Xiaoming LIU

CONTACT INFORMATION	Room 3137, Engineering Building Department of Computer Science and Engineering 428 S. Shaw Lane East Lansing MI. USA 48824	*Phone:* (517) 355-2359 *E-mail:* liuxm@cse.msu.edu Personal Web: www.cse.msu.edu/ liuxm Lab Web: cvlab.cse.msu.edu

RESEARCH INTEREST Computer Vision, Machine Learning, Deep Learning, Human Computer Interface, Medical Image Analysis, Pattern Recognition, Image and Video Processing, Multimedia Retrieval.

PERSONAL U.S. Permanent Resident

EDUCATION

Carnegie Mellon University, Pittsburgh, PA. USA

Ph.D., Electrical and Computer Engineering **October, 2004**
- Dissertation Title: "Pose Robust Video-Based Face Recognition"
- Advisors: Prof. Tsuhan Chen and Prof. B.V.K. Vijaya Kumar
- Thesis committee: Tsuhan Chen (chair), B.V.K. Vijaya Kumar, Jie Yang, Zhengyou Zhang (Microsoft Research)

Zhejiang University, Hangzhou, Zhejiang, P.R. China

M.S., Computer Science and Engineering **March, 2000**
- Dissertation Title: "Study on Video based Human Animation Techniques"
- Advisor: Prof. Yueting Zhuang

Beijing Information Technology Institute, Beijing, P.R.China

B.A., Computer Science and Engineering **July, 1997**

EXPERIENCE

Jul 2018- Associate Professor with Tenure, Department of Computer Science and Engineering, Michigan State University, East Lansing, MI

Aug 2012-Jun 2018 Tenure-track Assistant Professor, Department of Computer Science and Engineering, Michigan State University, East Lansing, MI

Nov 2004-Aug 2012 Computer Scientist, Visualization & Computer Vision Lab, GE Global Research, Niskayuna, NY
- Led and performed research in government-sponsored programs on face-relevant topics, including face capture at a distance, face alignment, head and eye gaze estimation, face super-resolution, face deblurring, face recognition/verification, 3D-to-2D face recognition, face classifier adaption, spontaneous facial action units recognition, unsupervised and semi-supervised face congealing, thermal face processing, multi-model biometrics fusion, biometrics sample quality, etc.
- Led and performed research in government-sponsored video surveillance programs on topics including multi-camera person detection, person tracking, body alignment, body segmentation via matting, online boosting for person tracking, person counting, pan-tilt-zoom (PTZ) camera control, individual-level behavior and gait analysis, and group-level activity recognition, etc.
- Led and performed research in business-sponsored projects on topics such as affective analysis, user experience modeling, facial expression recognition, facial behavior (pain, stoke, delirium) analysis for elder, facial demographics recognition, gaze estimation for football players, interactive advertisement, medical image analysis, activity recognition for hospital rooms, etc.

- Invented and developed a suite of advanced image alignment algorithms, which have been applied to a wide range of applications within GE.
- Developed a classification and testing framework for automatic defect recognition (ADR) in industrial inspection applications.
- Delivered an array of technologies to GE businesses, including Viewers' emotion analysis for NBCU, gaze estimation of football players for NBCU, Biometrics ID kiosk for GE Security, Ultrasound fetal head scan plane identification for GE Healthcare, etc.

Jan 2000-Oct 2004 Research Assistant, Advanced Multimedia Processing Lab, Carnegie Mellon University, Pittsburgh, PA
- Developed novel video-based face recognition technologies which include: using face mosaicing to integrate human face tracking, modeling, and pose-robust recognition from video sequences, and using adaptive HMMs to model/utilize temporal information in face videos.
- Designed and implemented a camera array system (both hardware & software) for capturing face videos from six cameras simultaneously, which captured then the largest publicly available face video database.
- Developed an online subspace learning algorithm where an eigenspace can be updated with decaying memory. Applied the updating theory on various applications, including face recognition, detection of signal change, video coding and object tracking.
- Developed expression invariant face recognition algorithm (eigenflow) which uses motion information for recognition. Proposed Individual Principal Component Analysis (IPCA) for face authentication task.

Sep 1998-Dec 1999 Research Assistant, Intelligence CAD Lab, Zhejiang University, P.R.China
- Developed video-based human animation algorithms and system which includes two components: tracking 2D human skeleton from video sequences, and reconstructing 3D skeleton from the 2D skeleton sequence.
- Developed a Web-Oriented image/video information retrieval system where a Semantic Template is proposed to perform multimedia retrieval on the semantic level and a novel video similarity model is applied to video query by example clips.

GRANTS & PROJECTS Total funding during GE employment is **$2,950K**. Total funding during MSU employment is **$11,377K**, where my portion is **$5,015K**.

- **Principal Investigator**, "Person Identification at a Distance," Army Research Office, $500K, 6/18-5/21.

- **Principal Investigator**, "Computer vision research," Deepcam Inc., Research Gift, $30K, 9/17-8/18.

- **Principal Investigator**, "Accurate 3D Object Classification in Open World," Office of Naval Research, $300K, 6/17-5/20.

- **Principal Investigator**, "Computer vision research," Adobe Research, Research Gift, $17K, 9/17-3/18.

- **Principal Investigator**, "Gait-based Rider Authentication for Autonomous Carsharing," Ford-MSU Innovation Alliance, $155K, 1/17-12/18.

- **Co-Principal Investigator**, "Presentation Attack Detection: Solutions for Fingerprints, Face and Iris Systems," IARPA, PI Dr. Arun Ross, $6,206K, 1/17-12/20.
  Develop algorithms and systems to detect various presentation attacks in three biometrics modalities.

- **Principal Investigator**, "Computer vision research," Bosch Research and Technology Center North America, Research Gift, $105K, 1/17-10/18.

- **Principal Investigator**, "Computer vision research," NEC Laboratories America, Inc. Research Gift, $30K, 12/16-11/17.

- **Co-Principal Investigator**, "Perception software development with 3D Lidar," Changan US R&D Center Inc.,

PI Dr. Daniel Morris, $100K, 09/2016-09/17.

- **Co-Principal Investigator**, "Speaker Recognition from Degraded Audio Samples (SR-DAS)," FBI-BOE, PI Dr. Arun Ross, $500,000, 05/16-12/17.
  Develop algorithms to recognize individuals in surveillance videos using both audio and video signals

- **Co-Principal Investigator**, "Quantitative Molecular and Cellular MRI of Hepatocyte Transplantation," NIH R01, PI Dr. Erik Shapiro, $2,097,162, 09/15-09/19.
  Develop computer vision and machine learning algorithms to quantify cell transplantation in MRI

- **Principal Investigator**, "Intelligent vehicle," General Motors Company, $297K, 08/15-08/17.
  This project explores one specific scenario of autonomous driving - automatic trailer back up

- **Principal Investigator**, "Sports Video Analysis," TechSmith Inc. Research Gift, $52K, 08/15-08/16.
  Develop algorithms to analyze the motion in a diverse type of sports videos

- **Principal Investigator**, "Learning to Fuse Information with Missing Modalities", Department of Defense, $450K, 05/15-05/18.

- **Principal Investigator**, "A System for Online Exam Proctoring - Development and Evaluation," MSU Targeted Support Grants for Technology Development (TSGTD) program, $52K, 03/15-03/16.
  Evaluate and further developing a computer vision system to detect cheating behavior while students taking examination for online courses.

- **Principal Investigator**, "Sports Video Analysis," TechSmith Inc. Research Gift, $50K, 08/14-08/15.
  Develop algorithms to analyze the motion in a diverse type of sports videos

- **Principal Investigator**, "Imaging Technologies for Enhancing Agricultural Productivity, Cercospora Leaf Spot Rating as a Case Study," Project GREEEN, $30K, 05/14-06/15.
  Enhance the automatic rating system for the Cercospora leaf spot disease of sugar beet using the cross-year data.

- **Principal Investigator**, "Object (fish) Segmentation & Counting," Herrick foundation, $20K, 04/14-06/14.
  Develop a computer vision system to perform automatic fish segmentation and counting from videos.

- **Principal Investigator**, "A System for Online Exam Proctoring," MSU Targeted Support Grants for Technology Development (TSGTD) program, $55K, 07/13-08/14.
  Develop a computer vision system to detect cheating behavior while students taking examination for online courses.

- **Principal Investigator**, "Sports Video Analysis," TechSmith Inc. Research Gift, $47K, 06/13-08/14.
  Study algorithms to analyze the motion in a diverse type of sports videos

- **Co-Principal Investigator**, "Image acquisition and processing for enhanced scoring of Cercospora leaf spot nursery," Michigan Sugar Company Competitive Grant, #MSC-13-08, $5K, Mitch McGrath (PI), 01/13-12/13.
  Develop an automatic rating system for the Cercospora leaf spot disease of sugar beet by using the video captured from a small UAV flying over the field.

- **Co-Principal Investigator**, "Rapid Biometric System for Physical Access Control," US Army Research Laboratory, Awarded May 2012, $750K, Daniel Gray (PI), 10/12-09/13.
  Develop a smart lens system coupled with advanced image analysis that provides the DoD/ARL with an automated system for rapid verification for physical access.

- **Principal Investigator**, "Advanced Behavior Recognition in Crowded Environments - Continuation," National Institute of Justice (NIJ) award #2011-IJ-CX-K004, $250K, 10/11-09/12.
  Continue the development of the behavior recognition system and deploy it in a real-world law enforcement site.

- **Principal Investigator**, "Advanced Behavior Recognition in Crowded Environments," National Institute of

Justice (NIJ) award #2009-SQ-B9-K013, $350K, 03/11-12/11.
Developed a video surveillance system that performs multi-camera multi-person tracking in crowd environments and recognizes individual-level and group-level activity, such as loitering, chasing, franking, contraband hand-off, etc.

- **Project Leader**, "Recognize Facial Action Units (AUs) from Face Video Sequences," Department of Homeland Security (DHS), $100K, 01/10-11/10.
Developed a system to automatically recognize a set of spontaneous facial action units that are highly indicative of deception.

