

EMPLOYMENT

- **VIRNECT**
Research Engineer (Full-time) Seoul, South Korea
Apr. 2019 - Present
- **McKinsey & Company**
Analyst (Part-time) New York, USA
Oct. 2017 - Dec. 2017
- **CACTUS Communications**
Translator (Part-time) London, UK
Oct. 2016 - Jun. 2018

EDUCATION

- **Imperial College London**
M.Res. Medical Robotics and Image-Guided Intervention (Merit) London, UK
Oct. 2017 - Sept. 2018
- **University of Warwick**
B.Eng. Manufacturing and Mechanical Engineering (Upper-Second Class Hons.) Coventry, UK
Oct. 2014 - Jun. 2017

RESEARCH EXPERIENCES

- **Cavendish Laboratory, University of Cambridge**
Visiting Researcher (Advisor: Dr.Sarah Bohndiek) Cambridgeshire, UK
Jan. 2019 - Mar. 2019
- **Surgical Imaging and Biophotonics Laboratory, Imperial College London**
M.Res Student Researcher (Advisor: Prof.Daniel Elson) London, UK
Jan. 2018 - Sept. 2018
- **HARMS Lab, Imperial College London**
M.Res Student Researcher (Advisor: Dr.George Mynolas) London, UK
Oct. 2017 - Dec. 2017
- **Trace Metals in Medicine Laboratory, University of Warwick**
B.Eng Student Researcher (Advisor: Dr.Joanna Collingwood) Coventry, UK
Oct. 2016 - Jun. 2017
- **International Institute for Product and Service Innovation, WMG**
B.Eng Student Researcher (Advisor: Mr.Graeme Knowles) Coventry, UK
Oct. 2016 - Jun. 2017

PATENTS

- **Calibration Mechanism and Method for Posture Estimation of Augmented Reality Guide Tool**
[PENDING] T.J.Ha, H.G.Chang, S.H.Kim - Ref Num: TP191060
- **Method and System for Posture Estimation about Object Tracking Taken by Camera**
[PENDING] T.J.Ha, H.G.Chang, S.H.Kim, N.Y.Park - Ref Num: TP191091

PROJECTS

- **VIRNECT AR SDK**
Cross-platform AR SDK comprised of image target / QR code / CAD-model tracker and visual-inertial odometry
- **Real-Time Welding Guidance using Augmented Reality**
Augmented reality welding guidance system using markers and CAD-model tracking under extreme illumination
- **Hyperspectral Wide-field Endoscopic Image Registration and Structure-from-Motion**
Image registration and structure-from-motion pipeline for multi-fibre hyperspectral images
- **Marker-based Tool Tracker with a Novel Multi-Camera Calibration Method**
Pose detection and tracking system with an auto-calibration for camera extrinsics and marker-tooltip registration
- **Mobile Rover for Environment Mapping and Survivor Detection in Disaster Scenarios**
Voice-controllable rover, using RGB-D SLAM, object detection, and collision-avoidance.

- **Snapchat-like Face Filters**

Machine learning based face landmark detection and image morphology, using OpenCV and Dlib

- **A Real-Time Intraoperative Data Mapping Device for Probe-Based Measurements**

Real-time cancer detection system with a novel hyperspectral sensing device with augmented reality

- **Vision-Based Endoscopic Navigation Using Simultaneous Localization and Mapping**

Monocular visual SLAM (ORB-SLAM) on a rigid colon phantom.

- **Motion Capture for Optimisation of Endoscopic Robot for Bi-Manual Suturing**

Optimisation of robot structure for efficient hand motion transfer from a surgeon to a surgical robot

- **Robotic Path Planning for Beating Heart Surgery**

MATLAB simulation for inverse kinematics of a PUMA robot on dynamic trajectory

- **Development of Modular Training Imaging Phantom for MRI Radiologists**

Design of an MRI phantom for deliberate generation of image artefacts for educational purpose

LEADERSHIP

- **Community Leader** - Kakao Community “We will be SLAM Masters” Nov. 2019 - PRESENT
- **Lead Student Ambassador** - Hamlyn Robotic & AI Summer School 2018
- **Journal Club Lead** - Imperial College London 2018
- **Lead Student Researcher** - McKinsey & Company 2017
- **Course Representative** - Imperial College London 2017
- **Course Representative** - University of Warwick 2016

TEACHING

- **Implementation of Simultaneous Localization and Mapping** Seoul, South Korea
MODU Labs - Flipped Learning Scheme Oct. 2020 – PRESENT
 - In-depth review of ORB-SLAM source code.
- **Fundamentals of Simultaneous Localisation and Mapping** Seoul, South Korea
‘We will be SLAM masters’ study group Nov. 2019 – Feb. 2020
 - In-depth review of ORB-SLAM source code.
- **Medical Imaging and Image-Guided Intervention** Seoul, South Korea
MODU Labs - Flipped Learning Scheme Oct. 2019 – Dec. 2019
 - X-ray, CT, Ultrasound, Nuclear Medicine, MRI, Microscopy, Fluorescence Imaging, Image-Guided Intervention.

CONFERENCE TALKS

- **ANAIN Community Charity Webinar** 2020
 - Computer vision without deep learning - Augmented reality and SLAM
- **MODUCON 2019** 2019
 - Design considerations for robust computer vision systems and deep learning
- **PyCon APAC 2019** 2019
 - Lightning Talk - Robot development with Python
- **NVIDIA Jetson Meetup** 2019
 - NVIDIA Jetson Nano for intelligent robot development