

# Professor Wen-Hsiao Peng

## Education

- Ph.D., M.S. and B.S. in EE, National Chiao Tung University, Taiwan, 2005, 1999, 1997

## Work Experience

- July 2015 – July 2016, **Visiting Professor**, IBM Thomas J. Watson Research Center, New York, USA
- Aug. 2006 – Pres., National Chiao Tung University (NCTU), Hsinchu, Taiwan  
**Associate Professor**, Department of Computer Science  
**Director**, Division of Industry Cooperation, Office of International Affairs  
**Assistant Director**, Computer Vision Research Center  
**Secretariat**, EECS Center for Circuit Theory, Communications, and Signal Processing
- Aug. 2011 – Pres., Industrial Technology Research Institute International (ITRI-USA), USA  
**Principal Representative** to the InterNational Committee for Information Technology Standards, USA
- Nov. 2000 – Nov. 2001, **Intern**, Intel Microprocessor Research Lab, California, USA

## Societies Membership

- Senior Member of the IEEE, '13
- Member, IEEE CASS Visual Signal Processing and Communications Technical Committee, '09 – Pres.
- Conference Subcommittee Co-chair, IEEE CASS VSPC TC, '15 – Pres.
- Member, IEEE CASS Multimedia Systems and Applications Technical Committee, '09 – '15
- Delegate, ISO/IEC Moving Picture Experts Group (MPEG), '04 – Pres.

## Editorial and Review Experiences

- **Lead Guest Editor**, IEEE Journal on Emerging and Selected Topics in Circuits and Systems, '16
- **Area Chair**, IEEE Int. Conference on Multimedia and Expo (ICME), '15
- **Area Chair**, Visual Communications and Image Processing Conference (VCIP), '15
- **Best Reviewer Award**, Visual Communications and Image Processing Conference (VCIP), '13
- **Technical Program Co-chair**, Visual Communications and Image Processing Conference (VCIP), '11
- **Review Committee Member**, IEEE Int. Symposium on Circuits and Systems (ISCAS), '12 – '16
- **Best Paper Committee Member**, IEEE Int. Conference on Multimedia & Expo (ICME), '10
- **Special Session Organizer**, APSIPA ASC-2014, ASC-2010; IEEE ICME-2010
  - Special Session on HEVC Screen Content Coding (ASC-14); Special Session on High-Efficiency Video Coding (ASC-10); Special Session on High-Quality Video Coding (ICME-10)
  - Coordinated and invited 5+ papers for each special session
- **Technical Program Committee Member**, IEEE Int. Symposium on Multimedia (ISM), '08 – '15
- **Technical Program Committee Member**, IEEE Int. Symposium on Consumer Electronics (ISCE), '13
- **Technical Program Co-chair**, IEEE Workshop on Scalable Video Coding and Transport, '07
- **Reviewers for major journals/conferences**: IEEE Trans. Multimedia (T-MM); IEEE Trans. Circuits Syst. Video Technol. (T-CSVT); IEEE Trans. Image Process. (T-IP); IEEE J. Emerging Select. Topics in Circuits Syst. (JETCAS); J. Visual Commun. Image Representation (JVCI); IEEE Int. Conf. Multimedia and Expo (ICME), Visual Commun. Image Process. Conf. (VCIP); IEEE Int. Symp. Circuits Syst. (ISCAS); IEEE Int. Conf. on Image Process. (ICIP); Asia-Pacific Signal and Inform. Process. Assoc. Annu. Summit Conf. (ASC)

## Research Highlights

- Conducted joint study with IBM System G group on cross-domain data fusion for multimedia analytics
- Contributed actively to the development of international MPEG/ITU standards since 2003
  - Submitted responses (one of the few university teams) to MPEG/ITU Call-for-Proposals on (1) Scalable Video Coding (2004), (2) High-Efficiency Video Coding, HEVC (2011), and (3) HEVC Screen Content Coding Extensions (2014)

- Coordinated several Core Experiments related to these standards
- Main inventor of Non-square Intra Block Copy in the HEVC Screen Content Coding Extensions
- Published 50+ technical papers and 50+ MPEG/ITU standards contributions, and hold 9 patents