- **Principal Investigator**, "Site-Adaptive Face Recognition at a Distance," National Institute of Justice (NIJ) award #2007-DE-BXK191, $500K, 10/07-12/09.
Developed a face recognition system that optimizes over the existing subspace-based approaches, and adapts to the site-specific imaging conditions.

- **Project Leader**, "Biometrics ID Kiosk," Israel-U.S. Binational Industrial Research and Development (BIRD) foundation, $500K, 6/07-12/08.
Developed a face verification system for an ID kiosk that matches the ID photo scanned from an identity document (e.g., driver's license, passport) with the face image captured from the camera.

- **Project Leader**, "Active 3D Face Capture, " National Institute of Justice (NIJ) award #2006-IJ-CX-K045, $500K, 10/06-3/08.
Developed a face capture a distance system including PTZ control, face alignment, and facial super-resolution, which serves as the front-end component of a recognition at a distance system.

HONORS AND AWARDS **2018 Withrow Distinguished Scholar–Junior Award**. Established by the Withrow family to recognize faculty of the MSU College of Engineering who have demonstrated excellence in scholarly activities.
Invited participant, Microsoft Research Faculty Summit 2017.
The Second Place of the CSE Poster Competition at 2017 MSU College of Engineering Student Research Symposium for my students' work of "Towards Large-Pose Face Frontalization".
Honorable Mention of the CSE Poster Competition at 2017 MSU College of Engineering Student Research Symposium for my students' work of "Illuminating Pedestrians via Simultaneous Detection and Segmentation".
The Second Place of the CSE Poster Competition at 2016 MSU College of Engineering Student Research Symposium for my students' work of "Multi-Task Convolutional Neural Network for Face Recognition in Constrained Environment".
Honorable Mention of the CSE Poster Competition at 2016 MSU College of Engineering Student Research Symposium for my students' work of "Intelligent and Automatic Quantification of in vivo Cells in MRI".
Best Poster Award as a co-author at the 26th British Machine Vision Conference (BMVC) 2015.
Honorable Mentions of the CSE Poster Competition at 2015 MSU College of Engineering Student Research Symposium for my students' work of "Automatic In Vivo Cell Detection in MRI" and "Attribute Preserved Face De-Identification".
One co-authored paper selected as **the top 10% of accepted papers** at the International Conference of Image Processing (ICIP) 2014.
Best Industry Related Paper Award (BIRPA) runner-up as a co-author at the International Conference on Pattern Recognition (ICPR) 2014.
Best Paper Award Runner-up as a co-author at ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN) 2014.
Best Student Paper Award as a co-author at IEEE Winter Conference on Applications of Computer Vision (WACV) 2014.
Fellow of the Academy for Global Engagement, Michigan State University, 2014.
Best Demo Award as a co-author at IEEE Sixth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2013).
Best Student Paper Award as a co-author at IEEE Workshop on Applications of Computer Vision (WACV) 2012.
Publications Milestone Award, GE Global Research, 2011
Global Winner of Hack Week 2011, GE Healthcare, 2011
Who's Who in America 2011
Best Paper Honorable Mention Award as a co-author at IEEE Computer Society Workshop on Biometrics, 2009

One of the two finalists of the **Imagination at Work** award in Imaging Organization for "inventions in 2008 that fortify GE's reputation as a high-tech, innovative company", GE Global Research, 2009
Inventor Award, GE Global Research, 2008
Publications Award, GE Global Research, 2008
Several **Management Awards**, GE Global Research
Redington Team Award, GE Global Research, 2006
Inventor Award, GE Global Research, 2005
Graduate Research Assistantship, Carnegie Mellon University, 2000-2004
Rockwell University Fellowship, Zhejiang University, 1998-1999
Several **Excellent Student Fellowships**, Beijing Information Technology Institute, 1993-1997
Second Prizes, Advanced Mathematics Contest, Beijing Information Technology Institute, 1994

TEACHING

MSU CSE 471 Media Processing and Multimedia, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018.
MSU CSE 891-006 Computer Vision Seminar, Spring 2013.
MSU CSE 803 Computer Vision, Fall 2012, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017.
Teaching Assistant for Signal and Systems: Gave recitations, directed labs, prepared homework solutions, prepared recitation notes, and graded homework and exams. **Carnegie Mellon University**, Pittsburgh, PA. Fall 2002 & Fall 2003.
Guest lecture titled "Facial Analysis via Boosting" for Pattern Recognition (ECSE 6610) course. Rensselaer Polytechnic Institute, Troy NY. Apr 26, 2011.

PUBLICATIONS

I have >**4000** citations according to Google Scholar, and my **h-index** is **36**.

Journal Articles

1. Songyang Zhang, Yang Yang, Jun Xiao, **Xiaoming Liu**, Yi Yang, Yueting Zhuang, "Fusing Geometric Features for Skeleton-Based Action Recognition using Multilayer LSTM Networks," in IEEE Transactions on Multimedia, doi: 10.1109/TMM.2018.2802648, February 2018.

2. Xiangyu Zhu, **Xiaoming Liu**, Zhen Lei, Stan Li, "Face Alignment in Full Pose Range: A 3D Total Solution," in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), doi: 10.1109/TPAMI.2017.2778152, November 2017.

3. Xi Yin, **Xiaoming Liu**, "Multi-Task Convolutional Neural Network for Pose-Invariant Face Recognition," in IEEE Transactions on Image Processing, Volume 27, Issue 2, pp. 964-975, February 2018. arXiv

4. Xi Yin, **Xiaoming Liu**, Jin Chen, David Kramer, "Joint Multi-Leaf Segmentation, Alignment, and Tracking from Fluorescence Plant Videos," IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol. 40, No. 6, pp.1411-1423, June 2018. arXiv

5. Alsallakh Bilal, Amin Jourabloo, Mao Ye, **Xiaoming Liu**, Liu Ren, "Do Convolutional Neural Networks Learn Class Hierarchy?" IEEE Transactions on Visualization and Computer Graphics (TVCG), Volume 24, Issue 1, pp. 152-162, January 2018 = Proc. of IEEE Conference on Visual Analytics Science and Technology (VAST), Oct. 1-6, 2017, in Phoenix, Arizona. PDF

6. Amin Jourabloo, **Xiaoming Liu**, "Pose-Invariant Face Alignment via CNN-based Dense 3D Model Fitting," International Journal of Computer Vision (IJCV), Volume 124, Issue 2, pp. 187-203, September 2017. PDF

7. Zhong Luan, Yuanyuan Shang, Xiuzhuang Zhou, Hui Ding, Guodong Guo, **Xiaoming Liu**, "Fast Single Image Dehazing Based on A Regression Model," Neurocomputing, Volume 245, Pages 10-22, July 2017. PDF

8. Joseph Roth, Yiying Tong, **Xiaoming Liu**, "Adaptive 3D Face Reconstruction from Unconstrained Photo Collections," IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol. 39, No. 11, pp.2127-2141, November 2017. PDF

9. Muhammad Jamal Afridi, Arun Ross, **Xiaoming Liu**, Margaret F. Bennewitz, Dorela Doris Shuboni, Erik Shapiro, Intelligent and Automatic In Vivo quantification of transplanted cells in MRI, Magnetic Resonance in Medicine, Volume 78, Issue 5, pp. 1991-2002, November 2017. PDF Supplementary

10. Yu Wang, Rui Tan, Guoliang Xing, Jianxun Wang, Xiaobo Tan, and **Xiaoming Liu**, "Energy-Efficient Aquatic Environment Monitoring Using Smartphone-Based Robots," ACM Transactions on Sensor Networks, Volume 12, Issue 3, August 2016. PDF

11. Yousef Atoum, Liping Chen, Alex Liu, Stephen Hsu, **Xiaoming Liu**, "Automated Online Exam Proctoring", IEEE Transaction on Multimedia, Volume 19, Issue 7, pp. 1609-1624, July 2017. PDF

12. Yousef Atoum, Muhammad Jamal Afridi, **Xiaoming Liu**, J. Mitchell McGrath, Linda E. Hanson, "On Developing and Enhancing Plant-Level Disease Rating Systems in Real Fields," Pattern Recognition, Volume 53, Pages 287-299, May 2016. PDF

13. Hanno Scharr, Massimo Minervini, Andrew P. French, Christian Klukas, David M. Kramer, **Xiaoming Liu**, Imanol Luengo Muntion, Jean-Michel Pape, Gerrit Polder, Danijela Vukadinovic, Xi Yin, Sotirios A. Tsaftaris, "Leaf segmentation in plant phenotyping: A collation study," Machine Vision and Applications, Volume 27, Issue 4, pp. 585-606, May 2016. PDF

14. Xi Yin*, Jeffrey A. Cruz*, **Xiaoming Liu**, Saif M. Imran, Daniel D. Morris, David M. Kramer, Jin Chen, "Multi-modality Imagery Database for Plant Phenotyping," Machine Vision and Applications, Volume 27, Issue 5, pp.735 - 749, July 2016. (* denotes equal contribution by the authors) PDF

15. Yu Wang, Rui Tan, Guoliang Xing, Jianxun Wang, Xiaobo Tan, **Xiaoming Liu**, and Xiangmao Chang, "Monitoring Aquatic Debris Using Smartphone-Based Robots," IEEE Transactions on Mobile Computing, Vol.15, No.6, pp.1412-1426, June 2016. PDF

16. Yousef Atoum, Steven Srivastava, **Xiaoming Liu**, "Automatic Feeding Control for Dense Aquaculture Fish Tanks," IEEE Signal Processing Letters, Vol. 22, No. 8, pp.1089-1093, August 2015. PDF

17. Joseph Roth, **Xiaoming Liu**, Arun Ross, and Dimitris Metaxas, "Investigating the Discriminative Power of Keystroke Sound," IEEE Transactions on Information Forensics And Security, Vol.10, No.2, pp.333-345, February 2015. PDF

18. Hu Han, Charles Otto, **Xiaoming Liu**, and Anil K. Jain, "Demographic Estimation from Face Images: Human vs. Machine Performance," IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol.37, No.6, pp.1148-1161, June 2015. PDF

