# Yi-Ling Chen, *Ph.D.*

*Postdoctoral Researcher*

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## Summary


I am a researcher and developer in the general areas of **Computer Graphics**, **Computer Vision** and **Human-Computer Interaction (HCI)**. I focus on designing and developing novel techniques to empower end-users to effectively deal with real-world problems and better interact with the environment. I possess the following credentials:

- Comprehensive practice of conducting *algorithmic design* and *experimental validation* of research projects in various applications.
- Tracked record of *publications*, *scientific contributions*, and *technological inventions*.
- Hands-on experiences of software development in multiple *development platforms* and *programming languages*.
- Active involvement in *mentoring* young talents.

Research keywords:
3D geometric modeling, image understanding, video processing, novel user interfaces, computational photography.


## Education

2010.12 *Ph.D. in Computer Science*, **National Tsing Hua University**, Taiwan.
Thesis: Orientation Inference and Binary Orientation Trees for Surface Reconstruction from Unorganized Points
Advisor: Prof. Shang-Hong Lai

2004.6 *Master of Eng. in Computer Science*, **National Tsing Hua University**, Taiwan.
Thesis: Progressive Reconstruction of Piecewise Implicit Surface
Advisor: Prof. Shang-Hong Lai

2002.6 *Bachelor of Eng. in Computer Science*, **National Tsing Hua University**, Taiwan.

## Professional Experiences

2016.4–present *Postdoctoral Researcher*, **University of California**, Davis, CA.
Conducting the design and development of highly interactive systems for solving challenging real-world problems, *e.g.*, bio-medical imaging and creativity support tools for photography. Developed a deep learning approach to model photographic aesthetics [C15].

2014.1–2016.4 *Postdoctoral Researcher*, **Intel-NTU Connected Context Computing Center, National Taiwan University**, Taipei, Taiwan.
Accomplished various research projects in multiple disciplines:
- **Vision**: Focused on exploring novel vision applications under IoT and M2M environments, such as the "*Transparent Vehicles*" project [J6,C11];
- **HCI**: Conducted the design and prototyping of on-body interfaces [C9-10], novel interaction techniques [C9-10,W8] and tactile interface [C12];
- **Graphics**: Developed a structure-preserving retargeting method for 3D object and scenes [J7].

2011.4–2013.12 *Software Engineer*, **Industrial Technology Research Institute**, Hsinchu, Taiwan.
Developed a cloud based intelligent video surveillance system, City Eyes [S2], which features *vehicle tracking* [C7], *video summarization*, *camera anomaly detection* and a video analytics Platform-as-a-Service [W6]. The core technology of City Eyes has led to a start-up company, IronYun.

2005.9–2010.12 *Research Assistant*, **CV Lab**, **National Tsing Hua University**, Hsinchu, Taiwan.
Investigated the fundamental problems in geometric modeling and designed novel algorithms for surface reconstruction. Developed orientation inference methods and new spatial partition structures to facilitate surface reconstruction from unoriented point clouds [J1,J3-5,C1-2].

2009.5–2010.4 *Visiting Student*, **Computer Graphics Lab**, **The University of Tokyo**, Tokyo, Japan.
Designed and developed a spatial partitioning technique for surface reconstruction from unoriented point clouds [J4].

2007.3–2007.8 *Research Intern*, **Siemens Corporate Research**, Princeton, NJ.
Developed a memory-efficient system for simplifying large meshes with error control and attribute preservation [W3].

# Honors

## Scholarships

2009 Research Aboard Scholarship, **National Science Council of Taiwan**.

2008 Academic Scholarship, **Pan Wen Yuan Foundation**.

2006 Summer Program, **Interchange Association of Japan**.

2005 President Scholarship, **National Tsing Hua University**.

# Publications

## Refereed Journal Articles

[J7/C13] Chun-Kai Huang, Yi-Ling Chen, I-Chao Shen, and Bing-Yu Chen, **Retargeting 3D Objects and Scenes with a General Framework**, Computer Graphics Forum (Proc. of PG'16), 35(7), pp. 33-42, 2016.

*Acceptance rate: 26%*

[J6/C8] Shao-Chi Chen, Hsin-Yi Chen, Yi-Ling Chen, Hsin-Mu Tsai and Bing-Yu Chen, **Making in-Front-of Cars Transparent: Sharing First-Person-Views via Dashcam**, Computer Graphics Forum (Proc. of PG'14), 33(7), pp. 289–297, 2014.

