Huan WU

Research assistant Professor, Department of Electrical and Electronic Engineering (EEE)
The Hong Kong Polytechnic University (PolyU)
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RESEARCH INTERESTS

- Distributed optical fiber sensing
- Hardware and software co-designed intelligent sensing solution

EDUCATION

The Chinese University of Hong Kong Aug. 2014 – Jul. 2018

Ph.D. Electronic Engineering

Nanjing University of Aeronautics and Astronautics Sep. 2009 – Jun. 2013

B.Eng. Information Engineering

EXPERIENCE

Research Assistant Professor Oct. 2022 – present

Department of Electrical and Electronic Engineering (EEE),

The Hong Kong Polytechnic University, Hong Kong SAR

Postdoc Research Fellow Oct. 2020 – Oct. 2022

Department of Land Surveying and Geo-Informatics (LSGI),

The Hong Kong Polytechnic University, Hong Kong SAR

Postdoc Research Fellow Oct. 2018 – Oct. 2020

Department of Electronic and Information Engineering (EIE),

The Hong Kong Polytechnic University, Hong Kong SAR

Research Assistant Jul. 2013 – Jul. 2014

Department of Information Engineering,

Nanjing University of Aeronautics and Astronautics, China

PUBLICATIONS

[J16] H. Zheng[+], **H. Wu**[+*], D. J. Ma, Y. Miao, L. Zhou, M. Yan, J. Sun, C. Y. Yu, X. L. Ding, C. Lu. "Novel mining conveyor monitoring system based on quasi-distributed optical fiber accelerometer array and self-supervised learning," *Under review*.

[J15] **H. Wu**, H. F. Duan, Wallace Lai, K. Zhu, X. Cheng, H. Yin, B. Zhou, C. C. Lai, C. Lu, and X. L. Ding. "Leveraging optical communication fiber and AI for distributed water pipe leak detection," **IEEE Communications Magazine**, to appear.

[J14] H. Zheng, **H. Wu**[*], C. Y. Leong, Y. Y. Wang, X. L. Shen, Z. Fang, X. Chen, J. X. Cui, D. J. Ma, Y. Miao, L. Zhou, M. Yan, J. Sun, H. Y. Tam, X. L. Ding, C. Lu. "Enhanced quasi-distributed accelerometer array based on phase-OTDR and ultraweak fiber Bragg grating," **IEEE Sensors Journal**, vol. 23, no. 16, pp.18176-18182, 2023.

[J13] X. L. Shen, **H. Wu***, K. Zhu, H. H. Liu, Y. J. Li, H. Zheng, J. L. Li, L. Y. Shao, P. P. Shum, and C. Lu, "Fast and Storage-Optimized Compressed Domain Vibration Detection and Classification for Distributed Acoustic Sensing," **Journal of Lightwave Technology**, early access, 2023.

[J12] Y. Y. Wang, H. Zheng, **H. Wu**, D. M. Huang, C. Y. Yu, and C. Lu. "Coherent OTDR with large dynamic range based on double-sideband linear frequency modulation pulse," **Optics Express**, vol. 31, no. 11, pp. 17165-17174, 2023.

[J11] **H. Wu**, B. Zhou, K. Zhu, C. Shang, H.Y. Tam, and C. Lu. "Pattern recognition in distributed fiber-optic acoustic sensor using an intensity and phase stacked convolutional neural network with data augmentation," **Optics Express**, vol. 29, no. 3, pp. 3269-3283, 2021.

[J10] Z. Y. Zhao+, **H. Wu**+, J. H. Hu, K. Zhu, Y. L. Dang, Y. X. Yan, M. Tang, and C. Lu. "Interference fading suppression in phase-OTDR using space-division multiplexed probes," **Optics Express**, vol. 29, no. 10, pp. 15452-15462, 2021.

[J9] K. Zhu, B. Zhou, **H. Wu***, C. Shang, L. Y. Lu, M. Adeel, Y. Y. Xi, Z. Y. Zhao, H. Y. Tam and C. Lu. "Multipath distributed acoustic sensing system based on phase-sensitive optical time-domain reflectometry with frequency division multiplexing technique," **Optics and Lasers in Engineering**, vol. 142, pp. 106593, 2021.

