

# Chuanmin Jia

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## RESEARCH INTERESTS

- Video Compression/Processing
- Light Field Image Coding
- Deep Feature Compression
- Machine Learning

## EDUCATION

- Peking University (PKU)**, BJ, CHN, 2015 – present
- *Ph.D. student*, Computer Science
  - Advisor: Prof. Siwei Ma and Prof. Wen Gao
- New York University (NYU)**, NY, USA, 2017 –2018
- *Visiting Ph.D student*, Electrical and Computer Engineering
  - Advisor: Prof. Yao Wang
- Beijing Univ. of Posts. & Telecom. (BUPT)**, BJ, CHN, 2011 – 2015
- *B.Eng*, Computer Science
  - GPA: 86.7/100
  - Thesis: Research on Compressed Video Enhancement and GPU Acceleration.

## RESEARCH EXPERIENCE

- Research Assistant*, PKU-EECS Sep. 2014 – present  
Institute of Digital Media, Beijing
- Designed CNN based in-loop filter as coding tools for future video coding standards.
  - Implemented video restoration and quality enhancement algorithm based on non-local self similarity prior.
  - Optimized non-local self similarity based in-loop filter algorithm for next generation video coding standards.
  - Proposed high efficiency light field image compression algorithm based on sub-aperture adaptation.
  - Optimized virtual view synthesis algorithm using CUDA, achieved real-time view synthesis for full HD videos.
- Research Intern*, Peng Cheng Laboratory Mar. 2019 – present  
Artificial Intelligence Department, Shenzhen
- Developed the 8K real-time video codec based on AVS3 standards.
  - Investigated Deep Learning-inspired video coding tools for AVS3 standards.
- Visiting scholar*, NYU-Tandon Dec. 2017 – Dec. 2018  
Video Lab, Brooklyn, NY
- Layered end-to-end image compression via scalable auto-encoder.
  - Pareto optimization for end-to-end image compression and image analytic tasks.

## PUBLICATIONS *Journal Papers*

- **C. Jia**, S. Wang, X. Zhang, S. Wang, J. Liu, S. Pu and S. Ma, “Content-Aware Convolutional Neural Network for In-loop Filtering in High Efficiency Video Coding,” *IEEE Transactions on Image Processing (TIP)*, 28(7): 3343 - 3356, 2019.
- **C. Jia**, X. Zhang, S. Wang, S. Wang and S. Ma, “Light Field Image Compression Using Generative Adversarial Network Based View Synthesis,” *IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS)*, 9(1): 177-189, 2019.
- S. Ma, X. Zhang, **C. Jia**, Z. Zhao, S. Wang and S. Wang, “Image and Video Compression with Neural Networks: A Review,” **Accepted** by IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), 2019.
- S. Ma, S. Wang, X. Zhang, X. Zhang, **C. Jia** and S. Wang “Joint Feature and Texture Coding: Towards Smart Video Representation via Front-end Intelligence,” **Accepted** by IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), 2018.
- S. Ma, X. Zhang, J. Zhang, **C. Jia**, S. Wang and W. Gao “Nonlocal In-Loop Filter: The Way Toward Next-Generation Video Coding?,” *IEEE MultiMedia* 23(2): 16-26, 2019. (**Best Paper Award**)

