

# DONGBO MIN

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## RESEARCH INTEREST

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Computer Vision, Computational Photography, Augmented Reality  
Feature Descriptor, Image Filtering, Continuous/Discrete Optimization  
Deep Learning, Sparse Representation  
Color/Depth Imaging Sensor, Display Image Processing

## EDUCATION

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**PhD in Electrical and Electronics Engineering** 02/2005 – 02/2009  
Yonsei University, Seoul, Korea  
PhD thesis (supervisor: Prof. Kwanghoon Sohn)  
– **Multiview Stereo Matching and Freeview Video Generation for 3DTV System**

**MS in Electrical and Electronics Engineering** 03/2003 – 02/2005  
Yonsei University, Seoul, Korea  
MS thesis (supervisor: Prof. Kwanghoon Sohn)  
– **Edge-preserving Joint Motion/Disparity Estimation In Stereo Image Sequences**

**BS in Electrical and Electronics Engineering** 03/1999 – 02/2003  
Yonsei University, Seoul, Korea

## WORK EXPERIENCES

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**Chungnam National University (CNU)** Daejeon, Korea  
*Assistant Professor*, Dept. of Computer Science and Engineering 03/2015 – Present  
Director of the Computer Vision Laboratory (CVLab), CNU, Korea

**Advanced Digital Sciences Center (ADSC)<sup>1</sup>** Singapore  
*Research Scientist* 07/2012 – 02/2015  
*Researcher* 07/2010 – 06/2012

**Mitsubishi Electric Research Laboratories (MERL)** Cambridge, MA, US  
*Post-Doctoral Researcher* 06/2009 – 06/2010

**Yonsei University** Seoul, Korea  
*Research Assistant* 03/2003 – 05/2009

**Coordinated Science Laboratory (CSL), UIUC** Urbana-Champaign, IL, US  
*Principal Research Affiliate* (Joint appointment at CSL) 10/2012 – 02/2015

## PUBLICATIONS

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### International Journal

- Jiangbo Lu, Yu Li, Hongsheng Yang, **Dongbo Min**<sup>\*</sup>, Wei Yong Eng, and Minh N. Do  
PatchMatch Filter: Edge-Aware Filtering Meets Randomized Search for Visual Correspondence  
*IEEE Trans. on Pattern Analysis and Machine Intelligence* (TPAMI) (accepted, <sup>\*</sup>: corresponding author)
- Seungryong Kim, **Dongbo Min**, Bumsub Ham, Minh N. Do, and Kwanghoon Sohn  
DASC: Robust Dense Descriptor for Multi-modal and Multi-spectral Correspondence Estimation  
*IEEE Trans. on Pattern Analysis and Machine Intelligence* (TPAMI) (accepted)

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<sup>1</sup>The national research institute co-founded by Univ. of Illinois at Urbana-Champaign (UIUC) and A\*STAR (Singapore Government Agency)

