Jaehoon Choi

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EDUCATION

University of Maryland, College Park

- Ph.D. in Computer Science — Jan 2021 – Present
  - Adviser: Prof. Dinesh Manocha

Korea Advanced Institute of Technology (KAIST)

- M.S. in Electrical Engineering — Sep 2017 – Dec 2019
  - Adviser: Prof. Changick Kim

Korea Advanced Institute of Technology (KAIST)

- B.S. in Electrical Engineering — Feb 2011 – Aug 2017
  - Minor: Business and Technology Management
  - Korean Augmentation to the United States Army (mandatory military service) — Oct 2014 – Jul 2016

RESEARCH INTERESTS

3D Reconstruction, Neural Rendering, Structure from Motion, Depth Estimation, and Polarization Imaging

PUBLICATIONS

PREPRINTS

[1] **Jaehoon Choi**, Dongki Jung, Yonghan Lee, Sungmin Eum, Dinesh Manocha, and Heesung Kwon, "UAVTwin: Neural Digital Twins for UAVs using Gaussian Splatting", *Submitted*.

[2] Dongki Jung, **Jaehoon Choi**, Yonghan Lee, and Dinesh Manocha, "DEF360: 360 Depth Estimation with Perspective Foundation Models and Graph Optimization", *Submitted*.

[3] Dongki Jung*, **Jaehoon Choi***, Yonghan Lee, and Dinesh Manocha, "IM360: Textured Mesh Reconstruction for Large-scale Indoor Mapping with 360° Cameras", *Submitted*. (* These two authors contributed equally)

[4] Yonghan Lee, **Jaehoon Choi**, Dongki Jung, Jaeseong Yun, Soohyun Ryu, Dinesh Manocha, and Suyong Yeon, "Mode-GS: Monocular Depth Guided Anchored 3D Gaussian Splatting for Robust Ground-View Scene Rendering", *Submitted*.

[5] Christopher Maxey, **Jaehoon Choi**, Yonghan Lee, Hyungtae Lee, Dinesh Manocha, and Heesung Kwon, "TK-Planes: Tiered K-Planes with High Dimensional Feature Vectors for Dynamic UAV-based Scenes", *Submitted*.

INTERNATIONAL CONFERENCES

[1] Dongki Jung, **Jaehoon Choi**, Yonghan Lee, Somi Jeong, Taejae Lee, Dinesh Manocha, and Suyong Yeon, "EDM: Equirectangular Projection-Oriented Dense Kernelized Feature Matching", *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2025.

[2] **Jaehoon Choi**, Yonghan Lee, Hyungtae Lee, Heesung Kwon, and Dinesh Manocha "MeshGS: Adaptive Mesh-Aligned Gaussian Splatting for High-Quality Rendering", *Asian Conference on Computer Vision (**ACCV**)*, 2024.

[3] **Jaehoon Choi**, Rajvi Shah, Qinbo Li, Yipeng Wang, Ayush Saraf, Changil Kim, Jia-Bin Huang, Dinesh Manocha, Suhib Alsisan, and Johannes Kopf, "LTM: Lightweight textured mesh reconstruction for real-time rendering in unbounded scene.", *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2024.

[4] Christopher Maxey*, **Jaehoon Choi***, Hyungtae Lee, Dinesh Manocha, and Heesung Kwon, "UAV-Sim: NeRF-based Synthetic Data Generation for UAV-based Perception", *The IEEE International Conference on Robotics and Automation (**ICRA**)*, 2024. (* These two authors contributed equally)

[5] **Jaehoon Choi**, Dongki Jung, Taejae Lee, Sangwook Kim, Youngdong Jung, Dinesh Manocha, and Donghwan Lee, "TMO: Textured Mesh Acquisition of Objects with a Mobile Device by using Differentiable Rendering", *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2023.

[6] **Jaehoon Choi***, Dongki Jung*, Yonghan Lee, Deokhwa Kim, Dinesh Manocha, and Donghwan Lee, "SelfTune: Metrically Scaled Monocular Depth Estimation through Self-Supervised Learning", *The IEEE International Conference on Robotics and Automation (**ICRA**)*, 2022. (* These two authors contributed equally)

[7] Taekyung Kim, **Jaehoon Choi**, Seokeon Choi, Dongki Jung, and Changick Kim, "Just a Few Points are All You Need for Multi-view Stereo: A Novel Semi-supervised Learning Method for Multi-view Stereo", *International Conference on Computer Vision (**ICCV**)*, 2021.

[8] Dongki Jung*, **Jaehoon Choi***, Yonghan Lee, Deokhwa Kim, Changick Kim, Dinesh Manocha, and Donghwan Lee, "DnD: Dense Depth Estimation in Crowded Indoor Dynamic Scenes", *International Conference on Computer Vision (**ICCV**)*, 2021. (* These two authors contributed equally)

[9] **Jaehoon Choi**, Dongki Jung, Yonghan Lee, Deokhwa Kim, Dinesh Manocha, and Donghwan Lee, "SelfDeco: Self-Supervised Monocular Depth Completion in Challenging Indoor Environments", *The IEEE International Conference on Robotics and Automation (**ICRA**)*, 2021.