19. Joseph Roth, **Xiaoming Liu**, and Dimitris Metaxas, "On Continuous User Authentication via Typing Behavior," IEEE Transactions on Image Processing, Vol.23, No.10, pp.4611-4624, October 2014. PDF

20. Jixu Chen, **Xiaoming Liu**, "Transfer Learning with One-Class Data," Pattern Recognition Letter, Vol. 37, pp.32-40, February 2014. PDF

21. Jixu Chen, **Xiaoming Liu**, Peter Tu and Amy Aragones, "Learning Person-specific Models for Expression and Action Unit Recognition," Pattern Recognition Letter, Vol.34, No.15, pp.1964-1970, November 2013. PDF

22. Yan Tong, **Xiaoming Liu**, Frederick W. Wheeler, and Peter Tu, "Semi-supervised Facial Landmark Annotation," Computer Vision and Image Understanding, Vol.116, No.8, pp.922-935, August 2012. PDF

23. **Xiaoming Liu**, "Video-based Face Model Fitting using Adaptive Active Appearance Model," Image and Vision Computing, Volume 28, Issue 7, pp.1162-1172, July 2010. PDF

24. **Xiaoming Liu**, "Discriminative Face Alignment," IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol.31, No.11, pp.1941-1954, November 2009. PDF

25. **Xiaoming Liu**, Tsuhan Chen, and Susan M. Thornton, "Eigenspace Updating for Non-Stationary Process and Its Application to Face Recognition," Pattern Recognition, special issue on Kernel and Subspace Methods for Computer Vision, Vol.36, No.9, pp.1945-1959, September 2003. PDF

26. **Xiaoming Liu**, Tsuhan Chen, and B.V.K. Vijaya Kumar, "Face Authentication for Multiple Subjects Using Eigenflow," Pattern Recognition, special issue on Biometrics, Vol.36, No.2, pp.313-328, February 2003. PDF

27. Yueting Zhuang, **Xiaoming Liu**, and Yunhe Pan, "A Video-based Human Skeleton Extraction Technique For Animation," Journal of Computer Research & Development, Vol.37, No.4, pp.498-506, April 2000. (in Chinese)

28. Yueting Zhuang, **Xiaoming Liu**, Yi Wu, and Yunhe Pan, "A New Approach to Retrieve Video by Example Video Clip," The Chinese Journal of Computers, Vol.23, No.3, pp.300-305, March 2000. (in Chinese)

29. Yueting Zhuang, **Xiaoming Liu**, Yunhe Pan, and Jun Yang, "3D Human Skeleton Reconstruction from Motion Image Sequence," Journal of Computer-aided Design & Computer Graphics, Vol.12, No.4, pp.245-250, April 2000. (in Chinese)

30. Yunhe Pan, Yueting Zhuang, and **Xiaoming Liu**, "Video Motion Capture in VBA–Video-based Animation," Journal of Zhejiang University, SCIENCE, Vol.1, No.1, pp.1-7, January 2000.

31. **Xiaoming Liu**, Yueting Zhuang, and Yunhe Pan, "Model-Based Human Motion Tracking," Journal of Computer Research & Development, Vol.36, No.10, pp.1268-1273, October 1999. (in Chinese)

32. Yueting Zhuang, **Xiaoming Liu**, Chun Chen, Chenyu Zhang, and Weilin Lu, "GDP: The Design and Implementation of Object Oriented and Software Components Techniques," Computer Science, Vol.27, No.1, pp.40-43, January 2000. (in Chinese)

Book Chapters

33. Frederick Wheeler, **Xiaoming Liu**, and Peter Tu, "Face Recognition at a Distance," in *Handbook of Face Recognition, 2nd edition*, Stan Z. Li and Anil K. Jain, Eds, Springer-Verlag, 2011.

34. P.H. Tu, G.W. Brooksby, G. Doretto, D.W. Hamilton, N. Krahnstoever, J.B. Laflan, **X. Liu**, K.A. Patwardhan, T. Sebastian, Y. Tong, J. Tu, F.W. Wheeler, C. M. Wynnyk, Y. Yao, and T. Yu, "Video Analytics for Force Protection," In *Distributed Video Sensor Networks, 1st edition*, B. Bhanu, C.V. Ravishankar, A.K. Roy-Chowdhury, H. Aghajan, and D. Terzopoulos, Eds, Springer, February 2011.

Highly Selective Conference Papers

Papers with acceptance rates similar to major journals are highlighted. The top conference papers in computer vision and machine learning are considered as major publications. The top conferences are highly selective, e.g., CVPR has acceptance rates around 25%, and oral presentations have a 4% acceptance rate. Source CVPR is the top publication venue in the field of computer vision and pattern recognition, according to the h5-index, a citation measure for the recent five years. PAMI and ICCV rank second and third, respectively. CVPR also ranks 6th in the category of Engineering & Computer Science, and it is the highest-ranked venue in Computer Science. Source

35. Luan Tran, **Xiaoming Liu**, "Nonlinear 3D Face Morphable Model," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2018)*, Salt Lake City, UT, June 2018. PDF **(Spotlight, Acceptance rate $\frac{56}{3309} = 6.8\%$)**

36. Yu Chen*, Ying Tai*, **Xiaoming Liu**, Chunhua Shen, Jian Yang, "FSRNet: End-to-End Learning Face Super-Resolution with Facial Priors," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2018)*, Salt Lake City, UT, June 2018. arXiv PDF **(Spotlight, Acceptance rate $\frac{56}{3309} = 6.8\%$)**

37. Yaojie Liu*, Amin Jourabloo*, **Xiaoming Liu**, "Learning Deep Models for Face Anti-Spoofing: Binary or Auxiliary Supervision," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2018)*, Salt Lake City, UT, June 2018. (* denotes equal contribution by the authors) PDF **(Acceptance rate $\frac{979}{3309} = 30\%$)**

38. Feng Liu, Ronghang Zhu, Dan Zeng, Qijun Zhao, **Xiaoming Liu**, "Disentangling Features in 3D Face Shapes for Joint Face Reconstruction and Recognition," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2018)*, Salt Lake City, UT, June 2018. PDF **(Acceptance rate $\frac{979}{3309} = 30\%$)**

39. Garrick Brazil, Xi Yin, **Xiaoming Liu**, "Illuminating Pedestrians via Simultaneous Detection and Segmentation," In Proceeding of International Conference on Computer Vision (ICCV 2017), Venice, Italy, Oct. 2017. PDF **(Acceptance rate $\frac{621}{2143} = 29\%$)**

40. Amin Jourabloo, **Xiaoming Liu**, Mao Ye, Liu Ren, "Pose-Invariant Face Alignment with a Single CNN," In Proceeding of International Conference on Computer Vision (ICCV 2017), Venice, Italy, Oct. 2017. PDF **(Acceptance rate $\frac{621}{2143} = 29\%$)**

41. Ying Tai, Jian Yang, **Xiaoming Liu**, Chunyan Xu, "MemNet: A Persistent Memory Network for Image Restoration," In Proceeding of International Conference on Computer Vision (ICCV 2017), Venice, Italy, Oct. 2017. **(Spotlight, Acceptance rate $\frac{56}{2143} = 2.6\%$)** PDF

42. Yousef Atoum, Joseph Roth, Michael Bliss, Wende Zhang, **Xiaoming Liu**, "Monocular Video-based Trailer Coupler Detection using Multiplexer Convolutional Neural Network," In Proceeding of International Conference on Computer Vision (ICCV 2017), Venice, Italy, Oct. 2017. PDF **(Acceptance rate $\frac{621}{2143} = 29\%$)**

43. Xi Yin, Xiang Yu, Kihyuk Sohn, **Xiaoming Liu**, Manmohan Chandraker, "Towards Large-Pose Face Frontalization," In Proceeding of International Conference on Computer Vision (ICCV 2017), Venice, Italy, Oct. 2017. PDF **(Acceptance rate $\frac{621}{2143} = 29\%$)**

44. Luan Tran, Xi Yin, **Xiaoming Liu**, "Disentangled Representation Learning GAN for Pose-Invariant Face Recognition," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2017)*, Honolulu, Hawaii, July 2017. **(Oral, Acceptance rate $\frac{71}{2680} = 2.6\%$)** PDF

45. Luan Tran, **Xiaoming Liu**, Jiayu Zhou, and Rong Jin, "Learning with Missing Modalities via Cascaded Residual Autoencoder," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2017)*, Honolulu, Hawaii, July 2017. **(Acceptance rate $\frac{783}{2680} = 29\%$)** PDF

46. Ying Tai, Jian Yang, **Xiaoming Liu**, "Image Super-Resolution via Deep Recursive Residual Network," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2017)*, Honolulu, Hawaii, July 2017. **(Acceptance rate $\frac{783}{2680} = 29\%$)** PDF

47. Seyed Morteza Safdarnejad, **Xiaoming Liu**, "Spatio-temporal Alignment of Non-overlapping Sequences from Independently Panning Cameras," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2017)*, Honolulu, Hawaii, July 2017. **(Acceptance rate $\frac{783}{2680} = 29\%$)** PDF

48. Seyed Morteza Safdarnejad, Yousef Atoum, **Xiaoming Liu**, "Temporally Robust Global Motion Compensation by Keypoint-based Congealing," in *Proceeding of European Conference on Computer Vision (ECCV) 2016*, Amsterdam, The Netherlands, October 2016. **(Acceptance rate $\frac{415}{1561} = 26.6\%$)** PDF

49. Feng Liu, Dan Zeng, Qijun Zhao, **Xiaoming Liu**, "Joint Face Alignment and 3D Face Reconstruction," in *Proceeding of European Conference on Computer Vision (ECCV) 2016*, Amsterdam, The Netherlands, October 2016. **(Spotlight, Acceptance rate $\frac{45}{1561} = 2.9\%$)** PDF

50. Amin Jourabloo, **Xiaoming Liu**, "Large-pose Face Alignment via CNN-based Dense 3D Model Fitting," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2016)*, Las Vegas NV, June 2016. **(Acceptance rate $\frac{643}{1865} = 29.9\%$)** PDF