3. Kang Zhang, Yuqiang Fang, **Dongbo Min\***, Lifeng Sun\*, Shiqiang Yang, and Shuicheng Yan  
Cross-Scale Cost Aggregation for Stereo Matching  
*IEEE Trans. on Circuits and Systems for Video Technology (TCSVT)* (in press, \*: corresponding author)
4. Jongin Son, Minsung Kang, **Dongbo Min**, and Kwanghoon Sohn  
EMCCD Color Correction Based on Spectral Sensitivity Analysis  
*Multimedia Tools and Applications*, vol. 75, no. 13, pp. 7589-7604, Jul. 2016
5. Sunghwan Choi, **Dongbo Min**, Bumsub Ham, Yongjung Kim, Changjae Oh, and Kwanghoon Sohn  
Depth Analogy: Data-driven Approach for Single Image Depth Estimation using Gradient Samples  
*IEEE Trans. on Image Processing (TIP)*, vol. 24, no. 12, pp. 5953-5966, Dec. 2015
6. Sunghwan Choi, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn  
Unsupervised Texture Flow Estimation Using Appearance-space Clustering and Correspondence  
*IEEE Trans. on Image Processing (TIP)*, vol. 24, no. 11, pp. 3652-3665, Nov. 2015
7. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn  
Depth Super-Resolution by Transduction  
*IEEE Trans. on Image Processing (TIP)*, vol. 24, no. 5, pp. 1524-1535, May 2015
8. **Dongbo Min**, Sunghwan Choi, Jiangbo Lu, Bumsub Ham, Kwanghoon Sohn, and Minh N. Do  
Fast Global Image Smoothing Based on Weighted Least Squares  
*IEEE Trans. on Image Processing (TIP)*, vol. 23, no. 12, pp. 5638-5653, Dec. 2014  
◇ This work was included in the **official release of OpenCV 3.1** as of Dec. 2015.
9. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn  
Reliability-based Multiview Depth Enhancement Considering Inter-view Coherence  
*IEEE Trans. on Circuits and Systems for Video Technology (TCSVT)*, vol. 24, no. 4, pp. 603-616, Apr. 2014
10. Bumsub Ham, **Dongbo Min**, Changjae Oh, Minh N. Do, and Kwanghoon Sohn  
Probability-Based Rendering for View Synthesis  
*IEEE Trans. on Image Processing (TIP)*, vol. 23, no. 2, pp. 870-884, Feb. 2014
11. Stefan Winkler and **Dongbo Min\***  
Stereo/Multiview Picture Quality: Overview and Recent Advances  
*Signal Proc.: Image Comm. (SPIC)*, vol. 28, no. 10, pp. 1358-1373, Nov. 2013 (\*: corresponding author)
12. **Dongbo Min**, Jiangbo Lu, and Minh N. Do  
Joint Histogram Based Cost Aggregation for Stereo Matching  
*IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 35, no. 10, pp. 2539-2545, Oct. 2013
13. Bumsub Ham<sup>†</sup>, **Dongbo Min**<sup>†</sup>, and Kwanghoon Sohn  
A Generalized Random Walk with Restart and Its Application in Depth Up-sampling and Interactive Segmentation  
*IEEE Trans. on Image Processing (TIP)*, vol. 22, no. 7, pp. 2574-2588, Jul. 2013  
(<sup>†</sup>: contributed equally to this work.)
14. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn  
Revisiting the Relationship Between Adaptive Smoothing and Anisotropic Diffusion with Modified Filters  
*IEEE Trans. on Image Processing (TIP)*, vol. 22, no. 3, pp. 1096-1107, Mar. 2013
15. Viet-Anh Nguyen, **Dongbo Min**, and Minh N. Do  
Efficient Techniques for Depth Video Compression Using Weighted Mode Filtering  
*IEEE Trans. on Circuits and Systems for Video Technology (TCSVT)*, vol. 23, no. 2, pp. 189-202, Feb. 2013
16. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn  
Robust Scale Space Filter with Second Order Partial Differential Equations  
*IEEE Trans. on Image Processing (TIP)*, vol. 21, no. 9, pp. 3937-3951, Sep. 2012
17. **Dongbo Min**, Jiangbo Lu, and Minh N. Do  
Depth Video Enhancement Based on Weighted Mode Filtering  
*IEEE Trans. on Image Processing (TIP)*, vol. 21, no. 3, pp. 1176-1190, Mar. 2012
18. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn  
2D-Plus-Depth Based Resolution and Frame-rate Up-conversion Technique for Depth Video  
*IEEE Trans. on Consumer Electronics*, vol. 56, no. 4, pp. 2489-2497, Nov. 2010
19. **Dongbo Min** and Kwanghoon Sohn  
An Asymmetric Post-Processing for Correspondence Problem  
*Signal Processing: Image Communication (SPIC)*, vol. 25, no. 2, pp. 130-142, Feb. 2010

