# Dr. Hengtao He

Department of Electronic & Computer Engineering
Hong Kong University of Science and Technology
E-mail: eehthe@ust.hk

## Education

2021.1-    Hong Kong University of Science and Technology (HKUST)
*Postdoctoral Research Fellow in Dept of Electronic & Computer Engineering*
**Supervisor: Prof. Khaled B. Letaief** *Member of US National Academy of Engineering and New Bright Professor of Engineering in HKUST*

2018.10-2020.10  Georgia Institute of Technology (Gatech)
*Visiting Scholar in Dept of Electronic & Computer Engineering*

**Supervisor: Prof. Geoffrey Ye Li** *Professor, Dept of Electronic & Computer Engineering*

2017.3-2017.5  National Sun Yat-Sen University (NSYSU)
*Visiting Scholar in Institute of Communications Engineering*

**Supervisor: Prof. Chao-Kai Wen** *Professor, Institute of Communications Engineering*

2015.9-2020.10  Southeast University (SEU)
*Ph.D. in Information and Communications Engineering*

**Supervisor: Prof. Shi Jin** *Professor, College of Information Science and Engineering*

2011.9-2015.6  Nanjing University of science and technology (NJUST)
*B.Eng. in Communications Engineering*

## Research interests

- Machine learning for wireless communications.

- MmWave and cell-free massive MIMO.

- Integrated communication and sensing.

- Message passing algorithms.

## Honors and Awards

2022    Excellent Dissertation Award at Jiangsu Province
(Only 100 doctoral dissertations in 2022 for all disciplines)

2022    Excellent Dissertation Award at SEU

2015    Outstanding Graduate Student in NJUST

## Research Publications

[B1] **H. He**, H. Ye, S. Jin, and G. Y. Li, "Machine Learning based Channel Estimation and Signal Detection" in *Machine Learning and Wireless Communications*, Cambridge University Press, 2022.

[J1] **H. He**, S. Jin, C.-K. Wen, F. Gao, G. Y. Li, and Z. Xu, "Model-driven deep learning for physical layer communications", *IEEE Wireless Communications*, vol. 26, no. 5, pp. 77-83, Oct. 2019. (*IEEE ComSoc Best Readings*, *ESI Highly Cited Paper*)

[J2] **H. He**, C.-K. Wen, S. Jin, and G. Y. Li, "Model-driven deep learning for MIMO detection," *IEEE Trans. Signal Process.*, vol. 68, pp. 1702-1715, Mar. 2020. (*IEEE ComSoc Best Readings*, *ESI Highly Cited Paper*)

[J3] **H. He**, C.-K. Wen, and S. Jin, "Bayesian optimal data detector for hybrid mmWave MIMO-OFDM systems with low-resolution ADCs," *IEEE J. Sel. Topics Signal Processing.*, vol. 12, no. 3, pp. 469-483, June 2018.

[J4] **H. He**, C.-K. Wen, S. Jin, and G. Y. Li, "Deep learning-based channel estimation for beamspace mmWave massive MIMO systems," *IEEE Wireless Commun. Lett.*, vol. 7, no. 5, pp. 852-855, Oct. 2018. (*IEEE ComSoc Best Readings*, *ESI Highly Cited Paper*)

[J5] **H. He**, M. Zhang, S. Jin, C.-K. Wen, and G. Y. Li, "Model-driven deep learning for massive MU-MIMO with finite-alphabet precoding," *IEEE Commun. Lett.*, vol. 24, no. 10, pp. 2216-2220, Oct. 2020.

[J6] **H. He**, R. Wang, W. Jin, S. Jin, C.-K. Wen, and G. Y. Li,"Beamspace channel estimation for wide-band millimeter-wave MIMO: A model-driven unsupervised learning approach," *IEEE Trans. Wireless Commun.*, early access, doi: 10.1109/TWC.2022.3206773.

[J7] **H. He**, H. Wang, X. Yu, J. Zhang, S.H. Song, and K. B. Letaief, "Cell-Free Massive MIMO Detection: A Distributed Expectation Propagation Approach," *submitted to* **IEEE Trans. Wireless Commun.**, Nov. 2021.