51. Joseph Roth, Yiying Tong, **Xiaoming Liu**, "Adaptive 3D Face Reconstruction from Unconstrained Photo Collections," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2016)*, Las Vegas NV, June 2016. **(Acceptance rate $\frac{643}{1865} = 29.9\%$)** PDF

52. Xiangyu Zhu, Zhen Lei, **Xiaoming Liu**, Hailin Shi, Stan Li, "Face Alignment Across Large Poses: A 3D Solution," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2016)*, Las Vegas NV, June 2016. **(Oral, Acceptance rate $\frac{83}{1865} = 3.9\%$)** PDF

53. Amin Jourabloo, **Xiaoming Liu**, "Pose-Invariant 3D Face Alignment," in *Proceeding of International Conference on Computer Vision (ICCV 2015)*, Santiago, Chile, December 2015. **(Acceptance rate $\frac{525}{1698} = 30.3\%$)** PDF

54. Muhammad Jamal Afridi, **Xiaoming Liu**, Erik M. Shapiro, Arun Ross, "Automatic in vivo Cell Detection in MRI," in *Proceeding of the 18th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2015)*, Munich, Germany, October 2015. **(Acceptance rate $\frac{263}{810} = 32.5\%$)** PDF

55. Joseph Roth, Yiying Tong, **Xiaoming Liu**, "Unconstrained 3D Face Reconstruction," in *Proceeding of IEEE Computer Vision and Pattern Recognition (CVPR 2015)*, Boston MA, June 2015. **(Acceptance rate $\frac{602}{2123} = 28.4\%$)** PDF

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60. **Xiaoming Liu**, Yan Tong, Frederick W. Wheeler, and Peter Tu, "Facial Contour Labeling via Congealing," in *Proceeding of European Conference on Computer Vision (ECCV) 2010*, Hersonissos, Heraklion, Crete, Greece, September 5-11, 2010. **(Acceptance rate 27%)** PDF

61. **Xiaoming Liu**, Yan Tong, and Frederick W. Wheeler, "Simultaneous Alignment and Clustering for an Image Ensemble," in *Proceeding of International Conference on Computer Vision (ICCV) 2009*, Kyoto, Japan, September 27-October 5, 2009. **(Acceptance rate 23%)** PDF

62. Jilin Tu, **Xiaoming Liu**, and Peter Tu, "On Optimizing Subspaces for Face Recognition," in *Proceeding of International Conference on Computer Vision (ICCV) 2009*, Kyoto, Japan, September 27-October 5, 2009. **(Acceptance rate 23%)** PDF

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64. Hao Wu, **Xiaoming Liu**, and Gianfranco Doretto, "Face Alignment via Boosted Ranking Models," in *Proceeding of IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2008*, Anchorage, Alaska, June 24-26, 2008. **(Oral presentation, acceptance rate 4%)** PDF

65. **Xiaoming Liu**, Ting Yu, Thomas Sebastian, and Peter Tu, "Boosted Deformable Model for Human Body Alignment," in *Proceeding of IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2008*, Anchorage, Alaska, June 24-26, 2008. **(Acceptance rate 32%)** PDF

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73. Anurag Chowdhury, Yousef Atoum, Luan Tran, **Xiaoming Liu**, Arun Ross, "MSU AVIS dataset: Fusing Face and Voice Biometrics for Person Recognition in Indoor Surveillance Videos," in *Proceedings of the 24th International Conference on Pattern Recognition (ICPR) 2018*, Beijing, China, August 20-24, 2018.

74. Yaojie Liu, Amin Jourabloo, William Ren, **Xiaoming Liu**, "Dense Face Alignment," in *Proceedings of the 7th IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG) (conjunction with ICCV 2017)*, Venice, Italy, Oct 28, 2017.

75. Yousef Atoum*, Amin Jourabloo*, Yaojie Liu*, **Xiaoming Liu**, "Face Anti-Spoofing Using Patch and Depth-Based CNNs," in *Proceedings of the International Joint Conference on Biometrics (IJCB 2017)*, Denver, Colorado, Oct 1-4, 2017. (* denotes equal contribution by the authors) PDF

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77. Seyed Morteza Safdarnejad, **Xiaoming Liu**, Lalita Udpa, "Robust Global Motion Compensation in Presence of Predominant Foreground," in *Proceedings of British Machine Vision Conference (BMVC 2015)*, Swansea, UK, September 2015. (**Acceptance rate** $\frac{185}{553} = 33\%$, **Best Poster Award**, one out of 145 papers) PDF

78. Joseph Roth, Andrew Carriveau, **Xiaoming Liu**, Anil Jain, "Learning-based Ballistic Breech Face Impression Image Matching," in *Proceedings of the IEEE Seventh International Conference on Biometrics: Theory, Applications and Systems (BTAS 2015)*, Arlington, Virginia, September 2015. (**Oral presentation**) PDF

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83. Seyed Morteza Safdarnejad, **Xiaoming Liu**, Lalita Udpa, "Genre Categorization of Amateur Sports Videos in the Wild," in *Proceedings of the IEEE International Conference on Image Processing (ICIP) 2014*, Paris, France, Oct 27-30, 2014. PDF

84. Muhammad Jamal Afridi, **Xiaoming Liu**, J. Mitchell McGrath, "An Automated System for Plant-level Disease Rating in Real Fields," in *Proceedings of the 22nd International Conference on Pattern Recognition (ICPR) 2014*, Stockholm, Sweden, August 24-28, 2014. (**Oral presentation**, **acceptance rate** $\frac{198}{1409} = 14\%$, **Best Industry Related Paper Award (BIRPA) runner-up**, 4 out of 792 papers) PDF

85. Xi Yin, **Xiaoming Liu**, Jin Chen, David Kramer, "Multi-leaf Alignment from Fluorescence Plant Images," in *Proceedings of the IEEE Winter Conference on Applications of Computer Vision (WACV) 2014*, Steamboat Springs, CO, March 24-26, 2014. (**Best Student Paper Award**, 3 out of 152 papers) PDF

86. Muhammad Jamal Afridi, Chun Liu, Christina Chan, Seungik Baek, **Xiaoming Liu**, "Image Segmentation of Mesenchymal Stem Cells in Diverse Culturing Conditions," in *Proceedings of the IEEE Winter Conference on Applications of Computer Vision (WACV) 2014*, Steamboat Springs, CO, March 24-26, 2014. PDF

87. Joseph Roth, **Xiaoming Liu**, Arun Ross, and Dimitris Metaxas, "Biometric Authentication via Keystroke Sound," in *Proceedings of the 6th IAPR International Conference on Biometrics (ICB) 2013*, Madrid, Spain, June 4-7, 2013. (**Oral presentation, Acceptance rate** $\frac{24}{212} = 11\%$) PDF

88. Albert Montillo, Qi Song, **Xiaoming Liu**, and James Miller, "Parsing Radiographs by Integrating Landmark Set Detection and Multi-object Active Appearance Models," in *Proceedings of the SPIE Medical Imaging on Image Processing*, Orlando, Florida, February 10-12, 2013. (**Oral presentation**) PDF

89. Jixu Chen, **Xiaoming Liu**, and Siwei Lyu, "Boosting with Side Information," in *Proceeding of 11th Asian Conference on Computer Vision (ACCV) 2012*, Daejeon, Korea, November 5-9, 2012. PDF (**Acceptance rate** $\frac{231}{869} = 26.6\%$)

90. Yinfu Feng, Jun Xiao, Yueting Zhuang, and **Xiaoming Liu**, "Adaptive Unsupervised Multi-View Feature Selection for Visual Concept Recognition," in *Proceeding of 11th Asian Conference on Computer Vision (ACCV) 2012*, Daejeon, Korea, November 5-9, 2012. PDF (**Acceptance rate** $\frac{231}{869} = 26.6\%$)

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92. **Xiaoming Liu**, Pavan Annangi, Mithun Gupta, Bing Yu, Dirk Padfield, Jyotirmoy Banerjee, and Kajoli Krishnan, "Learning-based Scan Plane Identification From Fetal Head Ultrasound Images," in *Proceedings of the SPIE Medical Imaging on Ultrasonic Imaging, Tomography, and Therapy*, San Diego, California, February 5-6, 2012. (**Oral presentation**) PDF

93. Yimeng Zhang, Weina Ge, Ming-Ching Chang, and **Xiaoming Liu**, "Group Context Learning for Event Recognition," in *Proceedings of the IEEE Workshop on Applications of Computer Vision 2012 (WACV 2012)*, Breckenridge, Colorado, Jan 9-11, 2012. **(Oral presentation, acceptance rate $\frac{12}{142} = 8\%$, Best Student Paper Award**, 2 out of 63 papers) PDF

94. Ya Xue and **Xiaoming Liu**, "Image Congealing Via Efficient Feature Selection," in *Proceedings of the IEEE Workshop on Applications of Computer Vision 2012 (WACV 2012)*, Breckenridge, Colorado, Jan 9-11, 2012. PDF

95. Ting Yu, **Xiaoming Liu**, Ser-Nam Lim, Nils Krahnstoever, and Peter Tu, "Automatic Surveillance Video Matting Using a Shape Prior," in *Proceedings of the 11th IEEE Workshop on Visual Surveillance (conjunction with ICCV 2011)*, Barcelona, Spain, November 6-13, 2011. PDF

96. **Xiaoming Liu**, "Optimal Gradient Pursuit for Face Alignment," in *Proceedings of the International Conference on Automatic Face and Gesture Recognition 2011*, Santa Barbara, California, March 21-25, 2011. PDF

97. Jilin Tu, Brandon Laflen, **Xiaoming Liu**, Musodiq O Bello, Jens Rittscher, Peter Tu, "LPSM: Fitting Shape Model by Linear Programming," in *Proceedings of the International Conference on Automatic Face and Gesture Recognition 2011*, Santa Barbara, California, March 21-25, 2011. PDF