20. **Dongbo Min**, Donghyun Kim, SangUn Yun, and Kwanghoon Sohn  
2D/3D Freeview Video Generation for 3DTV System  
*Signal Processing: Image Communication (SPIC)*, vol. 24, no. 1-2, pp. 31-48, Jan. 2009  
(Invited paper, special issue on 3DTV)
21. **Dongbo Min** and Kwanghoon Sohn  
Cost Aggregation and Occlusion Handling With WLS in Stereo Matching  
*IEEE Trans. on Image Processing (TIP)*, vol. 17, no. 8, pp. 1431-1442, Aug. 2008
22. Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn  
A Stereoscopic Video Generation Method Using Stereoscopic Display Characterization and Motion Analysis  
*IEEE Trans. on Broadcasting (TB)*, vol. 54, no. 2, pp 188-197, Jun. 2008
23. Hansung Kim, Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn  
A 3D Modeling and Free-View Generation System Using Environmental Stereo Cameras  
*Int. Journal of Imaging Systems and Technology (IJIST)*, vol. 17, no. 6, pp. 367-378, Apr. 2008
24. **Dongbo Min**, Hansung Kim, and Kwanghoon Sohn  
Edge-Preserving Joint Motion Disparity Estimation in Stereo Image Sequences  
*Signal Processing: Image Communication (SPIC)*, vol. 21, no. 3, pp. 252-271, Mar. 2006
25. Hansung Kim, **Dongbo Min**, Shinwoo Choi, and Kwanghoon Sohn  
Real-Time Disparity Estimation Using Foreground Segmentation for Stereo Sequences  
*Optical Engineering*, vol. 45, no. 3, pp. 037402 1-10, Mar. 2006

### International Journal (Submitted)

1. Youngjung Kim, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn  
Fast Domain Decomposition for Global Image Smoothing  
*IEEE Trans. on Image Processing (TIP)* (**Under review**)
2. Sunok Kim, **Dongbo Min**, Seungryong Kim, and Kwanghoon Sohn  
Feature Augmentation for Learning Confidence Measure in Stereo Matching  
*IEEE Trans. on Image Processing (TIP)* (**Under review**)
3. Suhyuk Um, Jaeyoon Kim, **Dongbo Min**\*  
Fast 2-D Complex Gabor Filter with Kernel Decomposition  
*IEEE Trans. on Image Processing (TIP)* (**Under review**, \*: corresponding author)

### International Conference Tutorial

1. Jiangbo Lu, **Dongbo Min**, and Minh N. Do  
Discontinuities-Preserving Image and Motion Coherence: Computational Models and Applications  
**Half-day tutorial** in *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Mar. 2016  
Web: <https://sites.google.com/site/icassp16imc/>
2. **Dongbo Min**, Wen-Yan Lin, Jiangbo Lu, and Minh N. Do  
Visual Correspondences: Taxonomy, Modern Approaches and Ubiquitous Applications  
**Half-day tutorial** in *IEEE Int. Conf. Multimedia and Expo (ICME)*, Jun. 2015  
Web: <https://sites.google.com/site/icme15tutorial/>
3. Jiangbo Lu, **Dongbo Min**, and Minh N. Do  
Image Filtering 2.0: Efficient Edge-Aware Filtering Techniques and Their Applications  
**Half-day Tutorial** in *IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2013  
Web: <https://sites.google.com/site/filteringtutorial/>

### International Conference

1. Youngjung Kim<sup>†</sup>, Hyungjoo Jung<sup>†</sup>, **Dongbo Min**, and Kwanghoon Sohn  
Deeply Aggregated Alternating Minimization for Image Restoration  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jul. 2017  
(<sup>†</sup>: contributed equally to this work.)
2. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Sangryul Jeon, Stephen Lin, and Kwanghoon Sohn  
FCSS: Fully Convolutional Self-Similarity for Dense Semantic Correspondence  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jul. 2017

