Ying Liu

CONTACT
INFORMATION

Office: 113 Bergin Hall
Department of Computer Science & Engineering
Santa Clara University
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WEBPAGE
https://www.scu.edu/engineering/faculty/liu-ying/

GOOGLE SCHOLAR
PROFILE
https://scholar.google.com/citations?user=cpX8P_gAAAAJ&hl=en

RESEARCH
INTERESTS
Machine Learning, Deep Learning, Video Coding, Image Processing, Computer Vision, Compressed Sensing.

EDUCATION
The State University of New York at Buffalo (SUNY Buffalo), Buffalo, NY

Ph.D, Electrical Engineering, Sept. 2012
Thesis: Decoding of Purely Compressed Sensed Video
Advisor: Prof. Dimitris A. Pados

The State University of New York at Buffalo (SUNY Buffalo), Buffalo, NY

M.S., Electrical Engineering, June 2008
Advisor: Prof. Dimitris A. Pados

Beijing University of Posts and Telecommunications (BUPT), Beijing, China

B.S., Communications Engineering, June 2006
Thesis: Dynamic Bandwidth Allocation of Gigabit Passive Optical Networks (GPON), Excellent Undergraduate Thesis Award

EMPLOYMENT
Santa Clara University, Santa Clara, CA

Assistant Professor, Dept. Computer Science & Engineering, Sept. 2018 - Present

The State University of New York at Buffalo (SUNY Buffalo), Buffalo, NY

Lecturer, Dept. Electrical Engineering, Sept. 2016 - May. 2018

The State University of New York at Buffalo (SUNY Buffalo), Buffalo, NY

Postdoc - Research Scientist, Dept. Electrical Engineering, Oct. 2014 - Aug. 2018

Illinois Institute of Technology, Chicago, IL

Senior Research Associate, Dept. Electrical & Computer Engineering, July 2013 - Oct. 2014
Multimedia Communications Laboratory

ARCON Corporation, Waltham, MA

Staff Engineer, Jan. 2013 - Jul. 2013
Air Traffic Management Software Analysis and Testing.

RESEARCH GRANTS
- Nam Ling (PI) and Ying Liu (PI), "Low Complexity and High Efficiency Image and Video Coding with Deep Learning on Heterogeneous Platforms," $154,673, Kwai, Inc, June 16, 2021 - June 15, 2022, awarded.
- Nam Ling (PI) and Ying Liu (Co-PI), "Low Complexity and High Efficiency Image and Video Processing with Neural Network on Heterogeneous Platforms," US $150,873.00, Kwai, Inc., June 16, 2020 - June 15, 2021, awarded.

JOURNAL ARTICLES

1. B. Hou, **Y. Liu**, N. Ling, L. Liu, and Y. Ren, "A fast lightweight 3D separable convolutional neural network with multi-input multi-output for moving object detection", *IEEE Access*, vol. 9, pp. 148433 - 148448, Oct. 2021. Impact Factor: 3.367.

2. **Y. Liu**, K. Tountas, D. A. Pados, S. N. Batalama, and M. J. Medley, "L1-subspace tracking for streaming data", *Pattern Recognition*, vol. 97, Aug. 2019. Impact Factor: 7.740.

3. **Y. Liu** and J. Kim, "Variable block-size compressed sensing for depth map coding", *Multimedia Tools and Applications*, vol. 79, pp. 8825 - 8839, Apr. 2019. Impact Factor: 2.757.

4. **Y. Liu**, D. A. Pados, J. Kim, and C. Zhang, "Reconstruction of compressed-sensed multiview video with disparity and motion compensated total-variation minimization," *IEEE Trans. Circuits and Systems for Video Technology*, vol. 28, pp. 1288-1302, June 2018. Impact Factor: 4.685.

5. **Y. Liu** and D. A. Pados, "Compressed-sensed-domain L1-PCA video surveillance," *IEEE Trans. Multimedia*, vol. 18, pp. 351-363, Mar. 2016. Impact Factor: 6.513.