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99. Yan Tong, Frederick W. Wheeler, and **Xiaoming Liu**, "Improving Biometric Identification Through Quality-based Face and Fingerprint Biometric Fusion," in *Proceeding of IEEE Computer Society Workshop on Biometrics (conjunction with CVPR 2010)*, San Francisco, California, June 18, 2010. PDF

100. Necmiye Ozay, Yan Tong, Frederick W. Wheeler, and **Xiaoming Liu**, "Improving Face Recognition with a Quality-based Probabilistic Framework," in *Proceeding of IEEE Computer Society Workshop on Biometrics (conjunction with CVPR 2009)*, Miami Beach, Florida, June 26, 2009. **Best Paper Honorable Mention Award.** PDF

101. **Xiaoming Liu** and Tsuhan Chen, "Face Mosaicing for Pose Robust Video-Based Recognition," in *Proceeding of 8th Asian Conference on Computer Vision (ACCV) 2007*, Tokyo, Japan, November 18-22, 2007. **(Acceptance rate 32%)** PDF

102. Frederick Wheeler, **Xiaoming Liu**, and Peter Tu, "Multi-Frame Super-Resolution for Face Recognition," in *Proceeding of IEEE Conference on Biometrics: Theory, Applications and Systems (BTAS) 2007*, Washington D.C., September 27-29, 2007. PDF

103. **Xiaoming Liu**, Frederick Wheeler, and Peter Tu, "Improved Face Model Fitting on Video Sequences," in *Proceeding of British Machine Vision Conference (BMVC) 2007*, Warwick, UK, September 10-13, 2007. **(Acceptance rate 39%)** PDF

104. **Xiaoming Liu**, Nils Krahnstoever, Ting Yu, and Peter Tu, "What are Customers Looking at?" in *Proceeding of IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS) 2007*, London, UK, September 5-7, 2007. **(Oral presentation)** PDF

105. Frederick Wheeler, **Xiaoming Liu**, Peter Tu, and Ralph Hoctor, "Multi-Frame Image Restoration for Face Recognition," in *Proceeding of IEEE Signal Processing Society Workshop on Signal Processing Applications for Public Security and Forensics (SAFE) 2007*, Washington, D.C., 2007. PDF

106. **Xiaoming Liu**, Peter Tu, and Frederick Wheeler, "Face Model Fitting on Low Resolution Images," in *Proceeding of British Machine Vision Conference (BMVC) 2006*, Vol.3, pp.1079-1088, Edinburgh, UK, September 4-7, 2006. **(Acceptance rate 25%)** PDF

107. Rodney Goh, Lihao Liu, **Xiaoming Liu**, and Tsuhan Chen, "The CMU Face In Action (FIA) Database," in *Proceeding of IEEE International Workshop on Analysis and Modeling of Faces and Gestures, held in conjunction with ICCV 2005*, pp.255-263, Beijing, China, October 16, 2005. PDF

108. **Xiaoming Liu**, Peter Tu, Jens Rittscher, Amitha Perera, and Nils Krahnstoever, "Detecting And Counting People In Surveillance Applications," in *Proceeding of IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS) 2005*, Teatro Sociale, Como, Italy, September 15-16, 2005. PDF

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112. Tsuhan Chen, Yu-Feng Hsu, **Xiaoming Liu**, and Wende Zhang, "Principle Component Analysis and its Variants for Biometrics," in *Proceedings of the IEEE International Conference on Image Processing (ICIP) 2002*, Vol.1, pp.61-64, Rochester, NY, September 2002. PDF

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114. **Xiaoming Liu**, Yueting Zhuang, and Yunhe Pan, "Webscope-CBVR: A Customized Content-based Search Engine for Video on WWW," in *Proceedings of SPIE Vol.3974, Image and Video Communications and Processing 2000*, San Jose, California, January 23-28, 2000.

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116. Yueting Zhuang, **Xiaoming Liu**, and Yunhe Pan, "Query By Video Clip," in *Proceeding of The 6th International Conference on Computer-Aided Design and Computer Graphics (CAD/Graphics) 1999*, Shanghai, China, December 1-5, 1999.

117. **Xiaoming Liu**, Yueting Zhuang, and Yunhe Pan, "A New Approach to Retrieve Video by Example Video Clip," in *Proceeding of The 7th ACM International Multimedia Conference (Multimedia 1999)*, Orlando, Florida, October 30-November 5, 1999. PDF

118. Yueting Zhuang, **Xiaoming Liu**, and Yunhe Pan, "Video Motion Capture Using Feature Tracking and Skeleton Reconstruction," in *Proceeding of IEEE International Conference on Image Processing (ICIP) 1999*, Vol.4, pp.232-236, Kobe, Japan, October 25-28, 1999. PDF

119. **Xiaoming Liu**, Yueting Zhuang, Yi Wu, and Yunhe Pan, "Video Based Human Motion Capture," in *Proceeding of IEEE Workshop on Multimedia Signal Processing*, Copenhagen, Denmark, September 13-15, 1999.

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121. Lisa M. Kopf, Simone Graetzer, Rahul Shrivastav, **Xiaoming Liu**, Jina Huh, "Using Videos to Promote Awareness and Behavior Change for Voice in Parkinsons Disease," in *American Speech Language Hearing Association (ASHA) Annual Convention*, Denver, Colorado, November 12-14, 2015.

122. Bara Aldasouqi, Amin Jourabloo, Joseph Roth, **Xiaoming Liu**, Seungik Baek, Toward automatic wall thickness measurements for abdominal aortic aneurysm images, in *Computer Methods in Biomechanics and Biomedical Engineering (CMBBE)*, Montreal, Canada, September 1-5, 2015.

123. Muhammed Jamal Afridi, Matt Latourette, Margaret F. Bennewitz, Arun Ross, **Xiaoming Liu**, and Erik M. Shapiro, "Machine Learning and Computer Vision based Quantification of Cell Number in MRI-based Cell Tracking," in *Proc. Intl. Soc. Magn. Reson. Med.*, 23:, Toronto, Canada, 2015.

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125. **Xiaoming Liu** and Tsuhan Chen, "Pose Robust Face Recognition Based on Mosaicing –An Example Usage of Face In Action (FIA) Database," in *Demo session of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2004*, Washington, D.C., June 27-July 2, 2004.

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126. Ke Ning, **Xiaoming Liu**, Fei Wu, Multi-stream CNNs for video action recognition, in the ActivityNet Large Scale Activity Recognition Challenge Workshop (in conjuction with CVPR 2016), Las Vegas, Nevada, July 1, 2016.

127. Peter Tu, Fred Wheeler, Nils Krahnstoever, Thomas Sebastian, Jens Rittscher, **Xiaoming Liu**, Amitha Perera, and Gianfranco Doretto, "Surveillance Video Analytics for Large Camera Networks," in *SPIE Newsroom*, June 2007.

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129. Yueting Zhuang, **Xiaoming Liu**, and Yunhe Pan, "Construct Semantic Net For Video Database," in *Proceeding of First International Workshop on Intelligent Multimedia Computing and Networking*, Taj Mahal, Atlantic City, New Jersey, February 27-March 3, 2000.

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130. **Xiaoming Liu**, "Pose Robust Video-Based Face Recognition," Ph.D. Thesis, Carnegie Mellon University, Pittsburgh, PA, October 2004.

131. **Xiaoming Liu**, "Study on Video based Human Animation Techniques," Master Thesis, Zhejiang University, Hangzhou, P.R.China, January 2000.

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132. Luan Tran, Xi Yin, **Xiaoming Liu**, "Representation Learning by Rotating Your Faces," under review in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), May 2017. arXiv

133. Feng Liu, Dan Zeng, **Xiaoming Liu**, Qijun Zhao, "Joint Face Alignment and 3D Face Reconstruction with Application to Face Recognition," under review in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), June 2017. arXiv

134. Gee-Sern Hsu, Yi-Tseng Cheng, Moi Hoon Yap, Choon Ching Ng, **Xiaoming Liu**, "Soft Boundary Regression with Generalized Biologically Inspired Features for Age Estimation," under review in IEEE Transactions on Multimedia, August 2016.

135. Xi Yin, Xiang Yu, Kihyuk Sohn, **Xiaoming Liu**, Manmohan Chandraker, "Feature Transfer Learning for Deep Face Recognition with Long-Tail Data," under review in ECCV 2018.

136. Luan Tran, Kihyuk Sohn, Xiang Yu, **Xiaoming Liu**, Manmohan Chandraker, "Joint Pixel and Feature-level Domain Adaptation in the Wild," under review in ECCV 2018.

137. Yaojie Liu*, Amin Jourabloo*, **Xiaoming Liu**, "Face De-spoofing," under review in ECCV 2018.

138. Adam Terwilliger, Garrick Brazil, **Xiaoming Liu**, "Recurrent Flow-Guided Segmentation Prediction," under review in ECCV 2018.

139. Joel Stehouwer, Xi Yin, Luan Tran, Jingfeng Liu, **Xiaoming Liu**, "Surveillance Face Identification Dataset," under review in ECCV 2018.

140. Garrick Brazil, **Xiaoming Liu**, "Autoregressive Pedestrian Detection," under review in ECCV 2018.

141. Bangjie Yin, Luan Tran, Haoxiang Li, Xiaohui Shen, **Xiaoming Liu**, "Towards Interpretable Face Recognition," under review in ECCV 2018.

Patents

1. Yaojie Liu, Amin Jourabloo, and **Xiaoming Liu**, "Learning Deep Models for Face Anti-Spoofing via Auxiliary Supervision," U.S. Serial No. 62/626,486, filed on Feb 5, 2018.

2. Luan Tran, Xi Yin, and **Xiaoming Liu**, "Disentangled Representation Learning GAN for Pose-Invariant Face Recognition," U.S. Serial No. 62/560001, filed on Sep 18, 2017.

3. Michael Bliss, Yunfei Zhang, **Xiaoming Liu**, Yousef Atoum, and Joseph Roth, "Method and Apparatus for Providing Trailer Information," U.S. Serial No. 15/470,159, filed on Mar 27, 2017.