3. Yu Li, **Dongbo Min**, and Minh N. Do, and Jiangbo Lu  
Fast Guided Global Interpolation for Depth and Motion  
*European Conference on Computer Vision (ECCV)*, Oct. 2016 (**spotlight presentation**)
4. Seungryong Kim, **Dongbo Min**, Stephen Lin, and Kwanghoon Sohn  
Deep Self-Correlation Descriptor for Dense Cross-Modal Correspondence  
*European Conference on Computer Vision (ECCV)*, Oct. 2016
5. Seungryong Kim, **Dongbo Min**, and Kwanghoon Sohn  
ANCC FLOW: Adaptive Normalized Cross-Correlation with Evolving Guidance Aggregation for Dense Correspondence Estimation  
*IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2016
6. Yu Li, **Dongbo Min**\*, Michael S. Brown, Minh N. Do, and Jiangbo Lu  
SPM-BP: Sped-up PatchMatch Belief Propagation for Continuous MRFs  
*IEEE Int. Conf. on Computer Vision (ICCV)*, Dec. 2015  
(**Oral presentation**, < 4.0% **acceptance ratio**, \*: corresponding author)
7. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Seungchul Ryu, Minh N. Do, and Kwanghoon Sohn  
DASC: Dense Adaptive Self-Correlation Descriptor for Multi-modal and Multi-spectral Correspondence  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2015
8. Sunghwan Choi, **Dongbo Min**, and Kwanghoon Sohn  
Randomized Texture Flow Estimation Using Visual Similarity  
*IEEE Int. Conf. on Image Processing (ICIP)*, Jul. 2014
9. Kang Zhang, Yuqiang Fang, **Dongbo Min**, Lifeng Sun, Shiqiang Yang, Shuicheng Yan, and Qi Tian  
Cross-Scale Cost Aggregation for Stereo Matching  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2014
10. Wei Yong Eng, **Dongbo Min**, Viet-Anh Nguyen, Jiangbo Lu, and Minh N. Do  
Gaze Correction For 3D Tele-Immersive Communication System  
*IEEE IVMSWP Workshop: 3D Image/Video Technologies and Applications (IVMSWP)*, Jun. 2013
11. Jiangbo Lu, Hongsheng Yang, **Dongbo Min**, and Minh N. Do  
PatchMatch Filter: Efficient Edge-Aware Filtering Meets Randomized Search for Fast Correspondence Field Estimation  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2013  
(**Oral presentation**, < 4.0% **acceptance ratio**)
12. Viet-Anh Nguyen, **Dongbo Min**, and Minh N. Do  
Efficient Edge-Preserving Interpolation and In-Loop Filters for Depth Map Compression  
*IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2012
13. Jiangbo Lu, Keyang Shi, **Dongbo Min**, Liang Lin, and Minh N. Do  
Cross-Based Local Multipoint Filtering  
*IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2012
14. **Dongbo Min**, Jiangbo Lu, Viet-Anh Nguyen, and Minh N. Do  
Weighted mode filtering and its applications to depth video enhancement and coding  
*IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP)*, Mar. 2012 (Invited paper on special session)
15. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn  
Stereo Depth Video Enhancement Based on Temporal and Inter-view Coherences  
*IEEE Int. Conf. on Consumer Electronics (ICCE)*, Jan. 2012
16. Stefan Winkler and **Dongbo Min**  
Stereoscopic Image Quality Compendium  
*Proc. Int. Conf. on Information and Communication Systems (ICICS)*, Dec. 2011
17. Kyle Rupnow, Yun Liang, Yinan Li, **Dongbo Min**, Minh N. Do, and Deming Chen  
High Level Synthesis of Stereo Matching: Productivity, Performance, and Software Constraints  
*Int. Conf. on Field Programmable Technology (FPT)*, Dec. 2011. (The best paper nomination)  
[FPT is one of top FPGA-related conferences.]
18. **Dongbo Min**, Jiangbo Lu, and Minh N. Do  
A Revisit to Cost Aggregation in Stereo Matching: How Far Can We Reduce Its Computational Redundancy?  
*IEEE Int. Conf. on Computer Vision (ICCV)*, Nov. 2011 (**Oral presentation**, < 4.0% **acceptance ratio**)

19. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn  
Cost Aggregation with Anisotropic Diffusion in Feature Space for Hybrid Stereo Matching  
*IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2011
20. Jiangbo Lu, **Dongbo Min**, Raman S. Pahwa, and Minh N. Do  
A Revisit to MRF-based Depth Map Super-resolution and Enhancement  
*IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP)*, May 2011 (Oral presentation)
21. Jinwook Choi, **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn  
3D JBU based depth video filtering for temporal fluctuation reduction  
*IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2010
22. **Dongbo Min**, Sehoon Yea, and Anthony Vetro  
Occlusion handling based on support and decision  
*IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2010 (Oral presentation)
23. **Dongbo Min**, Sehoon Yea, and Anthony Vetro  
Temporally consistent stereo matching using coherence function  
*IEEE 3DTV Conference*, Jun. 2010 (Oral presentation)
24. **Dongbo Min**, Sehoon Yea, Zafer Arican, and Anthony Vetro  
Disparity search range estimation: enforcing temporal consistency  
*IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP)*, Mar. 2010
25. Jinwook Choi, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn  
Spatial and temporal up-conversion technique for depth video  
*IEEE Int. Conf. on Image Processing (ICIP)*, Nov. 2009
26. Bumsub Ham, **Dongbo Min**, Jinwook Choi, and Kwanghoon Sohn  
Virtual view rendering using super-resolution with multiview images  
*IEEE Int. Conf. on Image Processing (ICIP)*, Nov. 2009 (Oral presentation)
27. Donghyun Kim, **Dongbo Min**, Juhyun Oh, S. Jeon, and Kwanghoon Sohn  
Depth map quality metric for three-dimensional video  
*Proc. SPIE Electronic Imaging*, Jan. 2009
28. **Dongbo Min**, Juhyun Oh, and Kwanghoon Sohn  
Asymmetric post-processing for stereo correspondence  
*IEEE Int. Conf. on Pattern Recognition (ICPR)*, Dec. 2008
29. **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn  
2D/3D freeview video generation for 3DTV system  
*IEEE Int. Conf. on Image Processing (ICIP)*, pp. 1760-1763, Oct. 2008 (Oral presentation)
30. **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn  
Virtual view rendering system for 3DTV  
*IEEE 3DTV Conference*, pp. 249-252, May 2008 (Oral presentation)
31. **Dongbo Min**, Donghyun Kim, S. Yun, and Kwanghoon Sohn  
Freeview rendering with trinocular camera  
*IEEE Int. Symposium on Circuits and Systems (ISCAS)*, pp. 3446-3449, May 2008
32. **Dongbo Min** and Kwanghoon Sohn  
Stereo matching with asymmetric occlusion handling in weighted least square framework  
*IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP)*, pp. 1061-1064, Mar. 2008
33. SangUn Yun, **Dongbo Min**, and Kwanghoon Sohn  
3D scene reconstruction system with hand-held stereo cameras  
*IEEE 3DTV Conference*, May 2007
34. Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn  
Stereoscopic video generation method using motion analysis  
*IEEE 3DTV Conference*, May 2007
35. SangUn Yun, **Dongbo Min**, and Kwanghoon Sohn  
Fast dense stereo matching using adaptive window in hierarchical framework  
*Int. Symposium on Visual Computing (ISVC)*, LNCS, pp. 316-325, Nov. 2006

