIML. Specializing in computer vision, generative models, 3D geometry, human motion modeling, and audio processing, with expertise in vision-language models, multimodal learning, and efficient AI deployment. Published 10+ first-author papers at top-tier conferences (CVPR, ECCV, ICRA, etc.) and authored 7 patents. Proven ability to translate research into real-world VR and AR applications.

## Education

<b>Purdue University</b> PHD IN ELECTRICAL AND COMPUTER ENGINEERING • <b>Thesis:</b> Towards Improved Representations on Human Activity Understanding • <b>Advisor:</b> Dr. Karthik Ramani	West Lafayette, IN, USA Dec. 2023
<b>Purdue University</b> MS IN ELECTRICAL AND COMPUTER ENGINEERING	West Lafayette, IN, USA Dec. 2022
<b>Yonsei University</b> BS IN MECHANICAL ENGINEERING	Seoul, South Korea Feb. 2017

## Professional Experience

<b>Apple Inc.</b> AIML RESIDENT • Developed lightweight speech foundation models for Siri using knowledge distillation, reducing model size while maintaining performance. • Implemented adaptive knowledge distillation techniques, enhancing wake-word detection accuracy. • Collaborated with cross-functional teams to integrate AI models into Apple products.	Cupertino, CA, USA Jul 2024 -
<b>Hanwha Vision America</b> AI RESEARCHER • Researched human pose estimation and human action recognition to enhance surveillance AI. • Developed and deployed AI models, significantly increasing detection accuracy while reducing false positives.	Santa Clara, CA, USA Jan - June 2024
<b>Toyota Research Institute</b> ML RESEARCH INTERN • Designed a multi-modal vision-language-tactile representation model, improving robotic perception accuracy. • Published a large-scale dataset for robotic multimodal learning.	Los Altos, CA, USA May - Aug 2023
<b>Honda Research Institute</b> CV RESEARCH INTERN • Developed VQ-Diffusion models for text-to-human-motion generation, improving motion smoothness between the actions. • Created a NeuralODE-based Transformer model for trajectory prediction, significantly enhancing action forecasting accuracy.	San Jose, CA, USA Jan - May 2023 & May - Aug 2022
<b>Convergence Design Lab, Purdue University</b> GRADUATE RESEARCH ASSISTANT • Led research on vision-language representation learning for 3D human action recognition. • Developed a self-attention-based skeleton recognition model, integrated with Graph Convolutional Networks. • Published extensively in CVPR, ECCV, ICRA, with multiple patents in human pose estimation, human motion generation and multimodal AI.	West Lafayette, IN, USA Aug 2018 - Dec 2023
<b>HeumLabs</b> SOFTWARE ENGINEER & CEO • Founded a startup developing an office automation system, securing initial funding and leading full product development. • Successfully launched the system, adopted by 150+ businesses within the first year.	Seoul, South Korea Sep 2016 - Dec 2017

## Skills

<b>Programming</b>	Python, C/C++, Shell Scripting (Bash, Zsh), MATLAB, R
<b>AI/ML Frameworks</b>	PyTorch, TensorFlow, JAX
<b>Computer Vision &amp; Generative Models</b>	Diffusion Models, GANs, VAEs, Visual Transformers
<b>Optimization &amp; Deployment</b>	Model Distillation, Quantization
<b>Development Tools</b>	Git, Docker, AWS/GCP, Vim/Neovim

