

# Hongsuk Choi

## PERSONAL DETAILS

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## INTRODUCTION

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I am interested in a broad range of machine learning and computer vision topics. I have in-depth experience in 3D deep learning and neural image rendering/generation.

Summary of my experience:

- Published **9 papers** at top conferences, such as **CVPR, ECCV, and ICLR**, in 2 years of my Master's program.
- **First authored on 7 papers** out of 11 papers and filed 3 patents.
- Hands-on experience in various deep learning architectures: GraphCNN[1,2], Sparse 3D CNN[1,2], Transformer[1], NeRF[1,2], GRU[1], Diffusion-based LLM[1], Contrastive Learning[1], GAN, Mask R-CNN, etc.
- I maintain GitHub projects[1,2,3,4] with over **1000 stars**, as the main contributor.

## EDUCATION & SERVICE

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M.S., Electrical and Computer Engineering Seoul National University, Seoul, Korea Advisor: <a href="#">Prof. Kyoung Mu Lee</a>	Mar 2020 - Feb 2022
Military Service, Sergeant Squad Leader Air Force, Korea	Mar 2015 - Mar 2017
B.S., Computer Science and Engineering Seoul National University, Seoul, Korea	Mar 2015 - Feb 2020
B.S., Business Seoul National University, Seoul, Korea	Mar 2013 - Feb 2020

## WORK EXPERIENCE

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### Samsung AI Center, New York, USA

Researcher, June 2022 - Present

Projects I led

- FineControlNet: Fine-level Text Control for Image Generation with Spatially Aligned Text Control Injection
- HandNeRF: Hand-Object Interaction Scene Reconstruction from a Single RGB image
- Metric-scale Human Reconstruction from a Single RGB image
- Hand Force Estimation from Vision

Other team projects

- User-friendly Floor Plan Generation from Lidar Image
- Manipulation Robot System Development; integrated a perception module that estimates 6D object poses from RGBD pointclouds
- Reactive Human Tracking/Following with Mobile Robots

[Tech stack]

Tekscan tactile force sensing, Vicon motion capture, Pointcloud processing using pointnet++, 6D object pose estimation from RGBD sensor, ROS2, Multi-view camera calibration and synchronization, Python 3D simulation, Feature-based NeRF, 3D hand/body reconstruction, Diffusion-based LLM, Mask R-CNN, etc

### **NAVER AI LAB, Seoul, Korea**

Visiting Researcher, Mar 2022 - May 2022

- Project: Data Augmentation for 3D Human Pose and Shape Estimation using Image Generation and Pseudo-labeling
- NAVER AI LAB is the largest AI lab in Korea

[Tech stack]

Style Gan, Inpainting, Image Stitching, 3D Rendering, 3D Model Fitting, Transformer, GraphCNN, CNN, Learning-based fitting, etc

### **NAVER LABS Europe, Grenoble, France**

Research Intern, Apr 2021 - Oct 2021

- Project: Neural Image Generation for an Arbitrary Person with Implicit Function (NeRF) from a Single RGB Image  
Advisor: [Gregory Rogez](#), Vincent Leroy
- NAVER LABS Europe is a former Xerox Research Centre Europe

[Tech stack]

Generalizable NeRF, Sparse 3D CNN, GAN, 3D human pose and mesh estimation, 3D mesh rendering/rasterization, etc

### **Seoul National University, Seoul, Korea**

Teaching Assistant, Mar 2019 - Dec 2020

- Lecture: Introduction to Computer Programming

[Tech stack]

Python, Docker

### **NAVER Webtoon, Seoul, Korea**

Software Engineer Intern, Jun 2018 - Aug 2018

- Project: Android App Development for Movie Trailer Play in AR
- NAVER Webtoon has 85.6 million users

[Tech stack]

Java+Android Studio, OpenGL rendering, Vuforia AR API

### **Start-Up**

Team Leader & Software Engineer, Jul 2017 - Feb 2019

- WebApp Development for Workout Social Media
- Publicly launched at App Store & Google Play Store

[Tech stack]

Tech stack: Firebase+Node.js, TypeScript+Angular JS+Ionic Framework

## **PUBLICATIONS (SELECTED)**

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[1] **Hongsuk Choi** (\*), Isaac Kasahara(\*), Selim Engin, Moritz Alexander Graule, Nikhil Chavan-Dafle, Volkan Isler (\* equal contribution), “FineControlNet: Fine-level Text Control for Image Generation with Spatially Aligned Text Control Injection”, submitted to CVPR 2024, [[HOMEPAGE](#)][[ARXIV](#)][[CODE](#)]

[2] **Hongsuk Choi**, Nikhil Chavan-Dafle, Jiacheng Yuan, Volkan Isler, Hyunsoo Park, “HandNeRF: Learning to Reconstruct Hand-Object Interaction Scene from a Single RGB Image”, ICRA 2024, [[HOMEPAGE](#)] [[ARXIV](#)][[CODE](#)][[VIDEO](#)]

[3] **Hongsuk Choi** (\*), Hyeongjin Nam (\*), Taeryung Lee, Gyeongsik Moon, Kyoung Mu Lee (\* equal contribution), “Rethinking Self-Supervised Visual Representation Learning in Pre-training for 3D Human Pose and Shape Estimation”, **ICLR 2023**, [[ARXIV](#)][[VIDEO](#)]

