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Research Interest

- *Machine Learning* : Deep neural network & Reinforcement learning for image/video processing, Implicit Neural representation
- *Signal Processing* : Reproducing Kernel Hilbert Space, Sampling Theory, B-spline, Finite Ratio Innovation
- *Applications* : Image Processing (inpainting, denoising, super resolution, warping), Video Processing (motion estimation, video super resolution, codec), 1D Signal Processing (speech, OFDM communication, etc.)

Work Experience

- **Assistant Professor (2021.02~ present)**, DGIST, Dept. of Electrical Engineering and Computer Science (EECS),
- **Staff Engineer (2019.09~ 2021.02)**, Samsung Reserach, Camera T/F - Global AI Center
- **Postdoc. (2016.06~ 2019.08)**, École polytechnique fédérale de Lausanne (EPFL), Biomedical Imaging Group (PI : Michael Unser)
- **Postdoc. (2015.03~2016.05)**, Korea Advanced Institute of Science and Technology (KAIST), Bioimaging Signal Processing Lab. (PI : Jong Chul, Ye)

Education

- **Ph.D. (2015)** , Korea Advanced Institute of Science and Technology (KAIST), Dept. of Bio and Brain Engineering, South Korea.
 - Thesis : High speed imaging system and interpolation algorithm for irregularly undersampled data
 - Advisor : Jong Chul, Ye, Ph.D.
 - Keyword : Structured low rank matrix completion, Annihilation filter, Hankel matrix, image inpainting, irregular sampling, parallel MRI, dynamic MRI, Compressed sensing, ADMM
- **B.S. (2008)**, Korea Advanced Institute of Science and Technology (KAIST), Dept. of Bio and Brain Engineering, South Korea.

Peer-reviewed Publications

- W. K. Han, B. Lee, S. H. Park, and K. H. Jin, “ABCD : Arbitrary Bitwise Coefficient for De-quantization,” *Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)* , 2023, accepted.
- B. Pak, J. Lee, and K. H. Jin, “B-spline Texture Coefficients Estimator for Screen Content Image Super-Resolution,” *Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)* , 2023, accepted.

