## **PATENTS – Nam Ling**

## (1) PATENTS GRANTED

- Minqiang Jiang, Jianhua Zheng, Madhusudan Kalluri, Nam Ling, and Chen-Xiong Zhang, "Systems, Methods, and Devices for Image Coding," U.S. Patent granted (patent grant number US10587900B2), March 10, 2020. (U.S. Patent filed (application no. 15/433,344) on February 15, 2017. Provisional U.S. Patent filed (application no. 62/295,406) (title and authors' order different) on February 15, 2016.)
- Zhouye Gu, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "Illumination Compensation (IC) Refinement Based on Positional Pairings Among Pixels," U.S. Patent granted (publication number US10554967B2), February 4, 2020. (U.S. Patent filed (application no. 14/664,348) on March 20, 2015. PCT Application filed (application no. WO 2015/139668 A1) on March 21, 2015. Provisional U.S. Patent filed (application no. 61/968,980) on March 21, 2014.)
- 3. Zhouye Gu, Nam Ling, Chen-Xiong Zhang, and Jianhua Zheng, "System and Method for Estimating View Synthesis Distortion," U.S. Patent granted (publication number US10326995B2), June 18, 2019. (U.S. Patent filed (application no. 15/640,290) on June 30, 2017.)
- 4. Jianhua Zheng, Zhouye Gu, Chen-Xiong Zhang, and Nam Ling, "System and Method for Depth Map Coding for Smooth Depth Map Area," U.S. Patent granted (publication number US10097838B2), October 9, 2018. (U.S. Patent filed (application no. 14/882,256) and PCT Application filed (application no. PCT/US2015/055378) (authors' order different) on October 13, 2015. Provisional U.S. Patent filed (application no. 62/063,305) on October 13, 2014.)
- 5. Zhouye Gu, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "Method and Device for Reducing a Computational Load in High Efficiency Video Coding," U.S. Patent granted (publication number US10085028B2), September 25, 2018. (U.S. Patent filed (application no. 14/752,043) and PCT Application filed (application no. PCT/US2015/038042) on June 26, 2015. Provisional U.S. Patent filed (application no. 62/017,625) on June 26, 2014. A second related provisional application no. 62/027,386 was filed in-house and linked to the first one, on July 22, 2014.)
- 6. Zhouye Gu, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "Method and Device for Providing Depth Based Block Partitioning in High Efficiency Video Coding," U.S. Patent granted (publication number US10057586B2), August 21, 2018. (U.S. Patent filed (application no. 14/752,072) and PCT Application filed (application no. PCT/US2015/038037) on June 26, 2015. Provisional U.S. Patent filed (application no. 62/017,637) on June 26, 2014.)
- Guichun Li, Lingzhi Liu, Nam Ling, Jianhua Zheng, Chen-Xiong Zhang, and Li Song, "Simplification of Mode Dependent Intra Smoothing," U.S. Patent granted (publication number US9807385B2), October 31, 2017. (U.S. Patent filed (application no. 13/744,827), PCT Application filed (application no. PCT/US2013/022116), and China Patent filed (application no. CN 201380006070) on January 18, 2013. Provisional U.S. Patent (application no. 61/588,355) was filed on January 19, 2012.)
- 8. Zhouye Gu, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "System and Method for Estimating View Synthesis Distortion," U.S. Patent granted (publication number US9699462 B2), July 4, 2017. Revised version U.S. Patent granted later (publication number US10326995B2), June 18, 2019. (U.S. Patent filed (application no. 14/588,646) on January 2, 2015. Provisional U.S. Patent (application no. 61/923,500) was filed on January 3, 2014.)
- 9. Lingzhi Liu, Guichun Li, Nam Ling, Jianhua Zheng, and Chengxiong Zhang, "Using Multiple Prediction Sets to Encode Extended Unified Directional Intra Mode Numbers for Robustness," U.S. Patent granted (publication number US9667987 B2), May 30, 2017. (U.S. Patent filed (application no. 13/416,766) and PCT Application filed (application no. PCT/US2012/028533) (authors' order different) on March 9, 2012. Provisional U.S. Patent filed (application no. 61/451,432) on March 10, 2011.)