6. **Y. Liu**, M. Li, and D. A. Pados, "Motion-aware decoding of compressed-sensed video," *IEEE Trans. Circuits and Systems for Video Technology*, vol. 23, pp. 438-444, Mar. 2013. Impact Factor: 4.685.

7. **Y. Liu** and D. A. Pados, "Decoding of framewise compressed-sensed video via interframe total variation minimization," *SPIE Journal of Electronic Imaging, Special Issue on Compressive Sensing for Imaging*, Apr.-June 2013.

CONFERENCE PAPERS

1. P. Du, **Y. Liu**, N. Ling, L. Liu, Y. Ren, M. Hsu, "A generative adversarial network for video compression," *SPIE Defense + Commercial Sensing, Conference: Big Data IV: Learning, Analytics, and Applications*, Orlando, Florida, Apr. 2022, accepted.

2. B. Hou, **Y. Liu**, N. Ling, L. Liu, Y. Ren, and M. Hsu, "F3DsCNN: a fast two-branch 3D separable CNN for moving object detection," *IEEE Conf. Visual Commun. and Image Process. (VCIP)*, Munich, Germany, Dec. 2021, accepted.

3. Y. Pei, **Y. Liu**, N. Ling, L. Liu, and Y. Ren, "Class-specific neural network for video compressed sensing," *IEEE Int. Symp. Circuits and Systems*, Daegu, Korea, May 2021.

4. **Y. Liu**, P. Du, and Y. Li, "Hierarchical motion-compensated deep network for video compression," *SPIE Symp. Defense + Commercial Sensing*, Orlando, FL, Apr. 2021, accepted.

5. M. Schimpf, N. Ling, Y. Shi, and **Y. Liu**, "Sparse coding of intra prediction residuals for screen content coding," *IEEE Int. Conf. Consumer Electronics (ICCE)*, 2021, accepted.

6. B. Hou, **Y. Liu**, and N. Ling, "A super-fast deep network for moving object detection," *IEEE Int. Symp. Circuits and Systems*, online, Oct. 2020.

7. Y. Pei, **Y. Liu**, and N. Ling, "Deep learning for block compressed sensing of images in sparse domain," *IEEE Int. Symp. Circuits and Systems*, online, Oct. 2020.

8. R. Khan, **Y. Liu**, "Motion-aware deep video coding network," *Conference SI110: Big Data II: Learning, Analytics, and Applications, SPIE Symp. Defense + Commercial Sensing 2020*, online, Apr. 2020.

9. **Y. Liu**, Z. Bellay, P. Bradsky, G. Chandler, and B. Craig, "Edge-to-fog computing for color-assisted moving object detection," in *Proc. SPIE 10989, Big Data: Learning, Analytics, and Applications*, Baltimore, MD, Apr. 2019.

10. **Y. Liu** and D. A. Pados, "Conformity evaluation of data samples by L_1-norm principal-component analysis," in *Proc. SPIE 10658, Compressive Sensing VII: From Diverse Modalities to Big Data Analytics*, Orlando, FL, May 2018.

11. **Y. Liu**, D. A. Pados, S. N. Batalama, and M. J. Medley, "Iterative re-weighted L1-norm principal-component analysis," in *Proc. IEEE Asilomar Conference*, Pacific Grove, CA, Oct. - Nov. 2017.

12. F. Maritato, **Y. Liu**, S. Colonnese, and D. A. Pados, "Cloud-assisted individual L1-PCA face recognition using wavelet-domain compressed images," in *Proc. the 6th European Workshop on Visual Information Process. (EUVIP)*, Marseille, France, Oct. 2016.

13. **Y. Liu**, D. A. Pados, and C.H. Yeh, "Two-stage tensor locality-preserving projection face recognition," in *Proc. IEEE Int. Conf. Multimedia Big Data*, Taipei, Taiwan, Apr. 2016.