- S. Shin, M. W. Kim, K. H. Jin, K. M. Yi, Y. Kohmura, T. Ishikawa, J. H. Je, and J. Park, “Deep 3D reconstruction of synchrotron X-ray computed tomography for intact lungs,” *Scientific Reports* 13, Article number:1738, 2023
- J. Lee, K. P. Choi, K. H. Jin, “Learning Local Implicit Fourier Representation for Image Warping,” *Proc. European Conference on Computer Vision (ECCV)*, 2022.
- J. Lee, K. H. Jin, “Local Texture Estimator for Implicit Representation Function,” *Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.
- J. Yoo, K. H. Jin, H. Gupta, J. Yerly, M. Stuber, and M. Unser, “Time-dependent Deep Image Prior for Dynamic MRI,” *IEEE Trans. on Medical Imaging* 40.12 (2021): 3337-3348, 2021
- K. H. Jin, “Deep Block Transform for Autoencoders,” *IEEE Signal Processing Letters*, vol.28: 1016-1019, 2021
- J. Min, K. H. Jin, M. Unser, and J. C. Ye, “Grid-Free Localization Algorithm Using Low Rank Hankel Matrix For Super-Resolution Microscopy,” *IEEE Trans. on Image processing*, vol. 27, no. 10, pp. 4771-4786, Oct. 2018.
- K. Lee, Y. Li, K. H. Jin, and J. C. Ye, “Unified Theory for Recovery of Sparse Signals in a General Transform Domain,” *IEEE Trans. on Information Theory*, vol. 64, no. 8, pp. 5457-5477, Aug. 2018.
- H. Gupta, K. H. Jin, Ha. Nguyen, M. T. McCann and M. Unser, “CNN-Based Projected Gradient Descent for Consistent Image Reconstruction,” *IEEE Trans. on Medical imaging*, vol. 37, no. 6, pp. 1440-1453, June 2018.
- H. Choi[†] and K. H. Jin[†], “Predicting cognitive decline with deep learning of brain metabolism and amyloid imaging,” *Behavioural Brain Research*, vol 344, (2018), pp 103-109. [†] co-first author
- K. H. Jin and J. C. Ye, “Sparse and Low-Rank Decomposition of a Hankel Structured Matrix for Impulse Noise Removal,” *IEEE Trans. on Image processing*, vol. 27, no. 3, pp. 1448-1461, March 2018.
- M. T. McCann, K. H. Jin, and M. Unser, “Convolutional Neural Networks for Inverse Problems in Imaging: A Review.” *IEEE Signal Processing Magazine*, vol. 34, no. 6, pp. 85-95, Nov. 2017.
- K. H. Jin, M. T. McCann, E. Frosty, and M. Unser, “Deep Convolutional Network for Inverse Problems in Imaging,” *IEEE Trans. on Image processing*, vol. 26, no. 9, pp. 4509-4522, Sept. 2017.
- J. C. Ye, J. M. Kim, K. H. Jin, and K. Lee, “Compressive Sampling using Annihilating Filter-based Low-Rank Interpolation,” *IEEE Trans. on Information Theory*, vol. 63, no. 2, pp. 777-801, Feb. 2017.
- K. H. Jin, D. Lee, J. Um, J. Lee, S. Park and J. C. Ye, “MRI artifact correction using sparse + low-rank decomposition of annihilating filter-based Hankel matrix,” *Magnetic Resonance in Medicine* 78, no. 1 (2017): 327-340.
- H. Choi[†] and K. H. Jin[†], “Fast and robust segmentation of the striatum using deep convolutional neural networks,” *Journal of Neuroscience Methods* 274 (2016): 146-153, [†] co-first author
- K. H. Jin, D. Lee, and J. C. Ye, “A general framework for compressed sensing and parallel MRI using annihilating filter based low-rank Hankel matrix,” *IEEE Trans. on Computational Imaging*, vol. 2, no. 4, pp. 480-495, Dec. 2016.
- D. Lee[†], K. H. Jin[†], E. Kim, S. Park, and J. C. Ye “Acceleration of MR parameter mapping using annihilating filter-based low rank Hankel matrix (ALOHA),” *Magnetic Resonance in Medicine* 76, no. 6 (2016): 1848-1864, [†] co-first author
- J. Lee[†], K. H. Jin[†], and J. C. Ye, “Reference-free single-pass EPI Nyquist ghost correction using annihilating filter-based low rank Hankel structured matrix,” *Magnetic Resonance in Medicine* 76, no. 6 (2016): 1775-1789, [†] co-first author
- K. H. Jin and J. C. Ye, “Annihilating filter based low rank Hankel matrix approach for image inpainting,” *IEEE Trans. on Image Processing*, vol. 24, no. 11, pp. 3498-3511, Nov. 2015.

- J. Lim, K. Lee, K. H. Jin, S. Shin, S. Lee, Y. Park, and J. C. Ye, "Comparative study of iterative reconstruction algorithms for missing cone problems in optical diffraction tomography", *Optics Express* 23, no. 13 (2015): 16933-16948.
- D. Yee, K. H. Jin, J. S. Yahng, H. Yang, C. Y. Kim, and J. C. Ye, "High-speed terahertz reflection three-dimensional imaging using beam steering," *Optics Express* 23, no. 4 (2015): 5027-5034.
- K. H. Jin, Y. Kim, S. H. Cho, J. C. Ye, and D. Yee, "High-speed terahertz reflection three-dimensional imaging for nondestructive evaluation," *Optics Express* 20, no. 23 (2012): 25432-25440.
- M. Yi, H. Kim, K. H. Jin, J. C. Ye, and J. Ahn "Terahertz substance imaging by waveform shaping," *Optics Express* 20, no. 18 (2012): 20783-20789.
- S. Park, K. H. Jin, M. Yi, J. C. Ye, J. Ahn, and K. Jeong, "Enhancement of Terahertz Pulse Emission by Optical Nanoantenna," *ACS Nano* 6, no. 3 (2012): 2026-2031.
- Y. Kim, K. H. Jin, J. C. Ye, J. Ahn, D. S. Yee, "Wavelet Power Spectrum Estimation for High-resolution Terahertz Time-domain Spectroscopy," *Journal of the Optical Society of Korea* 15, no. 1 (2011): 103-108.
- K. H. Jin and J. C. Ye, "Recent Trends of Terahertz spectroscopy/imaging," *Journal of Korea institute of electromagnetic engineering and science* 21(4) (2010): 33-42. (Invited review)
- K. Lee, K. H. Jin, J. C. Ye, and J. Ahn, "Coherent optical computing for T-ray imaging," *Optics Letters* 35, no. 4 (2010): 508-510.
- K. H. Jin, Y. C. Kim, D. S. Yee, O. K. Lee, and J. C. Ye, "Compressed sensing pulse-echo mode THz reflectance tomography," *Optics Letters* 34, no. 24 (2009): 3863-3865