4. Erik Shapiro, Muhammad Jamal Afridi, Arun Ross, and **Xiaoming Liu**, "System and Method for Quantifying Cell Numbers in Magnetic Resonance Imaging (MRI)," U.S. Serial No. 13/775,363, filed on Feb 25, 2016.

5. Stephen Hsu, **Xiaoming Liu**, and Alex Liu, "Online Exam Proctoring System," U.S. Serial No. 13/775,363, filed on Feb 25, 2013.

6. Kirk Lars Bruns, **Xiaoming Liu**, et al., "System and Methods for Emotive Software Usability," U.S. Serial No. 13/452,329, filed on Apr 20, 2012.

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8. Peter Tu, **Xiaoming Liu**, et al., "Usage Measurement Methods for Interactive Advertising," U.S. Serial No. 13/308,386, filed on Nov 30, 2011.

9. Peter Tu, **Xiaoming Liu**, et al., "Episodic Approaches to Interactive Advertising," U.S. Serial No. 13/308,394, filed on Nov 30, 2011.

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13. Jilin Tu, **Xiaoming Liu**, et al., "Optimal Subspaces for Face Recognition," U.S. Patent No. 8498454, issued on Jul 30, 2013.

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15. Fred Wheeler, **Xiaoming Liu**, et al., "Assesssing biometric sample quality using wavelets and a boosted classifier," U.S. Patent No. 8442279, issued on May 14, 2013.

16. **Xiaoming Liu**, et al., "Improved Face Model Fitting on Video Sequences," U.S. Serial No. 12/100620, filed on Apr 10, 2008.

17. Robert Kaucic, **Xiaoming Liu**, et al., "A Screening Automated Defect Recognition System For Inspecting Turbine Blades," U.S. Serial No. 11/851422, filed on Sep 7, 2007.

18. Amitha Perera, **Xiaoming Liu**, et al., "Automatic Pose and Trajectory Tracking in Sports Video," U.S. Serial No. 11/774958, filed on Jul 9, 2007.

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26. **Xiaoming Liu**, Jens Rittscher, et al., "System and Method For Automatic Person Counting And Detection Of Specific Events," U.S. Patent No. 7596241, issued on Sep 29, 2009.

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5. Dec 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Capital Normal University, Beijing, P. R. China.

6. Dec 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Department of EECS, University of Michigan at Ann Arbor, Ann Arbor, MI.

7. Dec 2017: Deep Learning for Computer Vision, MSU Mathematics department machine learning course, East Lansing, MI.

8. Dec 2017: Deep Learning: the Past, Present and Future, MSU Chinese School, East Lansing, MI.

9. Nov 2017: Computer Vision for Autonomous Driving, Tech.AD Detroit conference, Detroit, MI.

10. Nov 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Department of EECS, Signals, Inference, and Networks (SINE) seminar, University of Illinois at Urbana-Champaign, Champaign, IL.

11. Oct 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, the 7th IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG), Venice, Italy (Keynote).

12. Oct 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Information Sciences Institute, University of Southern California, Los Angeles, CA.

13. Oct 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Department of Computer Science, University of California, Santa Barbara, Santa Barbara, CA.

14. Sep 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Amazon Visual Search, Seattle, WA.

15. Sep 2017: Learning to Fuse Information with Missing Modalities (Year 3), National Academy of Sciences (IC Academic Research Symposium), Washington, DC.

16. Aug 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Cloudream Inc., Shenzhen, P. R. China.

17. July 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Tencent Youtu Lab, Shanghai, P. R. China.

18. June 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, National Taiwan University of Science & Technology.

19. Apr 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Department of Computer Science, University of Notre Dame, Southbend, IN.

20. Mar 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Adobe Research, San Jose, CA.

21. Feb 2017: Disentangled Representation Learning and Image Synthesis via DR-GAN, National Geospatial-Intelligence Agency, Springfield, Virginia.

22. Feb 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, CVPR 2017 Area Chair Workshop, College Park, MD.

23. Feb 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, FORD Research and Innovation Center, Dearborn, MI.

24. Feb 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Centre for Vision Research Seminar, York University, Toronto, Canada.

25. Feb 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Media Analytics group, NEC Labs America, Cupertino, CA.

26. Feb 2017: Large-pose Face Analysis: Alignment, Reconstruction, and Recognition, Bosch Research and Technology Center, Palo Alto, CA.

27. Dec 2016: Large-pose Face Recognition, Capital Normal University, Beijing, P. R. China.

28. Dec 2016: Large-pose Face Recognition, Institute of Computing Technology, Chinese Academy of Sciences, Beijing, P. R. China.

29. Dec 2016: 2D/3D Shape Estimation and Recognition for Large-pose Faces, Horizon Robotics, Beijing, P. R. China.

30. Dec 2016: 2D/3D Shape Estimation and Recognition for Large-pose Faces, Department of Automation, Tsinghua University, Beijing, P. R. China.

31. Dec 2016: 2D/3D Shape Estimation and Recognition for Large-pose Faces, College of Computer Science, Beihang university, Beijing, P. R. China.

32. Dec 2016: High, Middle, and Low-level Vision Problems for Faces, Seoul National University, Seoul, South Korea.

33. Nov 2016: 2D/3D Shape Estimation and Recognition for Large-pose Faces, U.S. Army Research Laboratory, Adelphi, MD.

34. Oct 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, Nanyang Technological University, Singapore.

35. Oct 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, School of Computer Science and Engineering, Nanjing University of Science and Technology, Nanjing, P.R. China

36. Oct 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, The 11th Chinese Conference on Biometric Recognition (CCBR2016), Chengdu, P.R. China.

37. Sep 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, University of Western Ontario, London, Canada.

38. Sep 2016: Learning to Fuse Information with Missing Modalities (Year 2), National Academy of Sciences (IC Academic Research Symposium), Washington, DC.

39. May 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, Microsoft Research Asian, Beijing, P. R. China.

40. May 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, Yonsei University, Seoul, South Korea.

41. May 2016: Unconstrained 3D Face Reconstruction, Institute of Automation, Chinese Academy of Sciences, Beijing, P. R. China.

42. May 2016: Estimating 2D and 3D Facial Shape from Unconstrained Photos, Institute of Computing Technology, Chinese Academy of Sciences, Beijing, P. R. China.

43. Jan 2016: Global motion compensation, Capital Normal University, Beijing, P. R. China.

44. Sep 2015: Learning to Fuse Information with Missing Modalities (Year 1), National Academy of Sciences (IC Academic Research Symposium), Washington, DC.

45. Aug 2015: Lectures on facial analysis and face recognition, Wisesoft Inc., Chengdu, P. R. China.

46. Aug 2015: Unconstrained 3D face reconstruction, College of Computer Science, Zhejiang University, Hangzhou, P. R. China.

47. July 2015: Unconstrained 3D face reconstruction, Robotics Institute VASC Seminar, Carnegie Mellon University, Pittsburgh PA.

48. July 2015: Learning-based Ballistic Breech Face Impression Image Matching, Surface & Nanostructure Metrology Group, National Institute of Standards and Technology (NIST), Gaithersburg, MD.

49. May 2015: Unconstrained 3D face reconstruction, Department of Electronic Engineering, The Chinese University of Hong Kong, Hong Kong.

50. Jan 2015: Visual Sensing and Automatic Understanding of Human Behavior, Spring 2015 Cognitive Forum, Michigan State University, East Lansing, Michigan.

51. Dec 2014: Efficient Motion-Saliency Detection and Its Application to Video Analysis, Midwest vision workshop, Chicago IL.

52. Oct 2014: Human Sensing: Efficient Visual Analysis for Faces and Hands, Toyota Technical Center, Ann Arbor, Michigan.

53. Apr 2014: Efficient Time Series Data Matching and its Application to Human Sensing, Signal processing seminar, Department of Mathematics, Michigan State University, East Lansing, Michigan.

54. Nov 2013: Efficient Time Series Data Matching and its Application to Human Sensing, Department of Computer Science, Rutgers University, New Brunswick, NJ.

55. Oct 2013: Human Sensing: Computational Approaches to Human Behavior Understanding from Visual Content, DevCon, TechSmith Inc., Lansing, Michigan.

56. Feb 2013: Human Sensing: Computational Approaches to Human Behavior Understanding from Visual Signals, Electrical and Computer Engineering Seminar Series, Michigan State University, East Lansing, Michigan.

57. Nov 2012: Computer Vision and its Applications, College of Engineering Noon-time Seminar, Michigan State University, East Lansing, Michigan.

58. Jul 2012: Facial Analysis: Theory and Applications, Advanced Multimedia Processing Lab, Cornell University, Ithaca, New York.

59. Jun 2012: Advanced Behavior Recognition in Crowded Environments, NIJ Conference 2012, Washington DC.

60. Apr 2012: Facial Analysis: Theory and Applications, College of Computer Science, Zhejiang University, Hangzhou, P.R.China.

61. Mar 2012: Facial Analysis: Theory and Applications, Computer Science Departmental Colloquium, Georgia State University, Atlanta, Georgia.

62. Feb 2012: Facial Analysis: Biometrics and Beyond, Computer Science and Engineering Department Seminar, Michigan State University, East Lansing, Michigan.

63. Jan 2012: Group Context Learning for Event Recognition, IEEE Workshop on Applications of Computer Vision (WACV) 2012, Breckenridge, Colorado.

64. Oct 2011: Computer Vision-based Student Engagement Inference for Online Education (with Peter Shea), School of Education Seminar, State University of New York at Albany, Albany, New York.

65. Oct 2011: Visual Analysis via Boosted Learning, Computer Science Department Seminar, State University of New York at Albany, Albany, New York.

66. Jun 2011: Supervised and Semi-Supervised Image Alignment, Computer vision seminar, University of South Florida, Tampa, Florida.

67. Oct 2010: Supervised and Semi-Supervised Image Alignment, Computer & Information Sciences Department Colloquium, Temple University, Philadelphia, Pennsylvania.

68. Oct 2010: Supervised and Semi-Supervised Image Alignment, Electrical Engineering Department Colloquium, The City College of New York, New York City, New York.

