Yohan **Jun**

Postdoctoral Research Fellow, Ph.D.

Athinoula A. Martinos Center for Biomedical Imaging, Bldg 149 13th St Rm 2301, Charlestown MA 02129

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Research Interests

Magnetic Resonance Imaging Fast Magnetic Resonance Imaging (MRI), MR Image Reconstruction, Rapid MR Parameter Mapping

Computer-aided Diagnosis (CAD) Automatic Detection, Segmentation, and Diagnosis using Medical Images

Education

Yonsei University — *Seoul, S.Korea*

Ph.D. in Electrical & Electronic Engineering — *Mar. 2016 - Feb. 2022*

- **Thesis:** "Model-based Deep Learning Reconstruction Methods for Fast Magnetic Resonance Imaging"
- **Scholarship:** Brain Korea 21 Plus Outstanding Student Fellow Scholarship of Korea Research Foundation

Yonsei University — *Seoul, S.Korea*

B.S. in Electrical & Electronic Engineering — *Mar. 2012 - Feb. 2016*

- **Scholarship:** National Scholarship for Science & Engineering of Korea Student Aid Foundation

Research Experience

Athinoula A. Martinos Center for Biomedical Imaging — *Boston, US*

Research Fellow @ Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital (MGH), Harvard Medical School (HMS), **Advisor: Prof. Berkin Bilgic, Prof. Michael Gee** — *Mar. 2022 - Now*

- **Accelerating Quantitative MRI**
  1. **Subspace Reconstruction for Multiparametric Mapping:**
     - Developed a zero-shot deep subspace reconstruction network (**Zero-DeepSub**) for fast multiparametric quantiative MRI.
  2. **Rapid Quantitative MRI:**
     - Developed a self-supervised learning scheme for multiparametric mapping using QALAS (**SSL-QALAS**).
- **Rapid and Motion-Robust Fetal and Pediatric Imaging**
  - **Advanced HASTE imaging:** Developing a fast and motion-robust T2-weighted fetal/pediatric imaging.

Yonsei University — *Seoul, S.Korea*

Research Assistant @ Medical Artificial Intelligence Lab, **Advisor: Prof. Dosik Hwang** — *Jan. 2016 - Feb. 2022*

- **Accelerating MR Imaging with Deep Learning Techniques**
  1. **Accelerating MRI:**
     - Developed a joint deep model-based MR image and coil sensitivity reconstruction network (**Joint-ICNet**) for fast MRI.
     - Validated domain-transform manifold learning in phase-encoding direction for accelerating cartesian MRI (**DOTA-MRI**).
     - Implemented cross-domain CNNs (**KIKI-net**) for reconstructing undersampled MR images.
  2. **Rapid MR Parameter Mapping:** Developed a deep model-based MR parameter mapping network (**DOPAMINE**) for a fast T1 mapping.
  3. **Parallel Imaging in TOF-MRA:** Developed a deep multistream CNNs (**DPI-net**) for parallel imaging in TOF-MRA.
- **Computer-aided Diagnosis (CAD) for Brain Tumors**
  1. **Metastasis:** Developed a deep learning model for automatic detection and segmentation of brain metastases.
  2. **Meningioma:** Implemented meningioma segmentation and grading models using two-stage deep learning models.
  3. **Glioblastoma:** Developed an automatic deep-learning-based segmentation model for glioblastoma analysis.
- **MRI Applications**
  1. **Standardization of Quantitative MRI:** Developed a deep-learning-based model for standardization of MOLLI T1 mapping.
  2. **Increasing MRI SNR:** Analyzed a denoising method based on tissue characteristics for High-SNR multiple T2(*)-contrast MRI.
  3. **MRI-compatible Sensor:** Validated a megahertz-wave-transmitting conducting polymer electrode (MRI-compatible pressure sensor).