14. M. Pierantozzi, **Y. Liu**, D. A. Pados, and S. Colonnese, "Video background tracking and fore-ground extraction via L1-subspace updates," in *Proc. SPIE Commercial + Scientific Sensing and Imaging*, Baltimore, MD, Apr. 2016.

15. F. Maritato, **Y. Liu**, D. A. Pados, and S. Colonnese, "Face recognition with L1-norm sub-spaces," in *Proc. SPIE Commercial + Scientific Sensing and Imaging*, Baltimore, MD, Apr. 2016.

16. **Y. Liu**, S. Chamadia, and D. A. Pados, "Joint-view Kalman-filter recovery of compressed-sensed multiview videos," in *Proc. IEEE Int. Conf. Acoust. Speech, and Signal Process. (ICASSP)*, Shanghai, China, Mar. 2016.

17. Y. Xu, J. Sun, J. Zeng, Z. Kudyshev, A. Pandey, **Y. Liu**, and N. M. Litchinitser, "Probing metamaterials with structured light," in *Proc. SPIE 9544, Metamaterials, Metadevices, and Metasystems*, Sept. 2015.

18. **Y. Liu**, D. A. Pados, "Compressed-sensed L1-PCA surveillance video," in *Proc. SPIE Defense, Security, and Sensing (DSS)*, Baltimore, MD, Apr. 2015.

19. **Y. Liu**, C. Zhang, and J. Kim, "Disparity-compensated Total-variation Minimization for compressed-sensed multiview image reconstruction," in *Proc. IEEE Int. Conf. Acoust. Speech, and Signal Process. (ICASSP)*, Brisbane, Australia, Apr. 2015.

20. K. R. Vijayanagar, **Y. Liu**, and J. Kim, "Adaptive measurement rate allocation for block-based compressed sensing of depth maps," in *Proc. IEEE Int. Conf. Image Process. (ICIP)*, Paris, France, Oct. 2014.

21. **Y. Liu**, K. R. Vijayanagar, and J. Kim., "Rate-distortion optimization for compressive video sampling," in *Proc. SPIE Defense, Security, and Sensing (DSS)*, Baltimore, MD, May 2014.

22. **Y. Liu**, K. R. Vijayanagar, and J. Kim, "Quad-tree partitioned compressed sensing for depth map coding," in *Proc. IEEE Int. Conf. Acoustics and Speech Signal Process. (ICASSP)*, Florence, Italy, May 2014.

23. **Y. Liu** and D. A. Pados, "Rate-adaptive compressive video acquisition with sliding-window total-variation- minimization reconstruction," in *Proc. SPIE on Defense, Security and Sensing*, Baltimore, MD, Apr. 2013.

24. **Y. Liu**, M. Li, and D. A. Pados, "Decoding of purely compressed-sensed video," in *Proc. SPIE on Defense, Security and Sensing*, Baltimore, MD, Apr. 2012.

25. **Y. Liu**, M. Li, K. Gao, and D. A. Pados, "Motion compensation as sparsity-aware decoding in compressive video streaming," (invited paper) in *Proc. Intern. Conf. on Digital Signal Proc. (ICDSP)*, Corfu, Greece, Jul. 2011.

1. B. Hou, **Y. Liu**, N. Ling, L. Liu, Y. Ren, and M. Hsu, "3D separable deep convolutional neural network for moving object detection," *U.S. Patent Application No. 17/533,012*, filed.