*Nominated as Best Paper Award candidate; Acceptance rate: 20.22%*

[J5/C6] Yi-Ling Chen, Tung-Ying Lee, Bing-Yu Chen and Shang-Hong Lai, **Bipartite Polar Classification for Surface Reconstruction**, Computer Graphics Forum (Proc. of PG'11), 30(7), pp. 2003–2010, 2011.

*Acceptance rate: 16%*

[J4/C5] Yi-Ling Chen, Bing-Yu Chen, Shang-Hong Lai and Tomoyuki Nishita, **Binary Orientation Trees for Volume and Surface Reconstruction from Unoriented Point Clouds**, Computer Graphics Forum (Proc. of PG'10), 29(7), pp. 2011–2019, 2010.

*Acceptance rate: 17%*

[J3] Yi-Ling Chen and Shang-Hong Lai, **An Orientation Inference Framework for Surface Reconstruction from Unorganized Point Clouds**, IEEE Transactions on Image Processing, 20(3), pp. 762–775, Sep. 2010.

[J2] Chen-Kuo Chiang, Shu-Fan Wang, Yi-Ling Chen and Shang-Hong Lai, **Fast JND-Based Video Carving with GPU Acceleration for Real-Time Video Retargeting**, IEEE Transactions on Circuits and Systems for Video Technology, 19(11), pp. 1588–1597, Nov. 2009.

*Nominated as Best Paper Award candidate*

[J1/C3] Yi-Ling Chen and Shang-Hong Lai, **Creating MPU Implicit Surfaces from Unoriented Point Sets with Orientation Inference**, The Visual Computer (Proc. of CGI'09), 25(5), pp. 391–399, May 2009.

## Refereed Full-Length Conference Papers

[C15] Yi-Ling Chen, Jan Klopp, Min Sun, Shao-Yi Chien and Kwan-Liu Ma, **Learning to Compose with Professional Photographs on the Web**, in Proc. of ACM Multimedia 2017.

*Acceptance rate: 28%*

[C14] Yi-Ling Chen, Tzu-Wei Huang, Kai-Han Chang, Yu-Chen Tsai, Hwann-Tzong Chen and Bing-Yu Chen, **Quantitative Analysis of Automatic Image Cropping Algorithms: A Dataset and Comparative Study**, in Proc. of IEEE WACV 2017.

[C12] Yi-Chi Liao, Yi-Ling Chen, Ju-Yu Lo, Rong-Hao Liang, Liwei Chan and Bing-Yu Chen, **EdgeVib: Effective Alphanumeric Character Output Using a Wrist-Worn Tactile Display**, in Proc. of ACM UIST 2016.

*Acceptance rate: 20.6%*

[C11] Hsin-Yi Chen, Yi-Ling Chen, Wei-Tse Lee, Fan Wang, and Bing-Yu Chen, **Integrating Dashcam Views through Inter-Video Mapping**, in Proc. of ICCV 2015.

*Acceptance rate: 30.3%*

[C10] Liwei Chan, Yi-Ling Chen, Chi-Hao Hsieh, Rong-Hao Liang, and Bing-Yu Chen, **CyclopsRing: Enabling Whole-Hand and Context-Aware Interactions Through a Fisheye Ring**, in Proc. of ACM UIST 2015.

*Acceptance rate: 23.6%*

[C9] Liwei Chan, Chi-Hao Hsieh, Yi-Ling Chen, Shuo Yang, Da-Yuan Huang, Rong-Hao Liang, and Bing-Yu Chen, **Cyclops: Wearable and Single-Piece Full-Body Gesture Input Devices**, in Proc. of ACM CHI 2015, Seoul, Korea, 2015.

*Also in ACM CHI 2015 Extended Abstracts (Video Showcase); Acceptance rate: 23%*

[C7] Yi-Ling Chen, Tse-Shih Chen, Tsiao-Wen Huang, Liang-Chun Yin, Shiou-Yaw Wang, and Tzi-cker Chiueh , **Intelligent Urban Video Surveillance System for Automatic Vehicle Detection and Tracking in Clouds**, in Proc. of IEEE Advanced Information Network and Applications (AINA'13), 2013.

[C4] Te-Feng Su, Yi-Ling Chen, and Shang-Hong Lai, **Over-Segmentation Based Background Modeling and Foreground Detection with Shadow Removal Using Hierarchical MRFs**, in Proc. of Asian Conference on Computer Vision (ACCV'10).

*Acceptance rate 29.5%*

[C2] Yi-Ling Chen, Shang-Hong Lai and Tung-Ying Lee, **Generalized MPU Implicits by Using Belief Propagation**, in Proc. of 3D Digital Imaging and Modeling (3DIM'07), 2007.