69. Oct 2010: Intelligent Video (with Peter Tu), School of Electrical and Computer Engineering, Cornell University, Ithaca, New York.

70. Nov 2009: Image Alignment: Theory and Application, Computer Science Department Seminar, State University of New York at Albany, Albany, New York.

71. Nov 2009: Image Alignment: Theory and Application, Naval Research Laboratory, Washington DC.

72. Sep 2009: Image Alignment: Theory and Application, Artificial Intelligence Lab., Zhejiang University, Hangzhou, P. R. China.

73. Jun 2009: Improving Face Recognition with a Quality-based Probabilistic Framework, IEEE Computer Society Workshop on Biometrics (in conjunction with CVPR 2009), Miami Beach, Florida.

74. May 2008: Discriminate Image Alignment, Digital Video and Multimedia (DVMM) Lab, Columbia University, New York City, New York.

75. May 2008: Discriminate Image Alignment, Robotics Institute, Carnegie Mellon University, Pittsburgh, Pennsylvania.

76. Feb 2008: Face Alignment: Algorithms and Applications, National Sensor, Surveillance and Biometric Technologies Center Of Excellence, New York City, New York.

77. Sep 2007: What are Customers Looking at? IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS) 2007, London, UK.

78. Aug 2007: Generative and Discriminative Face Alignment, Electrical, Computer, & Systems Engineering (ECSE) Department, Rensselaer Polytechnic Institute, Troy, New York.

79. Jun 2007: Generic Face Alignment using Boosted Appearance Model, IEEE Conference on Computer Vision Pattern Recognition (CVPR) 2007 , Minneapolis, Minnesota.

80. Jun 2007: Intelligent Video for Security (with Fred Wheeler), Northeast Technology and Product Assessment Committee (NTPAC) Corrections Conference, Sturbridge, Massachusetts.

81. Apr 2007: Intelligent Video at GE, Artificial Intelligence Lab., Zhejiang University, Hangzhou, P.R.China.

82. Feb 2007: Multi-view Face Enhancement and Forensic Face Recognition (with Fred Wheeler), Identix Inc., Jersey City, New Jersey.

83. Aug 2005: Towards Intelligent Video Solutions (with Nils Krahnstoever and Jens Rittscher), Robotics Institute, Carnegie Mellon University, Pittsburgh, Pennsylvania.

84. Sep 2004: Pose Robust Video-Based Face Recognition, Siemens Corporate Research, Princeton, New Jersey.

85. Sep 2004: Pose Robust Video-Based Face Recognition, GE Global Research, Niskayuna, New York.

86. Aug 2004: Pose Robust Video-Based Face Recognition, Epson Palo Alto Lab, Palo Alto, California.

87. May 2002: Shot Boundary Detection Using Temporal Statistics Modeling, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2002, Orlando, Florida.

88. Feb 2001: Face Authentication with Tolerance to Expression Variations and Registration Errors, Media Site Inc., Pittsburgh, Pennsylvania.

CURRENT GRADUATE STUDENTS	Xi Yin (2013-)
	Amin Jourabloo (2014-)
	Luan Tran (2015-)
	Yaojie Liu (2016-)
	Garrick Brazil (2016-)
	Adam Terwilliger (2017-)
	Joel Stehouwer (2017-)
	Bangjie Yin (2017-)
	Zhongzheng Chen (2018-)
	Hieu Nguyen (2018-)
UNDERGRAD STUDENTS ADVISED	Yevgeny Khessin (Fall 2012)
	Jacob Jensen (Fall 2013-Spring 2014)
	Marco Botros (Fall 2013-Spring 2014)
	Nayana Kodur (Summer 2014-Fall 2014)
	Zach Richardson (Fall 2015)
	Jack Dean Smith (Fall 2015-Spring 2016)
	Zhiming Jiang (Summer 2016)
	Ziyuan Zhang (Summer 2017)
	Xiaohan Zhang (Summer 2017)
	Weilin Liang (Summer 2018)
HIGH SCHOOL STUDENTS ADVISED	Kyle Milka (Summer 2013)
	William Ren (Summer 2016, 2017)

GRADUATED STUDENTS **Ph.D. student advisees**

- Joseph Roth (Aug 2012 - Aug 2016, CSE), "Unconstrained 3D Face Reconstruction from Photo Collections". Recipient of the **2016 Outstanding Graduate Student Award** in the CSE Department at MSU; recipient of the **First Place of Fitch H. Beach Awards** - the highest honor among all the 2016 graduating PhD students in the College of Engineering at MSU. First job at Google@Pittsburgh.

- Muhammad Jamal Afridi (Aug 2012 - Jan 2017, CSE), "Convolutional Neural Networks for Automated Cell Detection in Magnetic Resonance Imaging Data". Co-advised with Erik Shapiro, Arun Ross. First job at 3M Company, Maplewood, MN.
- Morteza Safdarnejad (Aug 2013 - May 2017, ECE), "Robust Global Motion Compensation and its Applications". Co-advised with Lalita Udpa. First job at Adobe Systems Incorporated, San Jose, CA.
- Yousef Atoum (Aug 2013 - Jan 2018, ECE), "Detecting Objects under Challenging Illumination Conditions". First job as an Assistant Professor at Department of Computer Engineering, Hijjawi Faculty For Engineering Technology, Yarmouk University, Jordan.

M.S. student advisees

- Lingyi Wu (Fall 2012-Summer 2014, CSE), First job at Med-Care Diabetic and Medical Supplies, Inc., Boca Raton, FL.
- Liping Chen (Fall 2013-Spring 2016, CSE), First job at Amazon.com, Inc., Seattle, WA.

INTERN RESEARCHER SUPERVISION

Mahesh Ramachandran, University of Maryland at College Park, 2007.(co-supervision with Gianfranco Doretto)
Hao Wu, University of Maryland at College Park, 2007. (co-supervision with Gianfranco Doretto)
Peng Yang, Rutgers university, 2007. (co-supervision with Gianfranco Doretto)
Avinash Ravichandran, Johns Hopkins University, 2007. (co-supervision with Gianfranco Doretto)
Yilei Xu, University of California at Riverside, 2008.
Ryan Connaughton, University of Notre Dame, 2010. (co-supervision with Fred Wheeler)
Yimeng Zhang, Cornell University, 2011. (co-supervision with Ming-Ching Chang, Weina Ge) **Recipient of the prestigious GE Early Identification Award.**

VISITING SCHOLAR

Lekun Zhou, Zhejing University (Fall 2013)
Ke Ning, Zhejing University (Fall 2015)
Ying Tai, Nanjing University of Science and Technology (Spring 2016)
Yunfei Wang, Capital Normal University (Fall 2016)

PROFESSIONAL ACTIVITIES

Member of IEEE
Member of Sigma Xi
Program Committee

- 7th Asian Conference on Computer Vision (ACCV) 2006, Hyderabad, India, January 13-16, 2006.
- IEEE workshop on Beyond Patches (in conjunction with CVPR 2006), New York, NY, June 17, 2006.
- Workshop on Non-rigid registration and tracking through learning (in conjunction with ICCV 2007), Rio de Janeiro, Brazil, October 14, 2007.
- IEEE Workshop on Motion and Video Computing (WMVC), Copper Mountain, Colorado, January 8-9, 2008.
- International Workshop on Instinctive computing, Carnegie Mellon University, Pittsburgh, PA, June 15-16, 2009.
- 1st ACM International Workshop on Interactive Multimedia for Consumer Electronics (IMCE 2009), Beijing, China, October 23, 2009.
- Video Intelligence (VI-2010), ICCS Workshop, Amsterdam, May 30, 2010.
- IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG 2010, in conjunction with CVPR 2010), June 14, 2010.
- IEEE International Conference on Multimedia and Expo (ICME 2010), July 19-23, 2010.
- The 10th Asian Conference of Computer Vision (ACCV 2010), November 8-12, 2010.
- IEEE Workshop on Motion and Video Computing (WMVC), Kona, Hawaii, January 6, 2011.
- The 9th IEEE Conference on Automatic Face and Gesture Recognition (FG 2011), March 21-23, 2011.
- IEEE International Conference on Multimedia and Expo (ICME 2011) July 11-15, 2011.
- The 13th International Conference on Computer Vision (ICCV 2011), November 6-13, 2011.
- The International Workshop on Interactive Multimedia on Mobile and Portable Devices (IMMPD'11, in conjunction with ACM Multimedia 2011), November 28, 2011.
- The 1st International Conference on Pattern Recognition Applications and Methods (ICPRAM 2012), February 6-8, 2012.
- The 25th IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2012), June 18-20, 2012.

- IEEE International Conference on Multimedia and Expo (ICME 2012), July 9-13, 2012.
- The IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2012), September 23-27, 2012.
- The 9th IEEE Conference on Advanced Video and Signal-based Surveillance (AVSS 2012), September 18-21, 2012.
- The 2012 International Conference on Advanced Vehicle Technologies and Integration (VTI 2012), July 16-19, 2012.
- The 11th Asian Conference of Computer Vision (ACCV 2012), November 5-9, 2012.
- The IEEE Workshop on Applications of Computer Vision 2013 (WACV 2013), January 16-18, 2013.
- The 2nd International Conference on Pattern Recognition Applications and Methods (ICPRAM 2013), February 15-18, 2013.
- The 5th IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG2013), in conjunction with CVPR 2013, June 28, 2013.
- The IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2013),September 29 October 2, 2013.
- The 1st International Workshop on Multimedia Affective Computing, in conjunction with ICME 2014, July 14, 2014.
- The workshop on Face and Facial Expression Recognition (FFER) from Real World Videos, in conjunction with ICPR 2014, Aug 24, 2014.
- The workshop on My Car Has Eyes: Intelligent Vehicle With Vision Technology, in conjunction with ACCV 2014, Nov 1, 2014.
- The 6th IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG2015), in conjunction with CVPR 2015, Jun 12, 2015.
- The IEEE Seventh International Conference on Biometrics: Theory, Applications and Systems (BTAS 2015), Sep 2015.
- The 2nd Computer Vision Problems in Plant Phenotyping workshop (CVPPP), in conjunction with BMVC 2015, Sep 10, 2015.
- The ACCV 2016 Workshop on Large-Scale Soft Biometrics (LSSB), Nov 2016.
- The second workshop on Face and Facial Expression Recognition (FFER 2016), in conjunction with ICPR 2016, Dec 4, 2016.
- The Workshop on Facial Informatics, in conjunction with ACCV 2016, Nov 20, 2016.
- The First International Workshop on the Bright and Dark Sides of Computer Vision: Challenges and Opportunities for Privacy and Security, in conjunction with CVPR 2017, July 21, 2017.
- The CVPR 2017 workshop on DeepVision: Temporal Deep Learning, July 26, 2017.
- SmartAg International Symposium, December 3-6, 2017.
- IEEE FG 2018 Workshop on Dense 3D Reconstruction of 2D Face Images in the Wild, May 2018.
- IEEE FG 2018 Doctoral Consortium, May 2018.