Philips Korea — *Seoul, S.Korea*

Internship — *Oct. 2017 - Dec. 2017*

- DFI Project Intern

Philips Korea & Gyrotools — *Seoul, S.Korea*

Course Certificate — *Sep. 25-30. 2017*

- Philips Pulse Programming Course

Teaching Experience

Yonsei University — *Seoul, S.Korea*

Guest Lecturer, Teaching Assistant — *Sep. 2021 - Dec. 2021*

- **Introduction Artificial Intelligence**
  - Presented a lecture on principles of deep learning and convolutional neural networks

Guest Lecturer, Teaching Assistant — *Mar. 2021 - Jun. 2021*

- **Medical Imaging Artificial Intelligence**
  - Presented a lecture on MR image reconstruction using deep learning methods

Guest Lecturer, Teaching Assistant — *Sep. 2020 - Dec. 2020*

- **Medical Artificial Intelligence**
  - Presented a lecture on principles of MRI and reconstruction methods for fast MRI

Teaching Assistant — *Mar. 2018 - Jun. 2018*

- **Introduction to Bioengineering for Electrical and Electronic Engineering**

Teaching Assistant — *Mar. 2017 - Jun. 2017*

- **Electrical and Electronic Engineering Capstone Design**

Honors & Awards

International

2021	**1st Rank**, Cross-Modality Domain Adaptation for Medical Image Segmentation (crossMoDA-2021 challenge)	*Virtual Conference*
2021	**ISMRM Magna Cum Laude (1)**, The ISMRM 29th Annual Meeting	*Virtual Conference*
2021	**ISMRM Magna Cum Laude (2)**, The ISMRM 29th Annual Meeting	*Virtual Conference*
2020	**3rd Rank**, fastMRI Challenge 2020, Facebook AI Research & NYU Langone Health	*Virtual Conference*
2020	**ISMRM Summa Cum Laude**, The ISMRM 28th Annual Meeting	*Virtual Conference*
2020	**ISMRM The Poster Award of 2nd Place (Silver)**, 2020 ISMRM Workshop on Data Sampling & Image Reconstruction	*Sedona, US*
2019	**4th Rank**, fastMRI Challenge 2019, Facebook AI Research & NYU Langone Health	*Vancouver, Canada*
2017	**ISMRM Summa Cum Laude**, The ISMRM 25th Annual Meeting	*Hawaii, US*

Domestic

2021	**Excellence Award**, Medical Artificial Intelligence Datathon 2021, Ministry of Science and ICT and National Information Society Agency	*Seoul, S.Korea*
2021	**Excellence Award**, Hackathon of Development of AI-based Image Diagnosis using Medical Big Data 2021, Korea Testing Laboratory (KTL)	*Seoul, S.Korea*
2021	**Best Paper Award**, Graduate Student Paper Award, Yonsei University	*Seoul, S.Korea*
2019	**Participation Prize**, Samsung Humantech Paper Award (first author)	*Seoul, S.Korea*
2019	**1st Rank and Grand Prize**, HeLP Challenge 2018, Brain Tumor Segmentation Contest	*Seoul, S.Korea*
2018	**Participation Prize**, Samsung Humantech Paper Award (co-author)	*Seoul, S.Korea*
2017	**Grand Prize**, Yonsei Junior Convergence Science	*Seoul, S.Korea*

Scholarship

2023	**ISMRM Trainee Stipend**, ISMRM Workshop on Data Sampling and Image Reconstruction	*US*
2021	**Dissertation Fellowship**, Graduate Students Idea Incubation Fund, Yonsei University	*S.Korea*
2021	**Academy Research Fellowship**, Graduate Students Idea Incubation Fund, Yonsei University	*S.Korea*
2021	**Best Paper Award Scholarship**, Graduate Student Paper Award, Yonsei University	*S.Korea*
2020	**ISMRM Trainee Stipend**, ISMRM Workshop on Data Sampling and Image Reconstruction	*US*
2017-2019	**ISMRM Educational Stipend**, ISMRM	*US*
2019	**Brain Korea 21 Plus Outstanding Student Fellow Scholarship**, Korea Research Foundation	*S.Korea*
2018	**Teaching Assistant Scholarship**, Yonsei Univeristy	*S.Korea*
2017-2020	**Brain Korea 21 Plus Scholarship**, Korea Research Foundation	*S.Korea*
2016	**Research Assistant Scholarship**, Yonsei Univeristy	*S.Korea*
2012-2015	**National Scholarship for Science & Engineering**, Korea Student Aid Foundation	*S.Korea*