Patent

- J. C. Ye, K. H. Jin, K. Kim, Method and apparatus for restoring image, Korea Patent (10-2015-0183431) & USA, 2015 (pending)
- J. C. Ye, K. H. Jin, J. Lee, Reference-free EPI Nyquist ghost correction using annihilating filter-based low rank Hankel structured matrix in MRI, Korea Patent (10-2015-0146208) & PCT & USA & China, 2015 (pending)
- J. C. Ye, K. H. Jin, Y. Han, Interior tomography reconstruction algorithm using the low rank Fourier interpolation method, Korea Patent, 10-2015-0098149, 2015 (pending)
- J. C. Ye, K. H. Jin, Low-rank patch-based block Hankel structured matrix for image inpainting, Korea Patent, 10-2015-0034082, 2015 (pending)
- J. C. Ye, K. H. Jin, Reconstruction algorithm using annihilating filter for accelerated MR imaging, Korea Patent (10-2015-0034081) & USA, 2015 (pending)

Before 2015, 5 patents(1 international) have been pending.

Reviewer Service

Regular reviewer for

IEEE Trans. on (Image Processing, Signal Processing, Computational Imaging, Medical Imaging, Biomedical Engineering, Cybernetics, Instrumentation & Measurement, Circuits and Systems for Video Technology, Multimedia), IEEE Signal Processing Letters, IEEE Signal Processing Magazine, IEEE Access, Neurocomputing, Journal of Electronic Imaging, ICASSP (International Conference on Acoustics, Speech and Signal Processing), SPARS (Signal Processing with Adaptive Sparse Structured Representations), ISBI (International Symposium of Biomedical Imaging), LVA-ICA (International Conference on Latent Variable Analysis and Signal Separation), WACV, ACCV, ICCV, CVPR 2020/2021/2022, ECCV 2020/2022, ICLR2022, ISIT 2022, etc.

Invited Speach

- “Local Texture Estimator for Implicit Neural Representation,” UNIST Colloquium, 06APR2022, South Korea
- “Time-dependent Neural Network for Unsupervised Dynamic MRI Reconstructions,” ICAMD, 08DEC2021, Jeju, South Korea
- “Implicit Fourier representation for arbitrary-scale super resolutions,” Korean Computer Vision Society, 29NOV2021, South Korea
- “Machine Learning,” Gachon University, 18NOV2021, South Korea
- “Deep Networks for Inverse Problems : Application to Biomedical Imaging,” Korean Basic Science Institute, 05Dec 2019, South Korea
- “Deep Convolutional Neural Network for Inverse Problems in Imaging,” Turing/LMS Workshop, Inverse Problems and Data Science, 8-10 May 2017, Edinburgh, UK

Awards

- 2019 IEEE SPS Best Paper Award for the noted paper : Kyong Hwan Jin, Michael T. McCann, Emmanuel Froustey, and Michael Unser, “Deep Convolutional Neural Network for Inverse Problems in Imaging” IEEE Transactions on Image Processing, Volume 26, No. 9, September 2017
- Grant on EPFL Fellows co-funded by Marie Skłodowska-Curie (2015 call, European Union’s Horizon 2020)
(<http://research-office.epfl.ch/funding/internal-non-profit/epfl-fellows-marie-curie>)
- Samsung Humantech Paper Award - Silver Medal (2015, South Korea),
(<https://humantech.samsung.com/saitext/index.jsp>)
- Samsung Humantech Paper Award - Participation Prize (2004, South Korea)
- The Presidential Science Scholarship (2004-2008, South Korea)

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