36. **Dongbo Min**, SangUn Yun, and Kwanghoon Sohn  
Segment-based stereo matching using energy-based regularization  
*Proc. IWMRCS, LNCS*, pp. 761-768, Sep. 2006
37. **Dongbo Min** and Kwanghoon Sohn  
Edge-preserving simultaneous joint motion-disparity estimation  
*IEEE Int. Conf. on Pattern Recognition (ICPR)*, pp. 252-271, Aug. 2006 (Oral presentation)
38. Hansung Kim, **Dongbo Min**, Shinwoo Choi, Donghyun Kim, and Kwanghoon Sohn  
Real-time shape recovery from silhouette and disparity  
*SIGGRAPH (sketch paper)*, Jul. 2005
39. Hansung Kim, **Dongbo Min**, and Kwanghoon Sohn  
Real-time stereo using foreground segmentation and hierarchical disparity estimation  
*Pacific-Rim Conference on Multimedia (PCM), LNCS*, pp. 384-395, Nov. 2005 (Oral presentation)

### International Conference (Submitted)

### Korean Journal /Conference

Journal: 3 papers, Conference: 8 papers (in Korean)

## PATENTS

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1. **Dongbo Min** et. al., "Method for Handling Pixel Occlusions in Stereo Images Using Iterative Support and Decision Processes," US patent no.: US8315426 B2, Nov 20, 2012.
2. **Dongbo Min** et. al., "Determining Disparity Search Range in Stereo Videos," US patent no.: US8290248 B2, Oct 16, 2012.
3. **Dongbo Min** et. al., "Method of 2D/3D virtual view synthesis for freeview video generation," Korea patent no.: 10-0924716, Oct. 27, 2009
4. **Dongbo Min** et. al., "Method of calculating cost function and handling occluded region in disparity estimation," Korea patent no.: 10-0930286, Nov. 30, 2009.
5. **Dongbo Min** et. al., "Method and apparatus of image rectification in arbitrary view synthesis," Korea patent no.: 10-0897542, May 07, 2009.
6. **Dongbo Min** et. al., "Method and apparatus of 3D image reconstruction," Korea patent no.: 10-0890224, Mar. 17, 2009.

## PROJECT EXPERIENCES

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### Current Projects (@CNU)

**Highly Efficient and Advanced Visual Correspondence Algorithms for Big Visual Data** 11/2015–10/2018

- ‘Individual Basic Science and Engineering Research Program’ of NRF Korea
- Principal Investigator (PI), CNU, Korea (50M KRW/year)
- Feature descriptor, discrete labeling algorithm, graph matching

**High Quality 2D-to-Multiview Contents Generation from Large-scale RGB+D Database** 07/2015–08/2017

- ‘Digital Content R&D Project’ of Institute for Information & Communications Technology Promotion (IITP), Korea
- Co-Principal Investigator (Co-PI), CNU, Korea (80M KRW/year, Total amount of funding: 400M KRW/year)
- Constructing 2M RGB+D database, single image depth estimation, and interactive depth editing

### Past Projects (@CNU, ADSC, MERL, and Yonsei)

**Real-time Monitoring of Points of Impact**

10/2015–02/2016

- Funded by Institute for Information & Communications Technology Promotion (IITP), Korea
- Principal Investigator (PI), CNU, Korea (40M KRW)