Invited Talk

Deep Model-based MR Parameter Mapping Network (DOPAMINE) for Fast MR Reconstruction — *Seoul, S.Korea*

34th KSIIM Conference, 2020 — *17. Oct. 2020*

- Korean Society of Imaging Informatics in Medicine

Medical Imaging Research using Artificial Intelligence — *Seoul, S.Korea*

HUFS AIM LAB, 2020 — *7. Jan. 2020*

- The Catholic University of Korea, Eunpyeong St. Mary's Hospital

Publications - Preprints

COSMOS: Cross-Modality Unsupervised Domain Adaptation for 3D Medical Image Segmentation based on Target-aware Domain Translation and Iterative Self-Training — *2022*

H Shin, H Kim, S Kim, **Y Jun**, T Eo, D Hwang

- *arXiv preprint arXiv:2203.16557*

Publications - Peer-Review Journal

Ultrathin crystalline-silicon-based strain gauges with deep learning algorithms for silent speech interfaces — *2022*

T Kim*, Y Shin*, K Kang*, K Kim*, G Kim*, Y Byeon*, …, JR Lee, G Son, T Kim, **Y Jun**, …, HG Kang, D Hwang, KJ Yu

- *Nature Communications*, 13:5815

Results of the 2020 fastMRI Challenge for Machine Learning MR Image Reconstruction — *2021*

MJ Muckley*, B Riemenschneider*, …, **Y Jun**, H Shin, D Hwang, …, Florian Knoll

- *IEEE Transactions on Medical Imaging*, 40(9):2306-2317

Deep model-based magnetic resonance parameter mapping network (DOPAMINE) for fast T1 mapping using variable flip angle method — *2021*

Y Jun, H Shin, T Eo, T Kim, D Hwang

- *Medical Image Analysis*, 70:102017

Robust performance of deep learning for automatic detection and segmentation of brain metastases using three-dimensional black-blood and three-dimensional gradient echo imaging — *2021*

YW Park*, **Y Jun***, Y Lee, K Han, C An, SS Ahn, D Hwang, SK Lee

- *Co-first Authors, *European Radiology*, 31:6686-6695

The Latest Trends in Attention Mechanisms and Their Application in Medical Imaging — *2020*

H Shin, J Lee, T Eo, **Y Jun**, S Kim, D Hwang

- *Journal of the Korean Society of Radiology*, 81(6):1305-1333

Accelerating Cartesian MRI by domain-transform manifold learning in phase-encoding direction — *2020*

T Eo*, H Shin*, **Y Jun**, T Kim, D Hwang

- *Medical Image Analysis*, 63:101689

Parallel imaging in time-of-flight magnetic resonance angiography using deep multistream convolutional neural networks — *2019*

Y Jun, T Eo, H Shin, T Kim, HJ Lee, D Hwang

- *Magnetic Resonance in Medicine*, 81(6):3840-3853

Megahertz-wave-transmitting conducting polymer electrode for device-to-device integration — *2019*

T Kim, G Kim, H Kim, HJ Yoon, T Kim, **Y Jun**, TH Shin, S Kang, J Cheon, D Hwang, BW Min, W Shim

- *Nature Communications*, 10:653

Deep-learned 3D black-blood imaging using automatic labelling technique and 3D convolutional neural networks for detecting metastatic brain tumors *2018*

