WEI HU

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RESEARCH INTEREST

- **Graph-based Signal Processing & Machine Learning:** Graph signal representation & reconstruction, graph spectral machine learning, graph representation learning, with applications to the processing and analysis of geometric data (including 2D depth maps, 3D point clouds, 4D light fields).
- **3D Visual Computing:** Generative modeling of 3D geometry, diffusion models, with applications to the generation of 3D data.

EDUCATION

The Hong Kong University of Science and Technology (HKUST) *September 2010 - August 2015*
Ph.D. in Electronic and Computer Engineering
Thesis: "Graph Signal Processing for Image Compression and Restoration"
Supervisors: Prof. Ross Murch, Prof. Gene Cheung

University of Science and Technology of China (USTC) *September 2006 - June 2010*
Bachelor in Electrical Engineering

RESEARCH & WORK EXPERIENCE

Tenured Associate Professor *August 2023 - Present*
Wangxuan Institute of Computer Technology, Peking University, China

Assistant Professor *April 2017 - July 2023*
Wangxuan Institute of Computer Technology, Peking University, China

Visiting Researcher *August 2019*
York University, Canada (with Prof. Gene Cheung)

Researcher *September 2015 - February 2017*
Imaging Science Laboratory, Technicolor, France

Visiting Student *January 2012 - June 2015*
National Institute of Informatics, Japan
Supervised by Prof. Gene Cheung

HONORS & AWARDS

- **IEEE Multimedia Rising Star Award (Honorable Mention Award)**, for "outstanding early-stage career achievements in the area of geometric data processing in the graph domain", 2021
- **Best Paper Candidate** at *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021 (Top 0.5%, 1 of 32 chosen from 7015 submissions)
- **Best Student Paper Runner Up Award** at *IEEE International Conference on Multimedia and Expo (ICME)*, 2020 (Top 0.6%, out of 834 submissions)
- **Outstanding Editorial Board Member Award** by *IEEE Signal Processing Society*, 2023.
- **The Beijing Scientific and Technological Progress Award**, Second Prize, 2021
- **Peking University Boya Young Fellow**, 2020
- **Wangxuan Young Scholar Award**, Second Prize, Peking University, 2021
- **Outstanding Service Award** at *IEEE International Conference on Multimedia and Expo (ICME)*, 2021
- **Innovative Teaching and Learning** at Peking University, Second Prize, 2019
- **Top 10% Paper Award** at *IEEE International Conference on Image Processing (ICIP)*, 2014
- **Top 10% Paper Award** at *IEEE International Workshop on Multimedia Signal Processing (MMSP)*, 2013

REPRESENTATIVE PUBLICATIONS

The full publication list of 80 papers is accessible at https://www.wict.pku.edu.cn/huwei/.

*** highlights the corresponding author.**

JOURNAL PUBLICATIONS

1. Daizong Liu, Wei Hu*, Xin Li, "Point Cloud Attacks in Graph Spectral Domain: When 3D Geometry Meets Graph Signal Processing," *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, early access, December 2023. **[IF: 23.6]**
2. Daizong Liu, Wei Hu*, "Imperceptible Transfer Attack and Defense on 3D Point Cloud Classification," *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 45, no. 4, pp. 4727-4746, April 2023. **[IF: 23.6]**
3. Haolan Chen, Bi'an Du, Shitong Luo, Wei Hu*, "Deep Point Set Resampling via Gradient Fields," *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 45, no. 3, pp. 2913-2930, March 2023. **[IF: 23.6]**
4. Cheng Yang, Gene Cheung*, Wei Hu*, "Signed Graph Metric Learning via Gershgorin Disc Alignment," *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 44, no. 10, pp. 7219-7234, October 2022. **[IF: 23.6]**
5. Zichen Wang, Jing Yu, Muyue Zhai, Zehua Wang, Kaiwen Sheng, Yu Zhu, Tianyu Wang, Mianzhi Liu, Lu Wang, Miao Yan, Jue Zhang, Ying Xu, Xianhua Wang, Lei Ma*, Wei Hu*, Heping Cheng*, "System-level time computation and representation in the suprachiasmatic nucleus revealed by large-scale calcium imaging and machine learning," accepted for publication in *Cell Research*, March 2024. **[IF: 44.1]**
6. Wenfa Qi, Sirui Guo, Wei Hu*, "Generic Reversible Visible Watermarking Via Regularized Graph Fourier Transform Coding," *IEEE Transactions on Image Processing (TIP)*, vol. 31, pp. 691-705, December 2021. **[IF: 10.6]**

7. Wei Hu, Gene Cheung, Antonio Ortega, Oscar C. Au, "Multi-resolution Graph Fourier Transform for Compression of Piecewise Smooth Images," *IEEE Transactions on Image Processing (TIP)*, vol. 24, no. 1, pp. 419-433, January 2015. **[IF: 10.6]**

8. Gusi Te, Wei Hu*, Yinglu Liu, Hailin Shi, Tao Mei, "Adaptive Graph Representation Learning and Reasoning for Face Parsing," *IEEE Transactions on Image Processing (TIP)*, vol. 30, pp. 8236- 8250, September 2021. **[IF: 10.6]**