<b>Optimization for Visual Correspondence</b>	06/2015–05/2016
– Starting-up funding from CNU, Korea	
– Principal Investigator (PI), CNU, Korea (20M KRW)	
– Local labeling algorithm	
<b>Visual Modeling and Analytics of Dynamic Environments for the Mass</b>	04/2014–02/2015
– Internal funding from ADSC, Singapore: joint research project with UIUC	
– Global labeling optimization, visual correspondence, and reliable sparse interpolation (presented at <b>ICME 2015</b> and <b>ICASSP 2016 tutorials</b> )	
<b>Remote Reality for Immersive Communications and Games</b>	07/2010–03/2014
– Internal funding from ADSC, Singapore: joint research project with UIUC	
– Edge-preserving filters and discrete labeling optimization (presented at <b>ICIP 2013 tutorial</b> )	
– Video based rendering and depth enhancement and coding	
– Tele-conferencing system with depth sensor and real-time vision algorithms with GPUs	
<b>3D Display Processing Techniques</b>	06/2009–06/2010
– Funded by Mitsubishi Electric Research Laboratories (MERL), US	
– Depth estimation for 3DTV and video processing with temporal coherence	
<b>Research and Development of Next Generation Intelligent Broadcasting Technology</b>	03/2003–05/2009
– ‘Information Technology Research Center’ (ITRC) of Ministry of Knowledge Economy, Korea	
– Depth estimation, image-based rendering, 2D-to-3D conversion	
– 3D object modeling and interaction with multiple stereo cameras	
<b>SoC Development for 3D Media Processing</b>	09/2003–08/2006
– ‘System IC 2010 Project’ of Ministry of Knowledge Economy, Korea	
– Real-time depth estimation on SoC	
<b>Development of the Core Technology for 3DTV System</b>	09/2005–08/2008
– ‘Fostering Project of Lab of Excellency’ of Korea Industrial Technology Foundation	
– 3D video/audio capturing system, hybrid depth sensor system, and 3D scene modeling	
<b>Camera Tracking and 3D Shape Reconstruction</b>	05/2008–04/2009
– Funded by Korean Broadcasting System (KBS)	
– 3D scene modeling using Structure-from-Motion (SfM)	

## SUPERVISION

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### Graduate students (2015 – Present @CNU)

- |   |                   |
|---|-------------------|
| 1. Hai Tuan Mai (PhD student – Part-time, BNF Technology, Korea)                        | 03/2016 – Present |
| – Image enhancement using convolutional neural networks (CNN)                           |                   |
| 2. Myung Ho Kang (PhD student – Part-time, ADD, Korea)                                  | 03/2016 – Present |
| 3. Un Ju Yeo (PhD student – Part-time, ADD, Korea)                                      | 03/2016 – Present |
| 4. Sun Min Kim (MS student)   | 03/2016 – Present |
| – Unified framework for image filtering and segmentation using level set                |                   |
| 5. Hunsang Lee (MS student)   | 03/2016 – Present |
| – Accurate and efficient image denoising with dual domain filtering                     |                   |
| 6. Jae Kwang Park (MS student)  | 03/2016 – Present |
| – Spatially-varying affine matrix interpolation and its applications to computer vision |                   |
| 7. Jae Yoon Kim and Suhyuk Um (Undergraduate intern)                                    | 07/2015 – Present |
| – Fast Gabor filtering and its applications to image processing                         |                   |