## *Conference Papers*

- K. Lin, **C. Jia**, Z. Zhao, L. Wang, S. Wang, S. Ma and W. Gao, “Residual in Residual Based Convolutional Neural Network In-loop Filter for AVS3,” *Proc. of IEEE Picture Coding Symposium (PCS)*, Ningbo, China, Nov, 2019.
- J. Zhang, **C. Jia**, M. Lei, S. Wang, S. Ma and W. Gao, “Recent Development of AVS Video Coding Standard: AVS3,” *Proc. of IEEE Picture Coding Symposium (PCS)*, Ningbo, China, Nov, 2019.
- **C. Jia**, Z. Liu, Y. Wang, S. Ma and W. Gao, “Layered Image Compression using Scalable Auto-encoder,” *Proc. of IEEE International Conference on Multimedia Information Processing and Retrieval (MIPR)*, San Jose, California, USA, Mar, 2019. (Oral, 19%) (**Best Student Paper Award**)
- Y. Li, **C. Jia**, S. Wang, X. Zhang, S. Wang, S. Ma and W. Gao, “Joint rate-distortion optimization for simultaneous texture and deep feature compression of facial images,” *Proc. of IEEE International Conference on Multimedia Big Data (BigMM)*, Xi’an, China, Sep, 2018. (Poster)
- Z. Zhao, S. Wang, **C. Jia**, X. Zhang, S. Ma and J. Yang, “Light Field Image Compression Based on Deep Learning,” *Proc. of IEEE International Conference on Multimedia & Expo (ICME)*, San Diego, California, USA, July, 2018. (Oral, 15%)
- Y. Wang, X. Fan, **C. Jia**, D. Zhao and W. Gao, “Neural Network Based Inter Prediction for HEVC,” *Proc. of IEEE International Conference on Multimedia & Expo (ICME)*, San Diego, California, USA, July, 2018. (Poster, 30%)
- X. Meng, **C. Jia**, S. Wang, X. Zheng and S. Ma, “Optimized Non-local In-Loop Filter for Video Coding,” *Proc. of IEEE Picture Coding Symposium (PCS)*, San Francisco, California, USA, June, 2018. (Poster)
- **C. Jia**, S. Wang, X. Zhang, S. Wang and S. Ma, “Spatial-Temporal Residue Network Based In-Loop Filter for Video Coding,” *Proc. of IEEE Visual Communications and Image Processing (VCIP)*, St.Petersburg, Florida, USA, Dec, 2017. (Oral)

- **C. Jia**, Y. Yang, X. Zhang, S. Wang, S. Wang and S. Ma, “Light Field Image Compression with Sub-apertures Reordering and Adaptive Reconstruction,” *Proc. of the Pacific-Rim Conference on Multimedia (PCM)*, Harbin, China, Sept, 2017. (Oral) (**Best Paper Award**)
- **C. Jia**, Y. Yang, X. Zhang, S. Wang, X. Zhang, S. Wang and S. Ma, “Optimized Inter-view Prediction Based Light Field Image Compression with Adaptive Reconstruction,” *Proc. of IEEE International Conference on Image Processing (ICIP)*, grand challenge for LF image coding, Beijing, China, Sept, 2017. (Oral)
- **C. Jia**, X. Zhang, J. Zhang, S. Wang and S. Ma, “Deep Convolutional Network based Image Quality Enhancement for Low Bit Rate Image Compression,” *Proc. of IEEE Visual Communications and Image Processing (VCIP)*, Chengdu, China, Nov. 2016. (Oral)
- J. Zhang, **C. Jia**, N. Zhang, S. Ma, and W. Gao, “Structure-driven Adaptive Non-local Filter for High Efficiency Video Coding (HEVC),” *Proc. of IEEE Data Compression Conference (DCC)*, Snowbird, Utah, USA, Mar. 2016. (Oral) (**Top Conference in Data Compression**)
- J. Zhang, **C. Jia**, S. Ma, and W. Gao, “Non-Local Structure-Based Filter for Video Coding,” *Proc. of IEEE International Symposium on Multimedia (ISM)*, Miami, Florida, USA, Dec. 2015. (Oral)

#### Standardization Contributions

- X. Meng, **C. Jia**, Z. Wang, S. Wang, S. Ma, X. Zheng, “CE2: Non-local Structure-based In-loop Filter,” Joint Video Exploration Team (JVET) of ITU-T SG, **JVET-K0160**, Ljubljana, Slovenia, July, 2018.
- Z. Wang, X. Meng, **C. Jia**, J. Cui, S. H. Wang, S. Wang, S. Ma, W. Li, Z. Miao and X. Zheng, “Description of SDR video coding technology proposal by DJI and Peking University,” Joint Video Exploration Team (JVET) of ITU-T SG, **JVET-J0011**, San Diego, USA, April, 2018.
- X. Meng, **C. Jia**, Z. Wang, S. Wang, S. Ma, X. Zheng, “Non-local Structure-based Filter with integer operation,” Joint Video Exploration Team (JVET) of ITU-T SG, **JVET-J0071**, San Diego, USA, April, 2018.