9. Wei Hu*, Qianjiang Hu, Zehua Wang, Xiang Gao, "Dynamic Point Cloud Denoising via Manifold-to-Manifold Distance," *IEEE Transactions on Image Processing (TIP)*, vol. 30, pp. 6168-6183, July 2021. **[IF: 10.6]**

10. Wei Hu*, Zeqing Fu*, Zongming Guo, "Local Frequency Interpretation and Non-Local Self-Similarity on Graph for Point Cloud Inpainting," *IEEE Transactions on Image Processing (TIP)*, vol. 28, no. 8, pp. 4087-4100, August 2019. **[IF: 10.6]**

11. Xiang Gao, Wei Hu*, Guo-Jun Qi, "Self-Supervised Graph Representation Learning via Topology Transformations," *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, vol. 35, no. 4, pp. 4202-4215, April 2023. **[IF: 8.9]**

12. Yiqun Xu, Wei Hu*, Shanshe Wang, Xinfeng Zhang, Shiqi Wang, Siwei Ma*, Zongming Guo, Wen Gao, "Predictive Generalized Graph Fourier Transform for Attribute Compression of Dynamic Point Clouds," *IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*, vol. 31, no. 5, pp. 1968-1982, May 2021. **[IF: 8.4]**

13. Wei Hu, Jiahao Pang, Xianming Liu, Dong Tian, Chia-Wen Lin*, Anthony Vetro, "Graph Signal Processing for Geometric Data and Beyond: Theory and Applications," *IEEE Transactions on Multimedia (TMM)*, vol. 24, pp. 3961-3977, September 2021. **[IF: 7.3]**

14. Zeqing Fu, Wei Hu*, "Dynamic Point Cloud Inpainting via Spatial-Temporal Graph Learning," *IEEE Transactions on Multimedia (TMM)*, vol. 23, pp. 3022-3034, March 2021. **[IF: 7.3, invited to the Best Paper Track of TMM]**

15. Daizong Liu, Wei Hu*, Xin Li, "Robust Geometry-Dependent Attack for 3D Point Clouds," IEEE Transactions on Multimedia (TMM), vol. 26, pp. 2866-2877, August 2023. **[IF: 7.3]**

CONFERENCE PUBLICATIONS

1. Shitong Luo, Wei Hu*, "Diffusion Probabilistic Models for 3D Point Cloud Generation," *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021. **[Best Paper Candidate, 1 of 32 chosen from 7015 submissions]**

2. Zeqing Fu, Wei Hu*, Zongming Guo, "3D Dynamic Point Cloud Inpainting Via Temporal Consistency on Graphs," *IEEE International Conference on Multimedia and Expo (ICME)*, 2020. **[Best Student Paper Runner Up Award, out of 834 submissions]**

3. Bi'an Du, Wei Hu*, Renjie Liao, "Generative 3D Part Assembly via Part-Whole-Hierarchy Message Passing", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

4. Daizong Liu, Wei Hu*, "Explicitly Perceiving and Preserving the Local Geometric Structures for 3D Point Cloud Attack," *the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2023.

5. Yunbo Tao, Daizong Liu, Pan Zhou, Yulai Xie, Wei Du, Wei Hu*, "3DHacker: Spectrum-based Decision Boundary Generation for Hard-label 3D Point Cloud Attack," *International Conference on Computer Vision (ICCV)*, 2023.

6. Qianjiang Hu, Daizong Liu, Wei Hu*, "Density-Insensitive Unsupervised Domain Adaption on 3D Object Detection," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

7. Qianjiang Hu, Daizong Liu, Wei Hu*, "Exploring the Devil in Graph Spectral Domain for 3D Point Cloud Attacks," *European Conference on Computer Vision (ECCV)*, 2022.
8. Gusi Te, Xiu Li, Xiao Li, Jinglu Wang, Wei Hu*, Yan Lu*, "Neural Capture of Animatable 3D Human from Monocular Video," *European Conference on Computer Vision (ECCV)*, 2022.
9. Shitong Luo, Wei Hu*, "Score-Based Point Cloud Denoising," *International Conference on Computer Vision (ICCV)*, 2021.
10. Bi'an Du, Xiang Gao, Wei Hu*, Xin Li, "Self-Contrastive Learning with Hard Negative Sampling for Self-supervised Point Cloud Learning," *ACM International Conference on Multimedia (ACM MM)*, 2021.
11. Qianjiang Hu, Xiao Wang, Wei Hu*, Guo-Jun Qi*, "AdCo: Adversarial Contrast for Efficient Learning of Unsupervised Representations from Self-Trained Negative Adversaries," *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.
12. Shitong Luo, Wei Hu*, "Differentiable Manifold Reconstruction for Point Cloud Denoising," *ACM International Conference on Multimedia (ACM MM)*, 2020.
13. Gusi Te, Yinglu Liu, Wei Hu*, Hailin Shi, Tao Mei, "Edge-aware Graph Representation Learning and Reasoning for Face Parsing," *European Conference on Computer Vision (ECCV)*, 2020.
14. Xiang Gao, Wei Hu*, Guo-Jun Qi, "GraphTER: Unsupervised Learning of Graph Transformation Equivariant Representations via Auto-Encoding Node-wise Transformations," *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.
15. Ziling Huang, Zheng Wang*, Wei Hu*, Chia-Wen Lin, Shin'ichi Satoh, "DoT-GNN: Domain-Transferred Graph Neural Network for Group Re-identification," *ACM International Conference on Multimedia (ACM MM)*, 2019.

