

# Peter Kim

Canadian Citizen | Korean F-4 Visa | Toronto, ON

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## Experience

### 3DII

#### Research Engineer

Seoul, South Korea

Apr 2024 – Present

- Achieved **<1 cm accuracy using only 5 images** for foot reconstruction by incorporating DUST3R into a Python multi-view 3D reconstruction pipeline.
  - Achieved **9× resolution upscaling without fine-tuning** by modifying DUST3R using a novel positional encoding adaptation Meta's LLM Research—Acknowledged by DUST3R's lead author [[Github Issue #62](#)].
  - Added scale rectification via credit-card detection with YOLO.
- **Reduced implant surgical planning time by 4x** by automating the planning process.
  - Trained and deployed a 3D volume segmentation model for CT scans and developed a panoramic curve detection algorithm (**Ongoing 100% success rate for 600+ mandibular surgical cases**). Iteratively made the panoramic curve detection algorithm **25x faster** by using OpenMP and refactoring the code. Came up with a post-processing logic for the segmented CT volume that **reduced GPU memory consumption by 50%**.
  - Designed, trained, and deployed a diffusion model for missing-tooth filling by using Pytorch, ONNX, and C++.
- Researched and designed a transformer-based deep learning model to segment partial oral mesh scans.

#### Software Engineer

Oct 2023 – Mar 2024

- **Reduced image annotation time by 50%** by creating a 2D data-labeling tool with Segment Anything Model.
- Architected an iOS app using Swift and Firebase based on the MVVM design pattern to streamline image capture for a 3D teeth reconstruction pipeline, significantly increasing data acquisition efficiency. Integrated YOLO via CoreML to automatically filter out low-quality images, further enhancing data quality for downstream processing.

#### Synaptive Medical

Toronto, Canada

#### Optics Engineer

May 2018 – Sep 2019

- Analyzed intraoperative optical parameters to optimize search space and improve instrument performance.
- Identified optimal horizontal disparity configurations across optical settings, enhancing imaging system accuracy.
- Developed optical test protocols characterizing stray light angle and temperature effects on imaging quality.

## Projects

### Monocular Human Pose Estimation

Sep 2022 – Apr 2023

- Implemented a CNN-based deep learning pipeline for 3D human pose estimation.
- Adapted NVidia's "Physics-based Human Motion Estimation and Synthesis from Videos" for real-world constraints by modifying key assumptions.
- Applied noise filtering, Catmull-Rom spline fitting for robust post-processing and integrated physics-based optimization using RBDL, cvxopt, and Pybullet to boost model reliability.

## Skills

**Languages:** Python, C++, Swift

**Frameworks & Libraries:** Pytorch, ONNX Runtime, OpenCV, CNN, ViT, Segment Anything, DUST3R, YOLO, OpenCV

## Education

### University of Toronto

Master of Engineering, Computer Engineering. **3.66/4.0**

### University of Toronto

Bachelor of Applied Science, Mechanical Engineering. **3.74/4.0**

**Dean Honour's List**