#### PROFESSIONAL Reviewer Service ACTIVITY

- IEEE Transactions on Image Processing (T-IP).
- IEEE Transactions on Multimedia (T-MM).
- IEEE ACCESS.
- IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT).
- Journal of Visual Communication and Image Representation (JVCIR).
- IEEE International Conference on Image Processing (ICIP).
- IEEE International Conference on Multimedia and Expo (ICME).
- IEEE International Symposium on Multimedia (ISM).
- IEEE Visual Communication and Image Processing (VCIP).
- IEEE Student Member

#### Conference Presentations and Invited Talks

- Description of SDR video coding technology proposal by DJI and Peking University, *San Diego, CA, U.S, April. 2018*
- Non-local Structure-based Filter with integer operation, *San Diego, CA, U.S, April. 2018*
- Spatial-Temporal Residue Network Based In-Loop Filter for Video Coding, *VCIP2017, St Petersburg, FL, U.S, Dec. 2017*

- Light Field Image Compression with Sub-apertures Reordering and Adaptive Reconstruction, *PCM2017, Harbin, China, Sep. 2017*
- Optimized Inter-View Prediction Based Light Field Image Compression With Adaptive Reconstruction, *ICIP2017, Grand Challenge for Light Field Image coding, Beijing, China, Sep. 2017*
- Deep Convolutional Network based Image Quality Enhancement for Low Bit Rate Image Compression, *VCIP2016, Chengdu, China, Nov. 2016*

**TEACHING EXPERIENCE**

TA: Video Coding and Understanding (EECS 04812102), EECS, PKU, Spring.2017  
 TA (for projects): Image and Video Processing (EL-GY 6123), ECE, NYU, Spring.2018

**COMPUTER SKILLS**

*Languages & Software:* C/C++, CUDA, MATLAB, Power Shell, Python, L<sup>A</sup>T<sub>E</sub>X.  
*Operating Systems:* Mac OS X, Ubuntu Linux, Windows.  
*Libraries/Frameworks:* Caffe, MXNET, Tensorflow, HM, AVS2, VTM, AVS3.  
*Github Repo:*  $\circ$  <https://github.com/codersadis>  
*Homepage:*  $\circ$  <http://www.jiachuanmin.site>  
*Google Scholar:*  $\circ$  <https://scholar.google.com/citations?user=x5Na9n0AAAAJ>

**HONORS & AWARDS**

President Scholarship, PKU, 2019  
 Qualcomm Scholarship, PKU, 2019  
**Best Student Paper Award** of IEEE International Conference on Multimedia Information Processing and Retrieval (MIPR), 2019  
**Best Paper Award** of IEEE Multimedia Magazine, 2018  
 Innovation Scholarship, PKU, 2018  
**Outstanding Reviewer** of JVCIR, 2017  
**Best Reviewer** of IEEE Visual Communication and Image Processing (VCIP), 2017  
**Best Paper Award** of Pacific-Rim Conference on Multimedia (PCM), 2017  
**Outstanding Reviewer** of JVCIR, 2016  
 1<sup>st</sup> prize of Video Big Data Compression Contest of National Graduate Contest on Smart-City Technology. 2016  
 Excellent Graduation Thesis Award, BUPT, 2015  
 Excellent Undergraduates, BUPT, 2015  
 Innovation Scholarship, PKU, 2015  
 Honorable Mention Winner in Mathematical Contest in Modeling (MCM), 2014