- 10. Jianhua Zheng, Zhouye Gu, Nam Ling, and Chen-Xiong Zhang, "Method and Apparatus of Depth Prediction Mode Selection," U.S. Patent granted (publication number US9641853 B2), May 2, 2017. (U.S. Patent filed (application no. 14/253,465) (authors' order different) on April 15, 2014. Provisional U.S. Patent (application no. 61/812,124) was filed on April 16, 2013.)
- 11. Guichun Li, Lingzhi Liu, Changcai Lai, Nam Ling, Jianhua Zheng, and Chen-Xiong Zhang, "Mode Dependent Intra Smoothing Filter Table Mapping Methods for Non-Square Prediction Units," U.S. Patent granted (publication number US9602839 B2), March 21, 2017. Revised version U.S Patent granted later (publication number US10015522B2), July 3, 2018. (U.S. Patent filed (application no. 13/475,587) on May 18, 2012 and PCT Application filed (application no. PCT/CN2012/076949) on June 14, 2012. Provisional U.S. Patent filed (application no. 61/497,173) on June 15, 2011.)
- 12. Zhouye Gu, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "Method and Apparatus of Derivation for a Binary Partition Pattern," U.S. Patent granted (publication number US9571858 B2), February 14, 2017. Revised version U.S. Patent granted later (publication number US9762914 B2), September 12, 2017. (U.S. Patent filed (application no. 14/335,403) on July 18, 2014. European patent filed (application number EP 14 826 205.8), on February 24, 2016. Provisional U.S. Patent (application no. 61/866,941) was filed on August 16, 2013.)
- 13. Zhouye Gu, Jianhua Zheng, Nam Ling, and Philipp Zhang, "Method and Apparatus of Depth Prediction Mode Selection," U.S. Patent granted (publication number US9503723 B2), Nov. 22, 2016. (U.S. Patent filed (application no. 14/152,904) and PCT Application filed (application no. PCT/US2014/011157) on January 10, 2014. Provisional U.S. Patent filed (application no. 61/751,589) on January 11, 2013.)
- 14. Lingzhi Liu, Guichun Li, Nam Ling, Jianhua Zheng, Philipp Zhang, and Li Song, "Reference Pixel Reduction for Intra LM Prediction," U.S. Patent granted (publication number US9307237 B2), Apr. 5, 2016. (U.S. Patent filed (application no. 13/745,134) and PCT Application filed (application no. PCT/US2013/022156) on January 18, 2013. Provisional U.S. Patent filed (application no. 61/588,359) on January 19, 2012.) [Also: European Patent granted (publication number EP 2 805 496 B1), December 21, 2016. (European Patent filed (application no. EP 13 702 692.8) on September 2014.)]
- 15. Lingzhi Liu, Guichun Li, Nam Ling, Jianhua Zheng, and Chengxiong Zhang, "Multiple Predictor Set for Intra Coding with Intra Mode Prediction," U.S. Patent granted (Patent Number 9,204,155), issued on December 1, 2015. (U.S. Patent filed (application no. 13/247,555) on September 28, 2011 and PCT Application filed (application no. PCT/CN2011/080404) on September 30, 2011 (title: "Improved Multiple Predictor Set for Intra Coding with Intra Mode Prediction"). Provisional U.S. Patent filed (application no. 61/388,485) on September 30, 2010.)
- 16. Guichun Li, Lingzhi Liu, Changcai Lai, Nam Ling, Jianhua Zheng, and Philipp Zhang, "Simplified Bilateral Intra Smoothing Filter," U.S. Patent granted (Patent Number 9,179,148), issued on November 3, 2015. (U.S. Patent filed (application no. 13/495,899) in June 2012 and PCT Application filed (application no. PCT/CN2012/078022) on July 2, 2012. Provisional U.S. Patent filed (application no. 61/503,415) on June 30, 2011.)
- 17. Lingzhi Liu, Xiang Li, Jianhua Zheng, Nam Ling, and Chen-Xiong Zhang, "Predictive Adaptive Scan Ordering for Video Coding," U.S. Patent granted (Patent Number 8,477,845), issued on July 2, 2013. (U.S. Patent filed (application no. 12/905,872) on October 15, 2010. Provisional U.S. Patent filed (application no. 61/252,443) on October 16, 2009.)

## (2) PATENTS FILED

- 18. Minqiang Jiang, Jianhua Zheng, Taru Kanchan, Nam Ling, and Chen-Xiong Zhang, "Non-MPM Mode Coding for Intra Prediction in Video Coding," Provisional U.S. patent (application no. 62/750,649) filed on October 25, 2018.
- 19. Minqiang Jiang, Jianhua Zheng, Promila Agarwal, Michael Schimpf, Nam Ling, and Chen-Xiong Zhang, "System and Method for Coding Intra Prediction Mode using a Second Set of Most Probable Modes," U.S.

Patent filed (application no. 15/818,551) on November 20, 2017 and PCT Application filed (application no. PCT/CN2017112356) on November 22, 2017. (Note: Provisional U.S. patent (application no. 62/425,425) filed on November 22, 2016.)

20. Zhouye Gu, Jianhua Zheng, Nam Ling, and Philipp Zhang, "Improved Reference Pixel Selection and Filtering for Intra Coding of Depth Map," U.S. Patent filed (application no. 14/515,930) and PCT Application filed (application no. PCT/SU2014/060873) on October 16, 2014. (Note: two Provisional U.S. Patents filed - application no. 61/892,342 on October 17, 2013 and application no. 61/923,124 on January 2, 2014.)