[J8] **H. Wu**, C. Shang, K. Zhu, and C. Lu, "Vibration detection in distributed acoustic sensor with threshold-based technique: a statistical view and analysis," **Journal of Lightwave Technology**, vol. 39, no. 12, pp. 4082-4093, 2020.

[J7] M. Adeel, C. Shang, D. Hu, **H. Wu**, K. Zhu, A. Raza, C. Lu, "Impact-based feature extraction utilizing differential signals of phase-sensitive OTDR," **Journal of Lightwave Technology**, vol. 38, no. 8, pp. 2539-2546, 2020.

[J6] **H. Wu**+, H. D. Wang+, C. Shu, C. S. Choy, and C. Lu, "BOTDA fiber sensor system based on FPGA accelerated support vector regression," **IEEE Transactions on Instrumentation and Measurement**, vol. 69, no. 6, pp. 3826-3837, 2019.

[J5] **H. Wu**, L. Wang, Z. Zhao, C. Shu, C. Lu, "Support vector machine based differential pulse-width pair Brillouin optical time domain analyzer," **IEEE Photonics Journal**, vol. 10, no. 4, pp. 1-11, 2018.

[J4] **H. Wu**, L. Wang, Z. Zhao, N. Guo, C. Shu, C. Lu, 'Brillouin optical time domain analyzer sensors assisted by advanced image denoising techniques,' **Optics Express**, vol. 26, no. 5, pp. 5126-5139, 2018.

[J3] **H. Wu**, L. Wang, N. Guo, C. Shu, C. Lu, 'Support vector machine assisted BOTDA utilizing combined Brillouin gain and phase information for enhanced sensing accuracy,' **Optics Express**, vol. 25, no. 25, pp. 31210-31220, 2017.

[J2] N. Guo, L. Wang, **H. Wu**, C. Jin, H. Y. Tam, C. Lu, 'Enhanced coherent BOTDA system without trace averaging,' **Journal of Lightwave Technology**, vol. 36, no. 4, pp. 871-878, 2017.

[J1] **H. Wu**, L. Wang, N. Guo, C. Shu, C. Lu, 'Brillouin optical time-domain analyzer assisted by support vector machine for ultrafast temperature extraction,' **Journal of Lightwave Technology**, vol. 35, no. 19, pp. 4159-4167, 2017.

PROJECTS

- Consultancy study on distributed fiber optic system for leak detection for water mains in Anderson Road Quarry Development Site, Jan. 2023 – present
- Novel Mining Conveyor Monitoring System based on Quasi-Distributed Optical Fiber Accelerometer Array and Self-supervised Learning, Jan. 2022 – Jul. 2023

TALKS

Harnessing the power of light: the journey of distributed optical fiber sensors
Chongqing University summer visit to PolyU, July 2023.

Optical fiber sensing applications in real-time assets health monitoring for building structures
Webinar on Application of Automation and Technology in Construction Materials Testing,

Organized by Hong Kong Council for Testing and Certification (HKCTC), funded by Innovation and Technology Commission (ITC), Feb 2023.

PROFESSIONAL SERVICES

Journal Reviewer

- Optics Express
- Photonics Journal
- Journal of Lightwave Technology
- Optics and Lasers in Engineering

Consultant

- Water Supplies Department, The Government of Hong Kong SAR

TEACHING/TEACHING ASSISTANT

Teaching

EIE 515 Advanced Optical Communication Systems, 2023/2024 (upcoming)

Teaching Assistant

- ELEG3303 Fundamental of Photonics, Fall 2014
- ELEG3320 Introduction to Optical Communication, Spring 2015
- ENGG1100 Introduction to Engineering Design, Fall 2015
- ELEG3320 Introduction to Optical Communication, Spring 2016
- ENGG1100 Introduction to Engineering Design, Fall 2016
- ELEG3601 Introduction to Electric Power Systems, Spring 2017
- ELEG3320 Introduction to Optical Communication, Fall 2017
- ELEG3601 Introduction to Electric Power Systems, Fall 2018