# Selected Publications / Patents

## Publications

- [14] *DiceHuBERT: Distilling HuBERT with a Self-Supervised Learning Objective*  
H Chi, Z Aldeneh, T Likhomanenko, O Rudovic, T Higuchi, L Chen, S Watanabe, A Abdelaziz, **Interspeech**, 2025.
- [13] *Adaptive Knowledge Distillation for Device-Directed Speech Detection*  
H Chi, F Pesce, W Chang, O Rudovic, A Argueta, S Barun, V Garg, A Abdelaziz, **Interspeech**, 2025.
- [12] *Context-Enriched Voxel Queries for Camera-based 3D Occupancy Prediction*  
G Oh, S Kim, H Ko, **H Chi**, J Kim, D Lee, D Ji, S Choi, S Jang, S Kim, Conference on Computer Vision and Pattern Recognition (**CVPR**) 2025.
- [11] *InfoGCN++: Learning Representation by Predicting the Future for Online Skeleton-based Action Recognition*  
**H Chi\***, S Chi\*, Q Huang, K Ramani, Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**) 2024.
- [10] *M2D2M: Discrete Diffusion Model for the Multi-Motion Generation from the Text*  
**H Chi\***, S Chi\*, H Ma, N Agarwal, F Siddiqui, K Ramani, K Lee, European Conference on Computer Vision (**ECCV**) 2024.
- [9] *Enhanced Motion Forecasting with Visual Relation Reasoning*  
S Kim, H Baek, S Lee, **H Chi**, H Lim, J Kim, S Kim, European Conference on Computer Vision (**ECCV**) 2024.
- [8] *VisionTrap: Vision-Augmented Trajectory Prediction Guided by Textual Descriptions*  
S Moon, H Woo, H Park, H Jung, R Mahjourian, **H Chi**, H Lim, S Kim, J Kim, European Conference on Computer Vision (**ECCV**) 2024.
- [7] *Multi-Modal Representation Learning with Tactile Modality*  
**H Chi\***, J Barreiros\*, J Mercat, K Ramani, T Kollar, International Conference on Intelligent Robots and Systems (**IROS**) 2024.
- [6] *Higher-order Relation Reasoning for Trajectory Prediction*  
S Kim, **H Chi**, H Lim, K Ramani, J Kim, S Kim, Conference on Computer Vision and Pattern Recognition (**CVPR**) 2024.
- [5] *AdamsFormer for Spatial Action Localization in the Future*  
**H Chi**, K Lee, N Agarwal, Y Xu, K Ramani, C Choi, Conference on Computer Vision and Pattern Recognition (**CVPR**) 2023.
- [4] *Uncovering the Missing Pattern: Unified Framework Towards Trajectory Imputation and Prediction*  
X Yi, A Bazarjani, **H Chi**, C Choi, Y Fu, Conference on Computer Vision and Pattern Recognition (**CVPR**) 2023.
- [3] *Pose Relation Transformer: Refine Occlusions for Human Pose Estimation*  
**H Chi\***, S Chi\*, C Stanley, K Ramani, International Conference on Robotics and Automation (**ICRA**) 2023.
- [2] *InfoGCN: Representation Learning for Human Skeleton-based Action Recognition*  
**H Chi\***, MH Ha\*, S Chi, SW Lee, Q Huang, K Ramani, Conference on Computer Vision and Pattern Recognition (**CVPR**) 2022.
- [1] *A Large-scale Annotated Mechanical Components Benchmark for Classification and Retrieval Tasks with Deep Neural Networks*  
**H Chi\***, S Kim\*, X Hu, Q Huang, K Ramani, European Conference on Computer Vision (**ECCV**) 2020.

## Patents

- [P7] *Multi-Motion Generation*,  
S Chi, **H Chi**, F Siddiqui, N Agarwal, H Ma, K Lee, US Patent App.
- [P6] *System and Method for Authoring Context-augmented Reality Instruction through Generative Artificial Intelligence*,  
K Ramani, S Chi, **H Chi**, R Jain, J Shi, US Patent App.
- [P5] *Pose Relation Transformer Refine Occlusions for Human Pose Estimation*,  
K Ramani, **H Chi**, S Chi, US Patent App. 18/584,191.
- [P4] *Spatio Action Localization in the Future*,  
**H Chi**, K Lee, N Agarwal, Y Xu, C Choi, US Patent App. 18/300,844.
- [P3] *Trajectory Imputation and Prediction*,  
Y Xu, A Bazarjani, **H Chi**, C Choi, US Patent App. 18/182,195.
- [P2] *Pixel-wise Hand Segmentation of Multi-modal Hand Activity Video Dataset*,  
K Ramani, S Kim, **H Chi**, US Patent 11,562,489.
- [P1] *Computer Input System for Office/Factory Automation*,  
**H Chi**, 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, 2025), **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 / Honors

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

# References

Available upon request.