Y Jun, T Eo, T Kim, H Shin, D Hwang, SH Bae, YW Park, HJ Lee, BW Choi, SS Ahn

- *Scientific Reports*, 8:9450

KIKI-net: cross-domain convolutional neural networks for reconstructing undersampled magnetic resonance images *2018*

T Eo, Y Jun, T Kim, J Jang, HJ Lee, D Hwang

- *Magnetic Resonance in Medicine*, 80(5):2188-2201

High-SNR multiple T2 (*)-contrast magnetic resonance imaging using a robust denoising method based on tissue characteristics *2017*

T Eo, T Kim, Y Jun, H Lee, SS Ahn, DH Kim, D Hwang

- *Journal of Magnetic Resonance Imaging*, 45(6):1835-1845

Publications - Conference Papers

Evaluation of the Robustness of Learned MR Image Reconstruction to Systematic Deviations Between Training and Test Data for the Models from the fastMRI Challenge *2021*

PM Johnson, …, H Shin, Y Jun, T Eo, S Kim, T Kim, D Hwang, …, F Knoll

- *International Workshop on Machine Learning for Medical Image Reconstruction (MLMIR)*, pp. 25-34

Joint Deep Model-based MR Image and Coil Sensitivity Reconstruction Network (Joint-ICNet) for Fast MRI *2021*

Y Jun, H Shin, T Eo, D Hwang

- *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 5266-5275

Translation of 1D Inverse Fourier Transform of K-space to an Image Based on Deep Learning for Accelerating Magnetic Resonance Imaging *2018*

T Eo, H Shin, T Kim, Y Jun, D Hwang

- *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, pp. 241-249

Publications - Conference Abstracts

Deep Subspace Reconstruction with Zero-Shot Learning for Multiparametric Quantitative MRI *2023*

Y Jun, Y Arefeen, J Cho, X Wang, M Gee, B Gagoski, B Bilgic

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on Data Sampling and Image Reconstruction*

Interpretable Meningioma Grading and Segmentation with Multiparametric Deep Learning *2022*

Y Jun*, YW Park*, H Shin, Y Shin, JR Lee, K Han, SM Lim, SK Lee, SS Ahn, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Joint Generation of Multi-contrast Magnetic Resonance Images and Segmentation Map Using StyleGAN2-based Generative Network *2022*

G Son, T Eo, Y Jun, H Shin, D Hwang

- **[*Oral Presentation]**, *International Society for Magnetic Resonance in Medicine (ISMRM)*

Arbitrary Missing Contrast Generation Using Multi-Contrast Generative Network with An Encoder Network *2022*

G Son, Y Jun, S Kim, D Hwang, T Eo

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Deep Learning-based Automatic Detection and Segmentation of Brain Metastases Using Multi-Task Learning with 3D Black-Blood and GRE Imaging *2021*

Y Jun*, YW Park*, Y Lee, K Han, C An, SK Lee, SS Ahn, D Hwang

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM)*

Joint Reconstruction of MR Image and Coil Sensitivity Maps using Deep Model-based Network *2021*

Y Jun, H Shin, T Eo, D Hwang

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM)*

Results of the 2020 fastMRI Brain Reconstruction Challenge *2021*

B Riemenschneider, …, **Y Jun**, H Shin, D Hwang, F Knoll

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM)*

Deep Model-based MR Parameter Mapping Network (DOPAMINE) for Fast MR Reconstruction *2020*

Y Jun, H Shin, T Eo, T Kim, D Hwang

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM)*

Deep Model-based Network for Fast MR Parameter Map Reconstruction *2020*

Y Jun, H Shin, T Eo, T Kim, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on Data Sampling and Image Reconstruction*

Parallel Imaging in Time-of-Flight Magnetic Resonance Angiography Using Deep Multi-Stream Convolutional Neural Networks *2019*

Y Jun, T Eo, H Shin, T Kim, H Lee, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Parallel Imaging based on k-x Domain Interpolation using Deep Neural Networks *2019*