Program Chair

- IEEE Winter Conference on Applications of Computer Vision (WACV 2018), March 12-15, 2018.
- 9th IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS 2018), October 22-25, 2018.

Area Chair/Co-Chair

- The 21st International Conference on Pattern Recognition (ICPR 2012), November 11-15, 2012.
- The 6th IAPR International Conference on Biometrics (ICB 2013), June 4 - 7, 2013.
- Doctoral Consortium of 10th IEEE Conference on Automatic Face and Gesture Recognition (FG 2013), April 23, 2013.
- IEEE Winter Conference on Applications of Computer Vision (WACV 2014), March 24-26, 2014.
- The 11th IEEE International Conference on Advanced video and Signal-based Surveillance (AVSS 2014), August 26-29, 2014.
- The 11th IEEE Conference on Automatic Face and Gesture Recognition (FG 2015), May 4-8, 2015.
- IEEE Winter Conference on Applications of Computer Vision (WACV 2016), March 7-9, 2016.
- The 23rd International Conference on Pattern Recognition (ICPR 2016), December 4-8, 2016.
- The 12th IEEE Conference on Automatic Face and Gesture Recognition (FG 2017), May 29- June 3, 2017.
- 2017 IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2017), June 24-30, 2017.

- Tutorial Chair, IEEE Winter Conference on Applications of Computer Vision (WACV 2017), March 24-31, 2017.
- Corporate Relations Chair, International Joint Conference on Biometrics (IJCB 2017), October 1-4, 2017.
- The 19th IEEE International Conference on Image Processing (ICIP 2017), September 17-20, 2017.
- Doctoral Consortium Co-Chair, 2018 IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2018), June 18-23, 2018.
- The 13th IEEE Conference on Automatic Face and Gesture Recognition (FG 2018), May 15- 19, 2018.

Session Chair

- The IEEE 6th International Conference on Biometrics: Theory, Applications and Systems (BTAS 2013), September 29 - October 2, 2013.
- The 7th IAPR International Conference on Biometrics (ICB 2015), May 19 - 22, 2015.
- The Midwest Vision Workshop, April 14, 2016.
- IEEE Computer Society Workshop on Biometrics, in conjunction with CVPR 2016, June 26, 2016.
- The 23rd International Conference on Pattern Recognition (ICPR 2016), December 6, 2016.
- The Midwest Vision Workshop, May 5, 2017.
- IEEE Computer Society Workshop on Biometrics, in conjunction with CVPR 2017, July 21, 2017.
- The 7th IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG), October 28, 2017.

Panelist

- NSF Panel on IIS-Robust Intelligence (RI) small program, March 2012.
- Technology Innovation panel on NIJ Conference, June 2012.
- NSF Panel on IIS-Robust Intelligence (RI) small program, May 29-30 2014.
- ICPR 2014 Special Panel on Industry Related Research, August 26 2014.
- "Recent Advances in Biometrics" session in the 13th Annual Smart Card Alliance Government Conference, October 30, 2014.
- NSF Panel on IIS-Research Initiation Initiative (CRII) program, Nov 17-18 2016.
- CVPR 2018 Biometrics Workshop Panel on "Impact of deep learning on biometrics and trends", June 18, 2018.
- CVPR 2018 Disguised Faces in the Wild Workshop Panel on "Attacks on Face Recognition", June 18, 2018.

Grant Review

- DARPA 2013.
- NIJ 2013, 2015.
- NSF 2015.
- Hong Kong Research Grants Council (RGC) 2013, 2014, 2015.

Ph.D. Dissertation Committee Member

- Yimeng Zhang, Cornell University.
- Kien Trung Nguyen, Michigan State University.
- Alessandra Aparecida Paulino, Michigan State University.
- Sunpreet Arora, Michigan State University.
- Lanbo She, Michigan State University.
- Liyan Wang, Michigan State University.
- Thomas Swearingen, Michigan State University.
- Denton Bobeldyk, Michigan State University.
- Shaohua Yang, Michigan State University.
- Qi Qian, Michigan State University.
- Zhichao Lu, Michigan State University.
- Shuai Yuan, Michigan State University.
- Yaohui Ding, Michigan State University.
- Mehmet Akif Alper, Michigan State University.
- Jianpeng Xu, Michigan State University.

- Yuzhen Lu, Michigan State University.
- Inci Baytas, Michigan State University.
- Vahid Mirjalili, Michigan State University.
- Rundong Zhao, Michigan State University.
- Steven Hoffman, Michigan State University.
- Seongjong Song, Yonsei University, South Korea.
- Mohammed Al-Qizwini, Michigan State University.
- Xiao Zeng, Michigan State University.
- Anurag Chowdhury, Michigan State University.
- Elham Tabassi, Michigan State University.
- Xi Peng, Rutgers University.
- Melissa Dale, Michigan State University.
- Renu Sharma, Michigan State University.

External Examiner for Ph.D. thesis

- Ashton Fagg, Queensland University of Technology
- Hilton Bristow, Queensland University of Technology

Associate Editor

- Neurocomputing journal (Dec 2016-).

Guest Editor

- International Journal of Computer Vision Special Issue on Deep Learning for Face Analysis (Oct 2017-Oct 2018).
- ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM) Special Issue on Face Analysis for Applications (June 2018-Apr 2019).
- Machine Vision and Applications Special Issue on 2018 IEEE Winter Conference on Applications of Computer Vision (Jan 2018 - Dec 2018).

Master Thesis Committee

- Scott Klum, Michigan State University.
- Rosemary Dutka, Michigan State University.
- Jing Yang, Michigan State University.
- Malcolm Doering, Michigan State University.
- Raghunandan Pasula, Michigan State University.
- Aaron Gonzales, Michigan State University.

Reviewing Activities for Archived Journals

- Advances in Artificial Intelligence
- IEEE Transactions on Pattern Analysis Machine Intelligence (PAMI)
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Transactions on Circuits and Systems for Video Technology (CSVT)
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Human-Machine Systems
- IEEE Transactions on Information Forensics and Security
- IEEE Transactions on Systems, Man and Cybernetics, Part B
- IEEE Transactions on Neural Networks
- IEEE Signal Processing Letters
- International Journal of Computer Vision
- Computer Vision and Image Understanding
- Image and Vision Computing
- Pattern Recognition

- Pattern Recognition Letter
- Machine Vision and Applications
- EURASIP Journal on Signal Processing: Image Communication
- Neurocomputing
- Journal of Electronic Imaging
- Journal of Artificial Intelligence Research
- Turkish Journal of Electrical Engineering & Computer Sciences
- PLOS ONE
- The Visual Computer

Reviewing Activities for Conferences

- IEEE Conference on Computer Vision and Pattern Recognition
- IEEE International Conference on Computer Vision
- European Conference on Computer Vision
- Asian Conference on Computer Vision
- IEEE Winter Vision Meetings
- IEEE International Conference on Image Processing
- IEEE International Conference on Acoustics, Speech, and Signal Processing
- IEEE International Conference on Multimedia & Expo
- IEEE International Symposium on Circuits and Systems
- International Conference on Pattern Recognition
- SIGGRAPH Asia

Services

- Graduate Studies and Research Committee Chair, MSU CSE Department, Fall 2017.
- Graduate Studies and Research Committee Member, MSU CSE Department, Fall 2012-Spring 2014, Fall 2015, Spring 2016.
- Faculty advisor, NSF-sponsored Research Experience for Teacher (RET) program at MSU, Summer 2013, 2014, 2015.
- Colloquium Committee Co-Chair, MSU CSE Department, Fall 2013-Spring 2015.
- Instructor, MSU Grandparent University, Summer 2014.
- Faculty Search Committee Member, MSU CSE Department, Fall 2014-Spring 2015.
- Faculty Search Committee Member, MSU CSE Department, Fall 2015-Spring 2016.
- Mobility Faculty Search Committee Member, MSU College of Engineering, Fall 2017-Spring 2018.
- University Council/Faculty Senate representative, MSU, Fall 2014-present.
- Faculty mentor for Autonomous Ground Vehicle Research Club, Michigan State University, Fall 2016-present.
- Mentor of the CVPR 2017 Doctoral Consortium (DC), July 24, 2017.
- Mentor of the IJCB 2017 Doctoral Consortium (DC), Oct 3, 2017.

Other Activities

- Review book proposal submitted to the engineering technology editorial team at John Wiley and Sons, Ltd
- Judge panel, MEng student projects evaluation, School of Electrical and Computer Engineering, Cornell University, Ithaca, New York, May 2010
- Initiate "Rosenblum Undergraduate Research Opportunity Award (RUROA)" at MSU CSE Department, Fall 2013.
- Organizor of the Multi-group seminar in CSE since Spring 2015. This seminar brings together ∼30 MSU graduate students in the area of computer vision, pattern recognition and biometrics, and organizes weekly presentations for students to share progress and research ideas.
- Member of the advisory committee of the 5-year AI flagship project in South Korea titled "Intelligent interaction based on context awareness and intention understanding", starting April 2017.
- Technical Activities Committee member of IEEE Biometrics Council, starting June 2017.