

Dr. Jing Hu

jinghu09@gmail.com

805-637-0954

540 Ricardo Ave., Santa Barbara, CA, 93109

EDUCATION

Doctorate of Philosophy, Electrical & Computer Engineering Nov. 2007

University of California, Santa Barbara

Master of Science, Electrical & Computer Engineering Jul. 2003

Rice University

Bachelor of Science, Precision Instruments Jul. 2001

Tsinghua University, China

EXPERIENCE

Consulting and Testifying Expert Feb. 2013 – Present

- Consulting in multiples cases on flash memory, universal plug and play, and Bluetooth technologies
- Consulting in multiple cases on mobile banking applications, cryptography and network security related technologies
- Consulting in a case on Android smartphones, mobile hotspot and 4G LTE technologies
- Consulted and testified in a case on Android smartphones and communication over 3G mobile networks
- Consulted in a case on Bluetooth technology
- Evaluated video compression related patent portfolios
- Evaluated video and television related patent portfolios

Research Scientist and Embedded Software Engineer Aug. 2007 – Jan. 2013

DSP Group, Cisco Systems, Santa Barbara, CA

- Conducted independent research on non-intrusive video quality monitoring (VQM) over IP networks and invented a lightweight content aware bit stream video quality model. Also implemented the model and its related services in both digital signal processing (DSP) and Cisco IOS code for Cisco integrated service routers (ISR).
- Designed and implemented, together with another developer, a synthetic video traffic generator for IP service level agreement (IPSLA) video object (VO), for the purpose of ensuring Quality of Service (QoS) prior to network deployment. Through modeling synthetic video traffic gained in-depth knowledge and hands on experience with Cisco Telepresence Systems, Roundtable IP phones, Cisco Webex video traffic and Cisco Surveillance Cameras 4000 series. This feature was part of the Cisco Medianet architecture that won Cisco's prestigious Pioneer Award of 2011.
- Part of a group that designed and implemented a multiple control unit (MCU) for video conferencing on LSI StarPro 2603 DSP board. This feature is shipping with Cisco Integrated Service Router (ISR) Generation two (G2).
- Core developer in a Wide Area Network (WAN) optimization project. Was in charge of a

feature that performs deep video inspection and uses the extracted information to allocate bandwidth optimally across different video streams.

Research Assistant

Sep. 2003 – Jul. 2007

ECE Department, University of California, Santa Barbara

- Proposed a block-based local-texture-dependent correlation model of digitized natural videos and derived new theoretical rate distortion bounds for video. These theoretical bounds are the only existing valid bounds with regard to the cutting edge video coding standards such as H.264 and to-be-finalized high efficiency video coding (HEVC)/H.265.
- Proposed a statistical PSNR based quality indicator $PSNR_{r,f}$ and established its correspondence to a new perceptual quality indicator MOS_r through a subjective experiment. Proposed two video user capacity formulas for IEEE 802.11a WLAN with distributed coordination function and defined video user capacity under the multiuser perceptual video quality constraint $PSNR_{r,f}/MOS_r$. The journal paper that publishes this research won the best paper award of IEEE Transactions on Multimedia 2007-2009.
- Generated intra-mode indexed non-uniform quantization parameter matrices which improve perceptual quality of videos compressed in H.264, by studying the luminance, texture, and temporal masking properties of the human vision system (HVS).

Technical Intern

Jun. 2006 – Sep. 2006

Wireless communication lab, Intel Corporation, Hillsboro, OR

Conducted two tests to study end-to-end perceptual quality of television signals transmitted over wireless networks: MPEG-2 coded standard definition TV (SDTV) over 802.11g WLAN and H.264 coded high definition TV (HDTV) over WiMAX. Investigated the correspondence between network characteristics such as throughput and packet loss rate and sophisticated objective perceptual video quality metrics such as the Intel-developed video analysis system (VAS). Defined new criteria for smart path selection in the Hybrid Networking Project.

