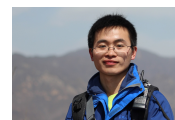# Hongwei Qin

✉ qinhw08@gmail.com
🖮 qinhongwei.com

Bio

I lead a team that focus on AI ISP and AI Video Codec (including software and silicon) for next generation AI-Camera. Before that, I got my PhD and Bachelor of Engineering from Tsinghua University in Jun. 2017 and Jun. 2012 respectively. In Jul. 2012, before my PhD began, I went to a reading club on Deep Learning with two friends. Three months later, Deep Learning won the Image-Net Classification Challenge and has been changing the world since then. In 2015, I talked to the same two friends, but in a small startup called SenseTime. I have been working here till now. I'm looking for talented researchers, engineers, and interns in areas of vision, photography, codec, software, and hardware. We have talented team, leading solutions, and innovative products. Positions are available in Beijing, Shanghai, Shenzhen, and Hangzhou. We believe revolutionary products require software hardware co-design. If you share the same vision, join us.

Education

2012 – 2017 **Ph.D.**, *Department of Automation, Tsinghua University*, Beijing.
Research topics: computer vision and deep learning.
Thesis: Object Detection by Deep Convolutional Neural Networks

2008 – 2012 **B.Eng.**, *Department of Automation, Tsinghua University*, Beijing.

News

2022.9 **product**, *Our Super Night Video by AI ISP chip is released to consumers after a software OTA.*

2022.9 **paper**, *2 papers accepted to NeurIPS 2022, both on data compression.*

2022.8 **open positions**, *I'm looking for research and engineering leaders in ISP and Codec. Please send me an email.*

2022.7 **paper**, *2 papers accepted to ECCV 2022, one on optical flow, one on image deblur.*

2022.6 **product**, *after more than two years development, our AI ISP chip mass production for smartphone is delivered! Stay tuned.*

2022.6 **challenge**, *my team won 1st place at all three bitrates in the 5th Challenge on Learned Image Compression 2022.*

2022.6 **paper**, *1 paper accepted to ICIP 2022, on neural image assessment.*

2022.5 **paper**, *1 paper accepted to IJCV, on efficient burst denoising.*

2022.5 **paper**, *1 paper accepted to CVPR CLIC workshop, on image compression.*

2022.3 **paper**, *3 papers accepted to CVPR 2022, one on image denoising and dataset, one on lossless image compression, one on lossy image compression (oral) .*

2021.12	**company**, *SenseTime Group Inc. completed IPO on the Hong Kong Stock Exchange, traded as 0020.HK.*
2021.7	**paper**, *1 paper accepted to ICCV 2021, on image noise modeling.*
2021.2	**paper**, *1 paper accepted to CVPR 2021, on image compression.*

Experience

2015 – 2022 — From Intern to Director, *SenseTime*.

- I lead a team that focuses on next-generation AI-Camera. Our selected revolutionary products:

1. AI ISP (software SDK, hardware IP and Companion Chip for mobile phones). I built the ISP team from zero. We were the pioneer that bring AI to ISP. We work with the top mobile phone OEMs to launch 4K HDR Super Night Video. Our 4K DOL-HDR hardware IP is the first that was massively produced (2022) in the Android world. We make ISP chips programmable with neural network modules. Our 2nd generation ISP chip is on the way. We aim to bring spectacular photography to everyone.

2. AI Codec. I built the Codec team from zero. We were the pioneer that bring AI to image and video compression. The image compression software *DIC* (deep image compression) can reduce image bitrate to less than $1/3$ of JPEG with no visual loss. My team won 1st place in the Challenge of Learned Image Compression 2022 with the best quality and 20x speed compared to second place. We are making storage and bandwidth more efficient.

3. Face Capture Camera (surveillance camera). We were the pioneer that use deep learning on cameras. Our SDK achieved beyond 90% market share (vendor market). The system also provided a base prototype for Face-Unlocking (the pioneer in Android community) and the first SenseTime AI Chip S1.

4. Face Detection System (in almost all the products of SenseTime). We were the pioneer that apply deep learning in face detection and face tracking. We spent 5 years (2015-2020) crafting a system that produces a system for industrial-grade face detection. Our data pipeline, model pipeline, training-deploying pipeline, and the automated closed-loop of the three pioneered the AI industry. (Similar Case: Tesla crafted automatic factories for manufacturing vehicles.)

In summary, we did not invent camera, we perfected it.

2020 – 2022 — Director, head of ISP&Codec, *SenseTime*.

- AI ISP, AI Codec, software and silicon

2017 – 2020 — Senior Researcher, head of AI Camera, *SenseTime*.