[C1] Yi-Ling Chen and Shang-Hong Lai, **A Partition-of-Unity Based Algorithm for Implicit Surface Reconstruction Using Belief Propagation**, in Proc. of Shape Modeling International 2007 (SMI'07), 2007.

### Refereed Short-Length Conference Papers

[S3] Hui-Hung Wang, Yi-Ling Chen, and Chen-Kuo Chiang, **Discriminative Paired Dictionary Learning for Visual Recognition**, in Proc. of ACM Multimedia 2016.

[S2] Yi-Ling Chen, Tse-Shih Chen, Liang-Chun Yin, Tsiao-Wen Huang, Shiou-Yaw Wang, and Tzi-cker Chiueh, **City Eyes: An Unified Computational Framework for Intelligent Video Surveillance in Cloud Environment**, in Proc. of IEEE International Conference on Internet of Things (iThings 2014), 2014.

[S1] Shu-Fan Wang, Yi-Ling Chen, Chen-Kuo Chiang, Bing-Yu Chen, Shang-Hong Lai and Tomoyuki Nishita, **Content-Aware Geometry Image Resizing**, in Proc. of Computer Graphics International 2010 (CGI'10), 2010.

### Posters, Work-in-Progress, and others

[W8] Yi-Ling Chen, Wei-Tse Lee, Liwei Chan, Rong-Hao Liang, and Bing-Yu Chen, **Direct View Manipulation for Drone Photography**, in Proc. of ACM SIGGRAPH Asia 2015. (Poster)

[W7] Chun-Kai Huang, Yi-Ling Chen, I-Chao Shen, and Bing-Yu Chen, **Retargeting 3D Objects and Scenes**, in Proc. of ACM SIGGRAPH 2015. (Poster)

[W6] Tse-Shih Chen, Tsiao-Wen Huang, Liang-Chun Yin, Yi-Ling Chen and Yi-Fu Ciou, **Platform-as-a-Service Architecture for Parallel Video Analysis in Clouds**, in Proc. of International Computer Symposium (ICS'12), 2012. (Full Paper)

[W5] Yi-Ling Chen, Shang-Hong Lai, and Tomoyuki Nishita, **Robust Surface Reconstruction from Defective Point Clouds by Using Orientation Inference and Volumetric Regularization**, in Proc. of Siggraph Asia 2009. (Sketch)

[W4] Shu-Fan Wang, Yi-Ling Chen, Chen-Kuo Chiang, and Shang-Hong Lai, **Surface Simplification by Image Retargeting**, in Proc. of Siggraph Asia 2009. (Sketch)

[W3] Yi-Ling Chen and Xiang Zhang, **A Memory Effective Two-phase Approach for Large Scanned Surface Mesh Simplification**, in Proc. of Shape Modeling International 2008 (SMI'08), 2008. (Poster)

[W2] Po-Hao Huang, Yi-Ling Chen, Chia-Ming Cheng, Yu-An Lu, and Shang-Hong Lai, **Robust 3D object model reconstruction from video**, in Proc. of SPIE Conference on Three-Dimensional Image Capture and Applications VI, San Jose, California, USA, Jan. 2004. (Full Paper)

[W1] Shang-Hong Lai and Yi-Ling Chen, **Learning a statistical 3D geometric head model**, in Proc. of SPIE Conference on Videometrics VII, Santa Clara, California, USA, Jan. 2003. (Full Paper)

## Patent

[P1] Bing-Yu Chen, Li-Wei Chan, Yi-Ling Chen, Chi-Hao Hsieh, Rong-Hao Liang, **Gesture Recognition System and Related Method**, US Patent 2017-0255821-A1, 2017.

# Student Supervision

## Supervision

2015.10–2016.3 *Yu-Chen Tsai*, *Research Assistant*, **Intel-NTU Connected Context Computing Center**.
On implementing and evaluating automatic image cropping methods [C14] (co-advised with Dr. Jane Jung-Jen Hsu).

2012.1–2012.6 *Kai-Wen Cheng*, *Research Intern*, **Industrial Technology Research Institute**.
On developing automatic violation detection method for railroad crossing surveillance videos (co-advised with Dr. Tzi-cker Chiueh).

2011.6–2011.8 *Oksana Hagen*, *Research Intern*, **Industrial Technology Research Institute**.
On developing portrait and name text segmentation algorithms to process yearbook images (co-advised with Dr. Tzi-cker Chiueh).

2011.6–2011.8 *Kateryna Zinchenko*, *Research Intern*, **Industrial Technology Research Institute**.
On developing portrait and name text segmentation algorithms to process yearbook images (co-advised with Dr. Tzi-cker Chiueh).

