

Tianhao (Jasmine) Peng

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Education

University of Bristol | Bristol, UK

PhD in Computer Science | Sept 2024 – Present (*Expected Graduation: 2027*)

- **Funding:** Fully funded by the EPSRC DTP Scholarship
- **Research Focus:** Neural Video Compression, Implicit Neural Representations (INRs), Video Quality Assessment, Image Super Resolution and Generative models for low-level vision

University of Bristol | Bristol, UK

BSc in Mathematics and Computer Science | Sept 2021 – June 2024

- **Grade:** 74/100 (First Class Honours equivalent)
- **Thesis:** Deep Video Quality Assessment (Co-supervised by **Amazon Prime Video** and published at **ECCV2024**)
- **Key Modules:** Machine Learning, Image Processing, Advanced Data Science, Algorithm Design, C/C++, Java, Python Programming

Skills

Programming & Frameworks:

- **Languages:** Python, C/C++, MATLAB, Java.
- **Deep Learning:** PyTorch, TensorFlow, CUDA.

Multimedia Expertise:

- **Neural Video Compression:** End-to-end Video Coding, Rate-Distortion Optimization (RDO).
- **Video Coding:** In-depth knowledge of H.266/VVC (VTM), H.265/HEVC, and AV1.
- **Tools:** FFmpeg, OpenCV, Git, Linux/Unix (HPC environments).
- **Domain:** Image Super-Resolution, Video Quality Assessment, Model Compression

Awards

- **EPSRC DTP PhD Scholarship:** Full funding awarded for doctoral research excellence.
- **Lynne Walling Memorial Prize (2023):** Awarded for outstanding academic performance at the School of Mathematics (University of Bristol).
- **Faculty of Engineering Summer Research Intern Scholarship (2023):** Competitive grant for deep learning research on video compression.

Publications

Instance Data Condensation for Image Super-Resolution

Tianhao Peng, Ho Man Kwan, Yuxuan Jiang, Ge Gao, Fan Zhang, Xiaozhong Xu, Shan Liu, David Bull

Under Review, 2025

- Proposed a novel **Instance Data Condensation (IDC)** framework specifically tailored for **low-vision tasks** (e.g., Image Super-Resolution).
- **Impact:** Achieved comparable or superior model performance using only **10% of the original training data** (DIV2K), significantly reducing storage and computational costs for training ISR models.

GIViC: Generative Implicit Video Compression

Ge Gao, Siyue Teng, Tianhao Peng, Fan Zhang, David Bull

ICCV, 2025

- Designed a **generative video compression** framework integrating **implicit diffusion** processes and hierarchical gated linear attention.
- **Impact:** Surpassed the VVC standard (VTM) by achieving **15.94% BD-rate savings**, marking a milestone for INR-based video codecs in achieving SOTA coding efficiency.

Ultra-lightweight Neural Video Representation Compression

Ho Man Kwan, Tianhao Peng, Ge Gao, Fan Zhang, Mike Nilsson, Andrew Gower, David Bull

Picture Coding Symposium (PCS), 2025

- Developed a **lightweight neural video codec** by incorporating multi-scale feature grids and an optimized octree-based entropy model.
- **Impact:** Delivered **8.4× encoding and 2.5× decoding speedups** while maintaining competitive rate-distortion performance, directly addressing the latency bottlenecks of neural codecs.

Accelerating Learnt Video Codecs with Gradient Decay and Layer-wise Distillation

Tianhao Peng, Ge Gao, Heming Sun, Fan Zhang, David Bull

Picture Coding Symposium (PCS), 2024

- Proposed a **model-agnostic pruning scheme** using gradient decay and adaptive **distillation** applied to **end-to-end video codecs** (DCVCs).
- **Impact:** Reduced model MACs by up to **65%** and achieved **2× inference speed-up** with negligible performance drop.

RMT-BVQA: Recurrent Memory Transformer-based Blind Video Quality Assessment for Enhanced Video Content

Tianhao Peng, Chen Feng, Duolikun Danier, Fan Zhang, Benoit Vallade, Alex Mackin, David Bull

ECCV, 2024

- Proposed a novel blind VQA method for **enhanced video content** (e.g., upscaled or HDR converted), leveraging a Recurrent Memory Transformer (RMT) and content-quality-aware contrastive learning.
- **Impact:** Constructed a new large-scale database containing 13K patches to address the data scarcity in evaluating video enhancement algorithms.

HIIIF: Hierarchical Encoding based Implicit Image Function for Continuous Super-resolution

Yuxuan Jiang, Ho Man Kwan, Tianhao Peng, Ge Gao, Fan Zhang, Xiaoqing Zhu, Joel Sole, David Bull

CVPR, 2025

- Proposed a hierarchical positional encoding strategy to capture fine-grained details for **continuous image representation**.
- **Impact:** Effectively reconstructs high-fidelity images at arbitrary scales, significantly mitigating spectral bias and aliasing artifacts found in traditional INR approaches.

Unified-VQA: Towards Unified Video Quality Assessment

Chen Feng, Tianhao Peng, Fan Zhang, Alex Mackin, Andrew Collins, David Bull

Under Review, 2025

- Developed a "Diagnostic Mixture-of-Experts (MoE)" framework to provide actionable, interpretable feedback for video quality across diverse formats (**HD, UHD, HDR, HFR**).
- **Impact:** Demonstrated superior performance compared to 18 benchmark methods across 17 databases, significantly advancing **universal artifact detection** in streaming media.

Services

Reviewer:

- IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**)
- Picture Coding Symposium (**PCS**)
- IEEE International Symposium on Circuits and Systems (**ISCAS**)