BOOK CHAPTERS

Wei Hu, Siheng Chen, Dong Tian, "Graph Spectral Point Cloud Processing," Chapter 7 of the book "Graph Spectral Image Processing", ISBN: 978-1-789-45028-6, *Wiley-ISTE*, August 2021.

FUNDING

Funding under my usage is 11.33 Million in Chinese Yuan (CNY), or equivalently 1,585,000 USD (1 USD $\approx$ 7.15 CNY)

- **(PI) National High-Level Talent Special Support Programs (10,000 Talents Program) - Young Talents**
  2024/01-2026/12, 1,200,000 CNY ($\approx$ 168,000 USD)
- **(Co-PI) National Key R&D Program, Ministry of Science and Technology of China (No. 2021YFF0901500)**
  Theme:"Key Techniques and Platform for Intelligent Omnimedia Content Production"
  2021/12-2024/11, 6,820,000 CNY ($\approx$ 954,000 USD)
- **(PI) Kuaishou Collaborative Research**
  Theme:"Image Super-resolution via Diffusion Models"
  2023/08-2024/01, 500,000 CNY ($\approx$ 70,000 USD)
- **(PI) National Natural Science Foundation of China (No. 61972009)**
  Theme:"Multi-resolution Graph Convolutional Neural Networks via Spectral Graph Theory"
  2020/01-2023/12, 590,000 CNY ($\approx$ 83,000 USD)

- **(PI) Beijing Natural Science Foundation (No. 4194080)**
  Theme:"3D Point Cloud Reconstruction via Graph Spectral Theory"
  2019/01-2020/12, 100,000 CNY (≈ 14,000 USD)
- **(Key Member) Beijing Natural Science Foundation (No. 19L2133)**
  Theme:"Personalized Surgery Simulation based on 3D Point Clouds"
  2019/12-2022/12, 90,000 CNY (≈ 13,000 USD)
- **(Key Member) National Key R&D Program, Ministry of Science and Technology of China (No. 2019YFF0302900)**
  Theme:"Key Techniques and System for Interactive Multi-dimensional Game Viewing Experience over Ice and Snow Sports"
  2019/10-2022/06, 670,000 CNY (≈ 94,000 USD)
- **(Co-PI) Inter-disciplinary Medical Research Funding at Peking University (No. BMU2018MI016)**
  Theme:"Image-based Personalized Virtual-reality Simulation of Clinical Surgery"
  2019/01-2019/12, 100,000 CNY (≈ 14,000 USD)
- **(Key Member) National Key R&D Program, Ministry of Science and Technology of China (No. 2018YFB1003500)**
  Theme:"Data Management and Analysis System based on Heterogeneous Graph Computers"
  2018/05-2021/04, 250,000 CNY (≈ 35,000 USD)
- **(PI) Alibaba Innovation Research (No. XTG201800108)**
  Theme:"Graph-based Point Cloud Compression"
  2018/01-2018/12, 410,000 CNY (≈ 57,000 USD)
- **(PI) MSRA Collaborative Research (FY18-Research-Sponsorship-029)**
  Theme:"Graph Neural Networks for 3D Face Anti-spoofing"
  2018/01-2018/12, 200,000 CNY (≈ 28,000 USD)
- **(PI) Fundamental Research Funding at Peking University (No. 7100602479)**
  Theme:"Efficient Point Cloud Compression"
  2017/07-2020/12, 400,000 CNY (≈ 56,000 USD)

ACADEMIC ACTIVITY

- **Associate Editor:** IEEE Signal Processing Magazine (IF: 14.9), 2021 - Present
- **Associate Editor:** IEEE Transactions on Signal and Information Processing over Networks (IF: 3.2), 2021 - Present
- **Chair / Co-Chair:** ICME 2025 Special Session Co-Chair, ISPA 2023 Program Co-Chair, VCIP 2022 Tutorial Co-Chair, ICME 2021 Open Source Co-Chair
- **Plenary Talk**: "Graph Spectral Processing and Analysis for 3D Point Clouds and Beyond" on Graph Signal Processing Workshop 2023
- **Workshop Co-Organizer:** ICCV 2021 workshop on "When Graph Signal Processing meets Computer Vision"
- **Special Session Co-Organizer:** ICME 2022 & ICME 2020, ICIP 2022 & ICIP 2021
- **Conference Program Committee:** ICASSP, ICME, ICIP, CVPR, ICCV, ECCV, ACM MM
- **IEEE Senior Member** since 2021