### (Co-)supervised students and engineers (2009 – Present @ADSC and CNU)

1. Sunok Kim (PhD student, Yonsei Univ., Korea) 10/2015 – Present  
– Confidence measure of stereo matching algorithms
2. Youngjung Kim (PhD student, Yonsei Univ., Korea) 10/2015 – Present  
– Efficient edge-preserving smoothing
3. Yu Li (PhD student, National Univ. of Singapore, Singapore) 06/2014 – Present  
– Fast discrete labeling optimization algorithms  
– He is now a researcher at ADSC, Singapore. (Sep. 2015 – Present)
4. Seungryong Kim (PhD student, Yonsei Univ., Korea) 08/2014 – Present  
– Feature descriptors for establishing visual correspondences among multi-modal images
5. Kang Zhang (PhD student, Tsinghua University, China) 09/2013 – 06/2014  
– Robust labeling algorithm on scale-space framework
6. Sunghwan Choi (PhD student, Yonsei Univ., Korea) 06/2012 – 02/2015  
– Texture flow estimation for automatic texture analysis  
– Data-driven approach for single image depth estimation  
– He worked as an intern at ADSC (Jun. 2012 – Sep. 2012), and is now at LG Electronics, Korea.
7. Bumsub Ham (PhD student, Yonsei Univ., Korea) 03/2009 – 02/2015  
– Edge-preserving filters: diffusion, random walk, and adaptive smoothing  
– Video based rendering and graph-based depth enhancement  
– I served as his Ph.D thesis committee member in 2013.  
**Thesis:** *Revisiting the Relationship Between Adaptive Smoothing and Anisotropic Diffusion: Robust Edge-Preserving Regularization Methods and Its Applications*  
– He is now an assistant professor at Yonsei University, Korea. (09/2016 – Present)
8. Jinwook Choi (PhD student, Yonsei Univ., Korea) 03/2009 – 12/2013  
– Multiview depth video enhancement system  
– He is now at Hyundai Motor, Korea.
9. Wei Yong Eng (Software Engineer, ADSC, Singapore) 11/2011 – 06/2014  
– Real-time 3D tele-conferencing system using MS Kinect  
– She is now a PhD student at Multimedia University, Malaysia.
10. Hongsheng Yang (Software Engineer, ADSC, Singapore) 08/2011 – 07/2013  
– Fast discrete labeling algorithms  
– He is now a software engineer at Google, US.
11. Zhiping Luo (Software Engineer, ADSC, Singapore) 09/2010 – 08/2011  
– Hybrid depth sensor (color+depth camera) for 3D tele-conferencing system
12. Keyang Shi (MS student, Sun Yat-Sen University, China) 09/2011 – 03/2012  
– Constant time edge-preserving filtering  
– He worked as an intern at ADSC (Sep. 2011 – Mar. 2012).
13. Iskander Sitdikov (BS student, Lomonosov Moscow State Univ., Russia) 08/2011 – 02/2012  
– Real-time depth estimation/enhancement on GPUs  
– Efficient non-linear filtering algorithms



## TEACHING

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### Undergraduate Course (2015 – Present @CNU)

- Computer Vision (2015/2016 Spring)
- Numerical Analysis (2015/2016 Fall)
- Algorithm (2016 Fall)
- Computer Programming I (2015 Fall)
- Computer Programming II (2016 Spring)
- Operating System (2016 Spring)
- Introduction to Creative Design (2015 Spring)

### Graduate Course (2015 – Present @CNU)

- Advanced Image Processing (2016 Spring)
- Computer Vision (2015/2016 Fall)

## PROFESSIONAL ACTIVITIES

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- **Senior Member of IEEE** (2016 – Present)
- Chair, Yonsei student branch, IEEE Seoul section (01/2008 – 12/2008)
- **Session Chair**
  - ICIP 2013 (Stereoscopic, Multiview and 3D Image Processing II)
- **Technical Program committee**
  - CISP 2010; ICIP 2012-2015; ICME 2013/2014; PCM 2014; ACCV 2014
- **Reviewer for Journal**
  - IEEE Trans. on Pattern Analysis and Machine Intelligence
  - IEEE Trans. on Image Processing
  - IEEE Trans. on Circuits and Systems for Video Technology
  - IEEE Trans. on Multimedia
  - IEEE Trans. on Broadcasting
  - IEEE Signal Processing Letters
  - Elsevier Signal Processing: Image Communication
  - Elsevier Journal of Visual Communication and Image Representation
  - Elsevier Pattern Recognition Letters
  - IET Image Processing
  - Springer Signal, Video and Image Processing
- **Reviewer for Conference**
  - CGI; ICME; ICIP; Pacific Graphics

## SKILL

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- **Programming Languages**
  - Visual C/C++, . NET, Matlab, OpenCV, OpenGL, GNU library
- **Equipments**
  - IEEE 1394 camera (Pointgrey: Digiclops, Bumblebee, Flea, Ladybug)
  - Light field camera (Pointgrey: ProFUSION 25)
  - Active range sensor (SwissRanger: SR3000, SR4000)
  - 3D Multiview capturing system with IEEE 1394 camera (Flea) / HD Video camcorder
  - Hybrid sensor system with IEEE 1394 camera (Flea) and active range sensor (SR3000, SR4000)

## REFERENCES

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