## Mentoring

2016.7–2016.8 *Zenyu Tang*, *Ph.D Student*, **University of North Carolina at Chapel Hill**.
On developing intuitive interface for creating long exposure imagery from videos (paper under review, co-advised with Dr. Kwan-Liu Ma).

2016.7–2016.8 *Tianchen Sun*, *Visiting Student*, **University of California, Davis**.
On developing an interactive system to facilitate medical image registration (paper under review, co-advised with Dr. Kwan-Liu Ma and Dr. Laura Marcu).

2014.1–2016.4 *Chun-Kai Huang*, *Ph.D. Student*, **National Taiwan University**.
On developing a structure-preserving method for 3D objects and scenes [J7,W7] (co-advised with Dr. Bing-Yu Chen).

2015.11–2016.3 *Kai-Han Chang*, *Master Student*, **National Taiwan University**.
On developing a crowd-sourcing image annotation system for building a new image cropping dataset [C14] (co-advised with Dr. Bing-Yu Chen).

2014.7–2015.6 *Chi-Hao Hsieh*, *Master Student*, **National Taiwan University**.
On developing novel interfaces using on-body cameras and the corresponding video processing and gesture recognition algorithms [C9-10] (co-advised with Dr. Bing-Yu Chen).

2014.9–2015.7 *Wei-Tse Lee*, *Master Student*, **National Taiwan University**.
On developing a spatial-varying video warping method to integrate video feeds from two dashboard cameras [C11] and an experimental interface for drone photography [W8] (co-advised with Dr. Bing-Yu Chen).

2014.9–2015.7 *Fan Wang*, *Master Student*, **National Taiwan University**.
On developing a spatial-varying video warping method to integrate video feeds from two dashboard cameras [C11] (co-advised with Dr. Bing-Yu Chen).

# Academic Services

## Program Committee

2018 NICOGRAPH International (TPC Member)

2017 Pacific Graphics (Tutorial/Workshop Co-Chair)

2016–2017 TAICHI Workshop (TPC Member)

2015 TAICHI Workshop (Program Co-Chair)

### Conference Paper Reviewer

2017 ACM User Interface Software and Technology Symposium (UIST)

2015, 2017 ACM SIGGRAPH Asia – Emerging Technologies

2017 IEEE International Conference on Multimedia and Expo (ICME)

2014, 2016–2017 Pacific Conference on Computer Graphics and Applications (PG)

2014 Asian Conference on Computer Vision (ACCV)

2017 ACM International Conference on Tangible, Embedded and Embodied Interactions (TEI)

2016–2018 Augmented Human (AH)

2014 International Conference on Computer Animation and Social Agents (CASA)

2014 Smart Graphics (SG)

### Journal Article Reviewer

IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)

## TALKS

### Conference Presentations

2017.10 *Learning to Compose with Professional Photographs on the Web*, **ACM Multimedia**, Mountain View, CA.

2017.3 *Quantitative Analysis of Automatic Image Cropping Algorithms: A Dataset and Comparative Study*, **IEEE WACV**, Santa Rosa, CA.

2015.11 *Direct View Manipulation for Drone Photography*, **ACM SIGGRAPH Asia**, Kobe, Japan.

2014.9 *City Eyes: An Unified Computational Framework for Intelligent Video Surveillance in Cloud Environment*, **IEEE iThings**, Taipei, Taiwan.

2013.3 *Intelligent Urban Video Surveillance System for Automatic Vehicle Detection and Tracking in Clouds*, **IEEE AINA**, Barcelona, Spain.

2009.12 *Robust Surface Reconstruction from Defective Point Clouds by Using Orientation Inference and Volumetric Regularization*, **ACM SIGGRAPH Asia**, Yokohama, Japan.

2009.12 *Surface Simplification by Image Retargeting*, **ACM SIGGRAPH Asia**, Yokohama, Japan.

2007.6 *Generalized MPU Implicits by Using Belief Propagation*, **3DIM**, Montréal, Canada.

2007.6 *A Partition-of-Unity Based Algorithm for Implicit Surface Reconstruction Using Belief Propagation*, **SMI**, Lyon, France.

### Invited Talks

2017.11 *A Pair of Pictures Is Worth a Thousand Rules: A Learning-to-Rank Approach for Modeling Aesthetics in Photographs*, **FXPAL**.

2015.5 *Making in-front-of Cars Transparent: Sharing First-Person-Views via Dashcam*, **Intel Tech Talk** (Remote).