- Research: AutoML, ISP, Codec, Video Recognition, Detection.
- Products: AI ISP Chip, Face Capture Camera, Face Dectection SDK, Face Unlocking SDK, and other Core Algorithms of SmartPhone and SmartCity

2015 – 2017 — Research Intern, *SenseTime*.

- I delivered the face detection SDK for all the face products of SenseTime. Named *Hunter*, it is the most widely used SDK in SenseTime history. It is called billions of times everyday. See the demo on http://www.sensetime.com

2012 – 2017 — PhD Student Researcher, *Tsinghua University*.

- With Prof. Xiu Li
- Focused on computer vision and deep learning. I had experimences on CNN model compression, face recognition, object detection, image classification, semantic segmentation and 3D reconstruction.

Spring, 2014	**Research Assistant**, *Broadband Network and Digital Media Laboratory, Department of Automation, Tsinghua University*, Beijing.
	- Worked on depth estimation from single still images (2D to 3D). Our algorithm used a very light-weight model while achieved state-of-the-art results. See publications (ACCV2014, T.CSVT2016) for details.
	- Worked with Prof. Qionghai Dai (now Fellow of Chinese Academy of Engineering) and Dr. Yangang Wang (now Associate Professor of Southeast University)
Nov. 2013	**Visiting Student**, *Web Science DTC, University of Southampton, UK*.
	- Investigated Visualizations of Marketing Trends on Online Social Networks
Summer, 2011	**Visiting Student**, *The Intelligent Modelling and Analysis Research Group, The University of Nottingham, UK*.
	- Investigated Energy Decision in Future City

Selected Publications

Dasong Li, Yi Zhang, Ka Chun Cheung, Xiaogang Wang, Hongwei Qin, and Hongsheng Li. Learning degradation representations for image deblurring. In *European Conference on Computer Vision (ECCV)*, 2022.

Dasong Li, Xiaoyu Shi, Yi Zhang, Xiaogang Wang, Hongwei Qin, and Hongsheng Li. No attention is needed: Grouped spatial-temporal shift for simple and efficient video restorers. *arXiv preprint arXiv:2206.10810*, 2022.

Dailan He, Ziming Yang, Hongjiu Yu, Tongda Xu, Jixiang Luo, Yuan Chen, Chenjian Gao, Xinjie Shi, Hongwei Qin, and Yan Wang. PO-ELIC: Perception-oriented efficient learned image coding. *arXiv preprint arXiv:2205.14501*, 2022.

Dasong Li, Yi Zhang, Ka Lung Law, Xiaogang Wang, Hongwei Qin, and Hongsheng Li. Efficient burst raw denoising with variance stabilization and multi-frequency denoising network. *International Journal of Computer Vision (IJCV)*, 2022.

Zhaoyang Huang, Xiaoyu Shi, Chao Zhang, Qiang Wang, Ka Chun Cheung, Hongwei Qin, Jifeng Dai, and Hongsheng Li. FlowFormer: a transformer architecture for optical flow. In *European Conference on Computer Vision (ECCV)*, 2022.

Dailan He, Ziming Yang, Yuan Chen, Qi Zhang, Hongwei Qin, and Yan Wang. Post-training quantization for cross-platform learned image compression. *arXiv preprint arXiv:2202.07513*, 2022.

Dailan He, Ziming Yang, Weikun Peng, Rui Ma, Hongwei Qin, and Yan Wang. ELIC: Efficient learned image compression with unevenly grouped space-channel contextual adaptive coding. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2022.

Lina Guo, Xinjie Shi, Dailan He, Yuanyuan Wang, Rui Ma, Hongwei Qin, and Yan Wang. Practical learned lossless jpeg recompression with multi-level cross-channel entropy model in the dct domain. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2022.

Yi Zhang, Dasong Li, Ka Lung Law, Xiaogang Wang, Hongwei Qin, and Hongsheng Li. IDR: Self-supervised image denoising via iterative data refinement. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2022.

Yi Zhang, Hongwei Qin, Xiaogang Wang, and Hongsheng Li. Rethinking noise synthesis and modeling in raw denoising. In *Proceedings of the IEEE/CVF International Conference on Computer Vision*, pages 4593–4601, 2021.

Dailan He, Yaoyan Zheng, Baocheng Sun, Yan Wang, and Hongwei Qin. Checkerboard context model for efficient learned image compression. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pages 14771–14780, 2021.

Yongqiang Yao, Yan Wang, Yu Guo, Jiaojiao Lin, Hongwei Qin, and Junjie Yan. Cross-dataset training for class increasing object detection. *arXiv preprint arXiv:2001.04621*, 2020.

