# Hah Min Lew

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## CAREER OBJECTIVE

My interest is to solve data-driven valuable real-world problems through AI / ML systems, currently based on data science, computer vision and ML engineering. I'm a curious and challenging spirit, and proactively seeking opportunities to grow and share my knowledge.

## EXPERIENCE

**Klleon, AI Researcher**                                                                 Aug. 2022 - present

- ML model engineering and research for image and video synthesis through generative modeling using implicit, score-based, and parameterized methods. Worked on Chroma-HS.
- Data collection, preprocessing, and analysis at a service-wise perspective.

**MBIS Lab, Graduate Researcher, Advisor: Prof. Jae Youn Hwang**          Mar. 2019 - Aug. 2022

- 6 SCIE publications, 7 international conferences, 9 projects, 6 patents, and 2 awards.
- ML-based anomaly detection for various biomedical applications under multimodal, class-imbalance, and multitask problems.
- Frequency-domain translation for substantial and informative data creation using generative modeling.
- Developed a novel 1-D time-series signal processing algorithm for the biomedical monitoring system.
- Collaborative research experiences with medical doctors from SNUH, SNUDH, Yonsei Severance, etc.

**LANTERN, Co-founder**                                                               Nov. 2016 - July 2017

- Founded a data-driven customized tutor matching service company. Co-working with **Class101**.

## SELECTED PROJECTS

**Construction of a facial action coding system**                                  June 2023 - present
- **Data-centric research** for photo-realistic facial rendering via parameterized model engineering.
- Used skills: Python, PyTorch, Docker

**Development of a state-of-the-art ML-based head swapping framework**      Oct. 2022 - June 2023
- Implementing and reproducing baseline **from scratch that has no code**.
- **Full cycle experience** from the problem statement, data collection and preprocessing, ML model design, training and evaluation, result serving and improvement.
- Core-contributed to raise a **$4.5m series A round**.
- Used skills: Python, PyTorch, Git

**Multitask learning for class-imbalanced region detection**                     Dec. 2021. - Aug. 2022
- Developed multitask network that leverages classification, segmentation, and proposed subsition learning for Rotator Cuff Tear detection.
- Employed Discrete Fourier Transforms for substitution of positive and negative regions in the frequency domain.
- Achievement: **Co-author of peer-reviewed conference publications**.
- Used skills: Python, TensorFlow

**Multimode data acquisition, registration and analysis for tumor detection**   Mar. 2019 - Oct. 2020
- Data collection from proposed multimodal imaging of human colon tissues including tumors ex vivo.
- Conducted quantitative analysis of multimode data for tumor characterization.
- Achievement: **Co-author of IEEE TMI (IF: 11.037) publications**.
- Used skills: Python, MATLAB, LabView

**Data collection and analysis for the mobile diagnosis** <span style="float:right">Feb. 2020 - Jan. 2022</span>
- Obtained and processed multimode data cubes into trainable matrices.
- Diagnosis via ML models (*Multilayer perceptron, Random forest, Logistic regression, Decision trees, Naïve Bayes*) for multimode human samples using standard metrics.
- **Achievement: Co-author of peer-reviewed SCIE publications**.
- Used skills: Python, Scikit

**Development of a novel 1-D times-series monitoring algorithm** <span style="float:right">Mar. 2019 - Aug. 2021</span>
- Developed an advanced signal processing algorithm that is complementary for both zero-crossing and cross-correlation algorithms.
- Achievement: **First author of peer-reviewed SCIE publications**.
- Used skills: MATLAB, LabView

**Frequency-domain translation for high-resolution in-depth imaging** <span style="float:right">Feb. 2021. - Aug. 2022</span>
- Frequency-domain translation through implicit generative modeling using low- and high-frequency image paired datasets through dual element ultrasonic capsule endoscopy.
- Used skills: Python, Pytorch, MATLAB, LabView

**Mobile-based anomaly detection for early dental caries** <span style="float:right">Apr. 2021. - Aug. 2021</span>
- 10-fold cross-validation for multimodal datasets from segmentation and classification models.
- Used skills: Python, TensorFlow, Keras

## EDUCATION

| Mar. 2019 - Aug. 2021 | M.S. in Electrical Engineering & Computer Science at **DGIST** | (GPA: 4.06/4.3) |
| Mar. 2014 - Feb. 2019 | Bachelor of Engineering at **DGIST** | (Best Project Award) |
| | - Thesis: Development of a screw motion haptic device for Osteosynthesis | |

## SELECTED PUBLICATIONS

**Hah Min Lew**, et al., **"Towards High-Fidelity Head Swapping with Chroma Keying"**, In Submission Soon.

K. Lee, **Hah Min Lew**, et al., **"CSS-Net: Classification and Substitution for Segmentation of Rotator Cuff Tear"**, In **ACCV 2022**.

M. H. Lee, **Hah Min Lew**, et al., **"Deep learning-based framework for fast and accurate acoustic hologram generation"**, IEEE TUFFC (IF: 3.267, **Frontal Cover Paper**), 2022.

T. C. Cavalcanti, **Hah Min Lew**, et al, **"Intelligent Smartphone-based Multimode Imaging Otoscope for the Mobile Diagnosis of Otitis Media"**, Biomedical Optics Express (IF: 3.562, **Spotlight on Optics**), 2021.

**Hah Min Lew**, et al., **"Ultrasonic Blood Flowmeter with a Novel Xero Algorithm for a Mechanical Circulatory Support System"**, Ultrasonics (IF: 4.062), 2021.

J. Kim, **Hah Min Lew**, et al., **"Forward-looking Multimodal Endoscopic System based on Optical Multispectral and High-frequency Ultrasound Imaging techniques for Tumor Detection"**, **IEEE TMI (IF: 11.037)**, 2020.

## SKILLS

| Programming | Python, PyTorch, TensorFlow, MATLAB | Docker, Git |
| Languages | Korean (native), English (professional working proficiency, TOEIC 920 in 2018) |

# Awards

**Outstanding Poster Award** Aug. 2021

 - 2021 Student Conference, DGIST

**Outstanding Paper Award** May. 2021

 - 2021 Spring Conference, The Korean Society of Medical & Biological Engineering (KOSOMBE)

**Best Project Award** Mar. 2017

 - 2016 Undergraduate Group Research Project (UGRP) Program, DGIST

# Scholarships

**Full Government Scholarships** Mar. 2019 - Aug. 2022

 - Full tuition exemptions for 7 semesters
 - Stipend for 7 semesters

**Full Government Scholarships** Mar. 2014 - Feb. 2019

 - Full tuition exemptions for 8 semesters
 - School expenses supports for 8 semesters
 - Scholarships for 8 semesters