#### Invited Talks (Selected)

- *Guest Lecture*, “Large-Scale Multimedia Analysis: MPEG Video and Visual Search,” in EECS E6895: Advanced Big Data Analytics at Columbia University, New York, Apr. 2016
- *Tutorial*, “HEVC Screen Content Coding (SCC) – Standardization and Technologies,” in Visual Communications and Image Processing Conf. (VCIP), Singapore, Dec. 2015
- *Talk*, “Recent Advances of ITU-T/MPEG Video Coding Standards,” at IBM Thomas J. Watson Research Center, New York, Sep. 2015

#### Publications (Selected)

1. W.-H. Peng, F. Walls, R. A. Cohen, J. Xu, J. Ostermann, S. MacInnis, and T. Lin, “Overview of screen content video coding: technologies, standards, and beyond,” *IEEE J. Emerging Select. Topics in Circuits Syst.*, submitted, 2016
2. C.-C. Chen and W.-H. Peng, “Intra line copy for HEVC screen content intra-picture prediction,” *IEEE Trans. Circuits Syst. Video Technol.*, to be published, 2016
3. W.-L. Ku, H.-C. Chou, W.-H. Peng, “Discriminatively-learned global image representation using CNN as a local feature extractor for image retrieval”, in *Proc. Visual Commun. Image Process. Conf. (VCIP)*, Dec. 2015
4. C. C. Chen, T. S. Chang, R. L. Liao, C. W. Kuo, W. H. Peng, H. M. Hang, et. al, "Description of screen content coding technology proposal by NCTU and ITRI International," *ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11*, JCTVC-Q0032, Valencia, Spain, Mar. 2014
5. C. C. Chen, X. Xu, R. L. Liao, W. H. Peng, S. Liu, and S. Lei, "Screen Content Coding Using Non-square Intra Block Copy for HEVC," *Proc. IEEE Int. Conf. Multimedia and Expo (ICME)*, China, July, 2014.
6. W.-H. Peng and C.-C. Chen, “An inter-frame prediction technique combining template matching and block motion compensation for high efficiency video coding,” *IEEE Trans. Circuits Syst. Video Technol.*, vol. 23, no. 8, pp. 1432-1446, Aug. 2013
7. Y.-W. Chen and W.-H. Peng, “Parametric OBMC for pixel-adaptive temporal prediction on irregular motion sampling grids,” *IEEE Trans. Circuits Syst. Video Technol.*, vol. 22, no. 1, pp. 113-127, Jan. 2012
8. H.-C. Lin, H.-M. Hang, and W.-H. Peng, "Fast bi-directional prediction selection in H.264/MPEG-4 AVC temporal scalable video coding," *IEEE Trans. on Image Process.*, vol. 20, no. 12, pp. 3508-3523, Dec. 2011
9. H. C. Lin, W.-H. Peng, and H. M. Hang, “Fast context-adaptive mode decision algorithm for scalable video coding with combined coarse-grain quality scalability (CGS) and temporal scalability,” *IEEE Trans. Circuits Syst. Video Technol.*, vol. 20, no. 5, pp. 732-748, May 2010
10. Y-W. Chen, T.-W. Wang, C.-H. Chan, C.-L. Lee, C.-H. Wu, Y.-C. Tseng, W.-H. Peng, C.-J. Tsai, and H.-M. Hang, “Description of video coding technology proposal by NCTU,” *ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11*, JCTVC-A123, Dresden, DE, Apr. 2010
11. W. H. Peng, J. K. Zao, H. T. Huang, T. W. Wang, and L. S. Huang, "A Rate Distortion Optimization Model for SVC Inter-layer Encoding and Bitstream Extraction," *J. Visual Commun. Image Representation*, vol. 19, no. 8, pp. 543-557, Dec. 2008.
12. H. C. Huang, W. H. Peng, T. Chiang, and H. M. Hang, "Advances in the Scalable Extension of H.264/AVC," *IEEE Commun. Mag.*, vol. 45, no. 1, pp. 68-76, Jan. 2007
13. W.-H. Peng, T. Chiang, H.-M. Hang, and C.-Y. Lee, "A context adaptive binary arithmetic codec with maximum likelihood based stochastic bit reshuffling (SBR) technique for scalable video coding," *IEEE Trans. on Multimedia*, vol. 8, no. 4, pp. 654-667, Aug. 2006