[J8] **H. He**, X. Yu, J. Zhang, S.H. Song, and K. B. Letaief, "Cell-free massive MIMO for 6G wireless communication networks," *J. Commun. Inf. Netw.*, vol. 6, no. 4, pp. 321-335, Dec. 2021. (**Invited Paper**)

[J9] Y. He, **H. He**, C.-K. Wen, and S. Jin, "Model-driven deep learning for massive multiuser MIMO constant envelope precoding," *IEEE Wireless Commun. Lett.*, vol. 9, no. 11, pp. 1835-1839, Nov. 2020.

[J10] W. Yu, Y. Shen, **H. He**, X. Yu, S.H. Song, J. Zhang, and K. B. Letaief, "An adaptive and robust deep learning framework for THz ultra-massive MIMO channel estimation,", *submitted*, 2022.

[C1] **H. He**, C.-K. Wen, and S. Jin, "Generalized expectation consistent signal recovery for nonlinear measurements," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Jun. 2017, pp. 2333-2337.

[C2] **H. He**, C.-K. Wen, S. Jin, and G. Y. Li, "A model-driven deep learning network for MIMO detection," in *Proc. IEEE Glob. Conf. Signal Inf. Process.*, Anaheim, CA, Nov. 2018, pp. 584-588.

[C3] **H. He**, H. Wang, X. Yu, J. Zhang, S.H. Song, K. B. Letaief, "Distributed expectation propagation detection for cell-free massive MIMO," in *Proc. IEEE Global Commun. Conf. (GLOBECOM)*, Madrid, Spain, 2021.

[C4] **H. He**, A. Kosasih, X. Yu, J. Zhang, S.H. Song, W. Hardjawana, and K. B. Letaief, "Graph neural network enhanced approximate message passing for MIMO detection," in *Proc. IEEE Wireless Commun. and Netw. Conf.(WCNC)*, Glasgow, Scotland, UK, March. 2023.

[C5] R. Wang, **H. He**, S. Jin, X. Wang, and X. Hou, "Channel estimation for millimeter wave massive MIMO systems with low-resolution ADCs," in *Proc.IEEE Int. Workshop Signal Process. Adv. Wireless Commun.(SPAWC)*, Cannes, France, 2019.

[C6] J. Zhang, **H. He**, C.-K. Wen, S. Jin, and G. Y. Li,"Deep learning based on orthogonal approximate message passing for CP-free OFDM," in *Proc. IEEE Int. Conf. Acoust., Speech Signal Process. (ICASSP)*, Brighton, U.K., May. 2019, pp. 1-6.

[C7] J. Zhang, **H. He**, X. Yang, C.-K. Wen, S. Jin, and X. Ma, "Model-driven deep learning based Turbo-MIMO receiver," in *Proc. IEEE Int. Workshop Signal Process. Adv. Wireless Commun.(SPAWC)*, 2020.

[C8] W. Jin, **H. He**, C.-K. Wen, S. Jin, and G. Y. Li, "Adaptive channel estimation based on model-driven deep learning for wideband mmWave Systems," in *Proc. IEEE Global Commun. Conf. (GLOBECOM)*, Madrid, Spain, Dec. 2021.

[C9] W. Yu, Y. Shen, **H. He**, X. Yu, J. Zhang, and K. B. Letaief, "Hybrid Far- and Near-Field Channel Estimation for THz Ultra-Massive MIMO via Fixed Point Networks," *Proc. IEEE Global Commun. Conf. (GLOBECOM).*, Rio de Janeiro, Brazil, 2022.

[C10] R. Cao, **H. He**, X. Yu, J. Zhang, S.H. Song, and K. B. Letaief, "Belief Propagation for Near-Field Cooperative Localization and Tracking in 6G Vehicular Networks," *Proc. IEEE Int. Mediterranean Conf. Commun. and Networking (MeditCom)*, 2022.

[C11] W. Yu, **H. He**, X. Yu, S.H. Song, J. Zhang, and K. B. Letaief, "Blind performance prediction for deep learning based ultra-massive MIMO channel estimation", *submitted to IEEE Int. Conf. Commun. (ICC)*, 2022.

# Invited Talks

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**H. He**, "Model-Driven Deep Learning for MIMO Detection," IEEE Signal Processing Society Webinar, Apr. 2022.