Rundong Li, Yan Wang, Feng Liang, Hongwei Qin, Junjie Yan, and Rui Fan. Fully quantized network for object detection. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

Yi Wei, Xinyu Pan, Hongwei Qin, Wanli Ouyang, and Junjie Yan. Quantization mimic: Towards very tiny cnn for object detection. In *European Conference on Computer Vision (ECCV)*, 2018.

Shaohui Liu and Hongwei Qin. EFA: Efficient multi-frame aggregation for robust tracking. *SenseTime Internal(unpublished)*, 2017.

Congrui Hetang, Hongwei Qin, Shaohui Liu, and Junjie Yan. Impression network for video object detection. *arXiv preprint arXiv:1712.05896*, 2017.

Zekun Hao, Yu Liu, Hongwei Qin, Junjie Yan, Xiu Li, and Xiaolin Hu. Scale-aware face detection. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.

Hongwei Qin and Junjie Yan. 1000 fps high performance face detection on cpu via net2net compression. *SenseTime Internal(unpublished)*, 2017.

Hongwei Qin, Junjie Yan, Xiu Li, and Xiaolin Hu. Joint training of cascaded CNN for face detection. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016.

Hongwei Qin, Xiu Li, Yangang Wang, Yongbing Zhang, and Qionghai Dai. DEPT: Depth estimation by parameter transfer with a lightweight model for single still images. *Circuits and Systems for Video Technology, IEEE Transactions on*, 2016.

Hongwei Qin, Xiu Li, Jian Liang, Yigang Peng, and Changshui Zhang. Deepfish: Accurate underwater live fish recognition with a deep architecture. *Neurocomputing*, 2015.

Academic Activities

Since 2014	**Reviewer: IJCV, ECCV, CVPR, ICCV etc**.
2017	**President and Founder of Tsinghua-SenseTime AI Club**.

Former Interns (Undergraduates list only)

Zekun Hao	Undergraduate@Beihang CS, now PhD@Cornell
Ji Lin	Undergraduate@Tsinghua EE, now PhD@MIT
Congrui Hetang	Undergraduate@Beihang CS, then Master@CMU, now engineer@Waymo
Shaohui Liu	Undergraduate@Tsinghua EE, now PhD@ETH
Yi Wei	Undergraduate@Tsinghua EE, now PhD@Tsinghua
Mingjie Sun	Undergraduate@Tsinghua Yao Class, now PhD@CMU
Zhen Dong	Undergraduate@Peking University MicroElectronics, now PhD@Berkeley
Jiayi Weng	Undergraduate@Tsinghua CS, now research engineer@OpenAI
Dasong Li	Undergraduate@Shanghai Jiaotong University EE, now PhD@CUHK
Yi Zhang	Undergraduate@Nanjing University InfoManagement, now PhD@CUHK
Dailan He	Undergraduate@Beihang CS, now researcher@SenseTime

Recent Awards

2020	**SenseTime Outstanding Team for AI ISP Chip**.
2019	**SenseTime Dean Innovation Award (for AI Camera)**.
2018	**SenseTime Outstanding Team for Deep Learning Camera. SenseTime Outstanding Individual**.
2015-2017	**Many Internship Awards in SenseTime**.
Nov. 2014	**National PhD Fellowship**.

Interests

2012–2013	**Mountaineering**.
	- Served as team member and climbing caption in Tsinghua University Mountaineering Team
	- Climbed Touming Mengke Snow Mountain East Peak (5483m) and South Peak (5475m) in Gansu, Xuanwu Peak (5383m) in Sichuan, and Tuanjie Peak(5827m) in Qinghai
2013–present	**Cycling**.
	- Surrounded Qinghai Lake
	- Completed North Guangdong Line
	- Surrounded Erhai Lake
	- Surrounded Lugu Lake
2015–present	**Long Distance Hiking**.
	- Shenzhen 100km Hiking 2015 2016 2017
	- North Xinjiang Hiking in 2017 as an after-graduation trip
2022–present	**Trail Running**.
	- Beijing Xishan Three Peaks, 22km, 1800m, 4 hours 20 minutes, on Aug. 28th 2022
	- 2022 Chongli 168 Ultra Trail TTC 60km, 2200m, 12 hours 7 minutes, on July 23th 2022

2010–present **Marathon**.
  - Completed several half Marathons in Beijing, Guangzhou, Shenzhen and Shanghai.
  - Completed my first road full Marathon in Olympic Forest Park in a night in Sep. 2022 :-)

2021–present **Car Racing**.
  - 1 min 4 seconds on Ruisi Track

2012–present **Photography**.
  - Photographed for 2012 Tsinghua University Mountaineering Team

2014–present **Blogger**, *http://qinhongwei.com*.
  - Top Single Article Pageviews: 10000+

2017–present **WeChat blog**, *Dr_red_*.
  - Top Single Article Pageviews: 10000+