[10] **Jaehoon Choi***, Dongki Jung*, Donghwan Lee, and Changick Kim, "SAFENet: Self-Supervised Monocular Depth Estimation with Semantic-Aware Feature Extraction", *Neural Information Processing Systems Workshop (**NeurIPSW**) on Machine Learning for Autonomous Driving*, Vancouver, Canada, 2020. (* These two authors contributed equally)

[11] Dongki Jung, Seunghan Yang, **Jaehoon Choi**, and Changick Kim, "Arbitrary Style Transfer Using Graph Instance Normalization", *The 27th IEEE International Conference on Image Processing (**ICIP**)*, Abu Dhabi, UAE, 2020

[12] **Jaehoon Choi**, Taekyung Kim, and Changick Kim, "Self-Ensembling with GAN-based Data Augmentation for Domain Adaptation in Semantic Segmentation", *International Conference on Computer Vision (**ICCV**)*, Seoul, South Korea, 2019

[13] Seunghyeon Kim, **Jaehoon Choi**, Taekyung Kim, and Changick Kim, "Self-Training with Adversarial Background Regularization for Unsupervised Domain Adaptive One-Stage Object Detection", *International Conference on Computer Vision (**ICCV**)*, Seoul, South Korea, 2019 (**Oral**)

[14] **Jaehoon Choi**, Minki Jeong, Taekyung Kim, and Changick Kim, "Pseudo-Labeling Curriculum for Unsupervised Domain Adaptation", *British Machine Vision Conference (**BMVC**)*, Cardiff, UK, 2019

OTHER PUBLICATIONS

[1] **Jaehoon Choi**, Daeyeong Kim, Dongwon Yang, Junhee Lee, Dokyung Kim, Changick Kim, "Channel Pruning Scaling Factor of Batch Normalization in Compact Networks", *Journal of the Institute of Electronics and Information Engineers*, vol. 56, No. 3, Mar 2019.

PROFESSIONAL EXPERIENCE

■ **Research Internship** at Meta Reality Labs — Jun 2024 – Aug 2024
- Manager: *Ph.D. Yi Zheng*
- Developing a Shape from Polarization algorithm for Polarization Camera.

■ **Research Internship** at Meta — Jun 2023 – Aug 2023
- Manager: *Ph.D. Rajvi Shah* and *Ph.D. Qinbo Li*
- Developed a Neural Rendering algorithm for Virtual Reality platform.

■ **Research Scientist** at NAVER LABS — Jan 2022 – Aug 2022
- Manager: *Ph.D. Donghwan Lee*
- Developed a Neural Rendering algorithm for Augmented Reality platform.

■ **Research Internship** at NAVER LABS — Jun 2021 – Aug 2021
- Manager: *Ph.D. Donghwan Lee*
- Developed a SLAM algorithm for the mobile robot.

■ **Research Internship** at NAVER LABS — Jan 2020 – Dec 2020
- Manager: *Ph.D. Donghwan Lee*
- Developed a depth estimation algorithm for robotics systems.

PROJECT EXPERIENCE

■ 3D Object Recognition Algorithm for Autonomous Driving — May 2019 – Nov 2019
- Funded by ***LG Electronics Co., Ltd***
- Aimed at Developing the 2D object detection and depth estimation for stereo RGB images and FIR images.

■ Deep Learning Algorithm on Embedded Systems for Vision Tasks — Jan 2018 – Dec 2018
- Funded by ***LIG Nex1 Co., Ltd***
- Developed the visual recognition algorithm on the embedded system, which requires light and efficient deep learning.

- Deep Learning-based Defect Detection — Apr 2017 – Dec 2017
  - Funded by ***Samsung Electronics Co., Ltd***
  - Aimed at developing the automatic surface defect detection algorithm for mobile phone based on deep learning.

TEACHING

- University of Maryland College Park, Teaching Assistant — Sep 2022 – Dec 2022
  - CMSC733 – Computer Processing of Pictorial Information
- University of Maryland College Park, Teaching Assistant — Sep 2021 – Dec 2021
  - CMSC250 – Discrete Structure
- University of Maryland College Park, Teaching Assistant — Feb 2021 – May 2021
  - CMSC426 – Computer Vision
- KAIST, Teaching Assistant — Mar 2019 – Jul 2019
  - EE838 – Special Topics in Image Engineering <Optimization for Computer Vision>

ACADEMIC ACTIVITIES

- Conference Reviewer
  - CVPR 2020, WACV 2021, ACCV 2020, AAAI 2021, ICRA 2021, CVPR 2021, AAAI 2022, ICRA 2023, ICRA 2024
  - Chosen as one of 66 outstanding reviewers of ACCV 2020

OTHER ACTIVITIES

- Large-scale 3D Shape Reconstruction and Segmentation from Shapenet Core55 — Aug 2017 – Oct 2017
  - Participated in the 3D shape segmentation from ShapeNet challenge held in ICCV 2017.
- Korean Augmentation to the United States Army — Oct 2014 – Jul 2016
  - Served in the 6-52 Air Defense Artillery in U.S.Army as a translator (mandatory military duty)

LANGUAGES Korean (Native), English (Fluent)

SKILLS Python, MATLAB, C, C++, CUDA, ROS, Docker, LaTeX, PyTorch, TensorFlow, Caffe.

REFERENCES

- **Dinesh Manocha**
  Professor of Computer Science and Professor of Electrical and Computer Engineering
  University of Maryland, College Park
  dmanocha@umd.edu
- **Donghwan Lee**
  Computer Vision Team Leader @ NAVER LABS
  8 Gumi-ro, Gumi 1(il)-dong, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
  donghwan.lee@naverlabs.com
- **Changick Kim**
  Professor in School of Electrical Engineering,
  Korea Advanced Institute of Science and Technology (KAIST)
  changick@kaist.ac.kr

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