H Shin, T Eo, **Y Jun**, T Kim, H Lee, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Deep-learned 3D black-blood imaging using automatic labeling technique and 3D convolutional neural networks for detection of metastatic brain tumors *2018*

Y Jun, T Eo, T Kim, H Shin, D Hwang, S Bae, Y Park, H Lee, B Choi, S Ahn

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Brain Vessel Extraction without MRA / V using Deep Convolutional Neural Network *2018*

H Shin, **Y Jun**, T Kim, T Eo, S Ahn, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Automatic Selection of Optimal Regularization Parameters in Compressed Sensing using No Reference Magnetic Resonance Image Quality Assessment *2018*

K Bang, J Jang, **Y Jun**, H Jang, H Lee, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Deep Sinogram Learning for Radial MRI: Comparison with k-space and Image Learning *2018*

T Kim, T Eo, D Park, **Y Jun**, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Reconstruction of brain vessel signals from undersampled time-of-flight magnetic resonance angiography using deep learning *2018*

Y Jun, T Eo, H Shin, T Kim, HJ Lee, H Jang, D Hwang

- *The 21th Annual Meeting of the the Korean Society for Brain and Neural Sciences (KSBNS)*

Deep Convolutional Neural Network for Acceleration of Magnetic Resonance Angiography (MRA) *2017*

Y Jun, T Eo, T Kim, J Jang, D Hwang

- **[*Oral Presentation]** *International Society for Magnetic Resonance in Medicine (ISMRM)*

Cascaded convolutional neural network (CNN) for reconstruction of undersampled magnetic resonance (MR) images *2017*

T Eo, **Y Jun**, T Kim, J Jang, D Hwang

- *International Society for Magnetic Resonance in Medicine (ISMRM)*

Patents

2021	**Method And Device For Correcting Medical Image Using Phantom**, Applied, 10-2021-0008478	*S.Korea*
2020	**Apparatus And Method For Reconstructing MR Parameter Map**, Applied, 10-2020-0051216	*S.Korea*
2020	**Deep Model-based MR Parameter Mapping Network for Fast MR Reconstruction**, Applied, 10-2020-0009479	*S.Korea*
2021	**Makeup evaluation system and operation method thereof**, Registered, US11113511B2	*US*
2019	**Makeup evaluation system and operation method thereof**, Applied, EP3579176A1	*Europe*
2019	**Capacitive Pressure Sensor And Method Of The Same**, Applied, 10-2019-0145371	*S.Korea*
2018	**Device And Method For Reconstructing Magnetic Resonance Image Thereof**, Registered, 10-2233996	*S.Korea*
2018	**Make-up Evaluation System and Operating Method Thereof**, Applied, 10-2018-0012931	*S.Korea*
2017	**Learning Apparatus and Method for Generating Encephaloma Discriminative Image, Apparatus and Method for Generating Encephaloma Discriminative Image, and Recording Medium thereof**, Registered, 10-1928213	*S.Korea*
2017	**Device and Method for Reconstructing Undersampled Magnetic Resonance Image**, Registered, 10-1886575	*S.Korea*

Skills

Programming Languages Python, Matlab, Pytorch, Tensorflow, C/C++
Korean, English

Activities

Reviewer
- IEEE Transactions on Medical Imaging (IEEE TMI)
- IEEE Sensors Letters
- Magnetic Resonance in Medicine
- International Society for Magnetic Resonance in Medicine (ISMRM 2022-2023)
- International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2020-2022)

Poster Facilitator
- International Society for Magnetic Resonance in Medicine (ISMRM 2021)

Membership
- Trainee Memmber of International Society for Magnetic Resonance in Medicine (ISMRM)

ISMRM Study Groups
- Quantitative MR
- Pediatric MR
- High Field Systems and Applications
- MR of Cancer
- MR Engineering

References

Available upon request