[4] Gyeongsik Moon, **Hongsuk Choi**, Sanghyuk Chun, Jiyoung Lee, Sangdoo Yun, “Three Recipes for Better 3D Pseudo-GTs of 3D Human Mesh Estimation in the Wild”, **CVPR 2023 workshop**, [[HOMEPAGE](#)][[ARXIV](#)][[PDF](#)]

[5] **Hongsuk Choi** (\*), Gyeongsik Moon (\*), Matthieu Armando, Vincent Leroy, Kyoung Mu Lee, Gregory Rogez (\* equal contribution), “MonoNHR: Monocular Neural Human Renderer”, **3DV 2022**, [[ARXIV](#)][[VIDEO](#)]

[6] **Hongsuk Choi**, Gyeongsik Moon, Joonkyu Park, and Kyoung Mu Lee, “Learning to Estimate Robust 3D Human Mesh from In-the-Wild Crowded Scenes”, **CVPR 2022**, [[ARXIV](#)][[CODE](#)]

[7] Gyeongsik Moon, **Hongsuk Choi**, Kyoung Mu Lee, “NeuralAnnot: Neural Annotator for 3D Human Mesh Training Sets”, **CVPR 2022 workshop**, [[ARXIV](#)][[CODE](#)]

[8] Gyeongsik Moon, **Hongsuk Choi**, Kyoung Mu Lee, “Accurate 3D Hand Pose Estimation for Whole-Body 3D Human Mesh Estimation”, **CVPR 2022 workshop**, [[ARXIV](#)][[CODE](#)]

[9] JoonKyu Park (\*), Yeonguk Oh (\*), Gyeongsik Moon (\*), **Hongsuk Choi**, Kyoung Mu Lee (\* equal contribution), “HandOccNet: Occlusion-Robust 3D Hand Mesh Estimation Network”, **CVPR 2022**, [[ARXIV](#)][[CODE](#)]

[10] **Hongsuk Choi**, Gyeongsik Moon, Ju Yong Chang, and Kyoung Mu Lee, “Beyond Static Features for Temporally Consistent 3D Human Pose and Shape from a Video”, **CVPR 2021**, [[ARXIV](#)][[VIDEO](#)][[CODE](#)]

[11] **Hongsuk Choi** (\*), Gyeongsik Moon (\*), and Kyoung Mu Lee (\* equal contribution), “Pose2Mesh: Graph Convolutional Network for 3D Human Pose and Mesh Recovery from a 2D Human Pose”, **ECCV 2020**, [[ARXIV](#)][[PDF](#)][[VIDEO](#)][[CODE](#)]

## **PATENTS**

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In Process

[1] FineControlNet: FINE-LEVEL TEXT CONTROL FOR IMAGE GENERATION (U.S. Provisional Application(s) filed No. 63/600,563, filed November 17, 2023 by Samsung)

[2] HandNeRF: RGB-BASED HAND-OBJECT INTERACTION RECONSTRUCTION SYSTEM (United States Patent Application No. 63/460,995, filed on April 21, 2023 by Samsung)

[3] MonoNHR: THREE DIMENSIONAL RENDERING SYSTEMS AND METHODS FROM MONOCULAR IMAGE (U.S. Provisional Application(s) No(s) 63/394,741, filed August 3, 2022 by Seoul National University & NAVER patent)

## PROJECTS

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Human mesh model parameter fitting from 3D point cloud      Mar 2021 - Oct 2021  
co-op with Antigravity

A Large-scale Dataset for 3D Human Pose and Mesh Estimation      May 2020 - Dec 2020  
[Dataset link](#) / co-op with SweetK and MotionTechnology

HumanFit: A New Large-scale Dataset for Human Fitness  
Evaluation and Feedback      May 2020 - Dec 2020  
[Dataset link](#) / co-op with SuperbAI, KakaoBrain

Human tracking and counting from Drone images  
(Data collection and Model development)      Mar 2019 - May 2019  
co-op with Ministry of Science and ICT, Korea

Human Part Segmentation for AI-based Animation Coloring      Mar 2019 - Jun 2019  
co-op with NCSOFT

## HONORS

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**Distinguished** Master Dissertation Award, Seoul National University, 2022

Selected as a finalist in **Qualcomm Innovation Fellowship Korea**, 2020 & 2021

**1st place** and **2nd place** at the *without association* track of **3D human pose estimation in the wild (3DPW) challenge**, workshop conjunction with **ECCV 2020** (1st in a joint orientation metric and 2nd in a joint position metric), 2020

**1st place** at the Qualcomm IT Tour presentation competition held by Qualcomm, proposed AR-based workout coaching system and selected as a winner by Jim Cathey (President of Qualcomm Global Business), 2019

## SKILLS

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**Professional at:**

PYTHON, PYTORCH, PYTORCH3D, OPENCV, OPEN3D, PIL, CAMERA CALIBRATION, HUMAN BODY AND HAND MOTION CAPTURE, VICON, 3D VISUALIZATION, PERFOR-

MANCE REPORT, CONVENTIONAL MULTI-VIEW GEOMETRY CV, IMAGE PROCESSING,  
MACHINE LEARNING, CONVEX OPTIMIZATION, LATEX

**Familiar at:**

JAVA, JAVASCRIPT, TENSORFLOW, ROS, ANDROID STUDIO, PYTHON SIMULATION,  
TACTILE FORCE SCANNING, 3D GRAPHICS

## **SOMETHING DIFFERENT**

During my stay in Bristol, UK, I went by Benjamin in an elementary school. I played an electric guitar in a university rock band. Looking to expand my musical repertoire, I picked up a bass guitar this year.