PATENTS

- [1] Jing Hu. Lightweight content aware bit stream video quality monitoring service. *Filed with USPTO on Nov. 07, 2011, ref #13/290,649.*
- [2] Wenyi Wang, Jing Hu, Laura Liao, Rong Wang, Duanpei Wu, Stan Yang. Controlling bit-rates for media streaming sessions. *Issued US 13/365,122.*
- [3] Wenyi Wang, Laura Liao, Rong Wang, Duanpei Wu, Stan Yang, Jing Hu. Wide Area Network Optimization. *Filed with USPTO on Feb 2, 2012.*
- [4] Herb Wildfeuer, Da Lin, Jing Hu. Endpoint Information for Network VQM. *Filed with USPTO on July 12, 2013.*

PUBLICATIONS**Journals and books:**

- [1] Jing Hu, Sayantan Choudhury, and Jerry D. Gibson. Video capacity of WLANs with a multiuser perceptual quality constraint. *IEEE Transactions on Multimedia*, 10(8):1465-1478, Dec. 2008. **Best Paper Award of IEEE Transactions on Multimedia 2007-2009.**
- [2] Jing Hu and Jerry D. Gibson. New rate distortion bounds for natural videos based on a texture dependent correlation model. *IEEE Transactions on Circuits and Systems for Video*

Technology, 19(8): 1081-1094, Aug. 2009.

[3] Jerry D. Gibson and Jing Hu. Rate Distortion Bounds for Voice and Video. *A book in the series Foundations and Trends in Communications and Information Theory. Now Publishers Inc., Feb. 2014.*

Selected peer reviewed conference papers:

[1] Jing Hu. A lightweight content aware bit stream video quality monitoring service . *CTech Forum, Nov. 2011.*

[2] Jing Hu. Video Capacity of WLANs with a Multiuser Perceptual Quality Constraint. *CTech Forum, Sep. 2010.*

[3] Jing Hu and Jerry D. Gibson. A practical rate distortion bound for inter-frame video coding. **Invited**, *Proceedings of the Forty-third Asilomar Conference on Signals, Systems, and Computers, Nov. 2009.*

[4] Jing Hu, Sayantan Choudhury and Jerry D. Gibson. PSNR_{r,f}-MOS_r: an easy-to-compute multiuser perceptual video quality measure. *First International Workshop on Quality of Multimedia Experience, Jul. 2009.*

[5] Jing Hu and Herb Wildfeuer. Use of content complexity factors in video over IP quality Monitoring. *First International Workshop on Quality of Multimedia Experience, Jul. 2009.*

[6] Jing Hu and Jerry D. Gibson. Rate distortion bounds for blocking and intra-frame prediction in videos. **Invited**, *Information Theory and Applications Workshop, University of California, San Diego, Feb. 2009.*

[7] Jing Hu and Jerry D. Gibson. New rate distortion bounds for natural videos based on a texture dependent correlation model in the spatial-temporal domain. *Forty-Sixth Annual Allerton Conference on Communication, Control, and Computing, Sep. 2008.*

[8] Jing Hu, Sayantan Choudhury, and Jerry D. Gibson. Perceptual quality constrained video user capacity of 802.11a WLANs. *International Symposium on Multimedia over Wireless, Aug. 2007.*

[9] Jing Hu, Sayantan Choudhury, and Jerry D. Gibson. H.264 video over 802.11a WLANs with multipath fading: Parameter interplay and delivered quality. *International Conference on Multimedia & Expo, Jul. 2007.*

[10] Jing Hu and Jerry D. Gibson. New rate distortion bounds for natural videos based on a texture dependent correlation model. *IEEE International Symposium on Information Theory, Jun. 2007.*

[11] Jing Hu and Jerry D. Gibson. New block-based local-texture-dependent correlation model of digitized natural video. *Proceedings of the Fortieth Asilomar Conference on Signals, Systems, and Computers, Oct. 2006.*

[12] Jing Hu, Sayantan Choudhury, and Jerry D. Gibson. PSNR_{r,f} : Assessment of delivered AVC/H.264 video quality over 802.11a WLANs with multipath fading. *First Multimedia Communications Workshop: State of the Art and Future Directions, Jun. 2006.*

[13] Jing Hu and Jerry D. Gibson. Intra-mode indexed non-uniform quantization parameter matrices in AVC/H.264. *Proceedings of the Thirty-ninth Asilomar Conference on Signals, Systems, and Computers, Oct. 2005.*

[14] Jing Hu and A. C. Antoulas, Krylov-based moment matching methods for discrete-time linear periodically Time-Varying systems," *The Eighth SIAM Conference on Applied Linear Algebra, Williamsburg, Virginia, Jul 2003.*

COMPUTER SKILLS

C, C++, C sharp, objective C, COBOL, Matlab, Ruby, Java, Linux, Unix, Windows, Android OS, JavaScript, VHDL