2. Y. Pei, **Y. Liu**, N. Ling, L. Liu, Y. Ren, and M. Hsu, "Class-specific neural network for video compressed sensing," *Provisional U.S. patent (application no. US 63/161,431).*

TEACHING

1. COEN166/266 Artificial Intelligence, Santa Clara University

2. COEN140/240 Machine Learning, Santa Clara University

3. COEN347 Advanced Techniques in Video Coding, Santa Clara University

4. EE614 Smart Antennas (graduate), Spring 2018, SUNY at Buffalo

5. EE462/562 Principle of Medical and Radar Imaging (graduate), Spring 2018, Spring 2017, SUNY at Buffalo

6. EE631 Detection & Estimation I (graduate), Fall 2017, Fall 2016, SUNY at Buffalo

7. EE484 Communication Systems 2 (Senior), Fall 2017, SUNY at Buffalo

8. EE200 EE Concepts/non-Majors (undergraduate, 200+ students), Fall 2017, Spring 2017, Fall 2016, SUNY at Buffalo

9. EE303 Signal Analysis and Transform Methods (undergraduate), Summer 2011, SUNY at Buffalo

PRESENTATIONS AND TALKS

1. COEN 100, Undergraduate Seminar.

2. COEN 400, Graduate Seminar.

STUDENTS & PROJECTS

PhD Students' Projects:
- Pengli Du - Deep Learning for Video Coding
- Tianma Shen - Deep Learning for Video Processing
- Zhongpeng Zhang - Deep Learning for Video Processing
- Bingxin Hou (co-advisor) - Deep Learning for Moving Object Detection
- Yifei Pei (co-advisor) - Deep Learning for Image and Video Compression

MS Students' Projects:
- Rida Khan – Convolutional neural network-based video compression
- Zachary Bellay (graduated) - Deep Learning for Image and Video Processing

Undergraduate Students' Research Projects:
- Yuzhu Li - Deep Learning for Video Coding
- Junhe Cui - Deep Learning-based Object Detection

Senior Design Projects Advised:
- Xukun Zhang, Yuzheng Wu, Haochen Zhang - "Crossroad - avoid crowd intelligence," 2020/2021.
- Carter Duncan, Alexander Kennedy, Andrew Wang, Jack Cunningham - "Urban planning optimization via 'Cities: Skylines'," Senior Design Conference Session Winner, 2020/2021.
- Zachary Bellay, Payton Bradsky, Glen Chandler, Brandon Craig - "Edge-to-fog computing for color-assisted moving object detection," Senior Design Conference Session Winner, 2018/2019.
- James Olivas, Haobo Zhang - "Machine learning solution to organ-at-risk segmentation in radiotherapy planning," 2018/2019.

PhD Thesis Committee:

- Suthee Chaidaroon
- Bingxin Hou
- Eyor Alemayehu
- Michael Schimpf

Master Thesis Reader:
- Licheng Xiao
- Yifei Pei
- Yuan Wang
- Glen Chandler

Honors Contract Class Instructor:
- Drew Ligman, COEN 140, Spring 2021

Senior Honor Thesis Reader:
- Nam Tran, Philip Cori, June 2020
- Payton Bradsky, June 2019

PROFESSIONAL
ACTIVITIES

Panelist:

- NSF Graduate Research Fellowship Program (GRFP), 2020

Conference and Workshop Chair/Co-Chair:

- Area Chair/Meta-reviewer, IEEE Conf. Visual Commun. and Image Process. (VCIP), Munich, Germany, Dec. 2021.
- Poster Session Chair, IEEE Int. Symp. Circuits and Systems, Daegu, Korea, May 2021.
- Co-Chair, The 1st International Workshop on Edge, Fog, and Cloud Computing for the Internet of Things (EFIOT), in conjunction with the 16th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services, Houston, TX, Nov. 2019.

Technical Program Committee Member:

- IEEE-CAS Visual Signal Processing and Communications (VSPC), Jan. 2021 - present.
- The 23rd IEEE Int. Symp. Multimedia, Naples, Italy, Dec. 2021.
- The 22nd IEEE Int. Symp. Multimedia, Naples, Italy, Dec. 2020.
- The 5th IEEE Int. Conf. Multimedia Big Data, Singapore, Singapore, Sept. 2019.
- The 21st IEEE Int. Symp. Multimedia, San Diego, CA, Dec. 2019.
- The 20th IEEE Int. Symp. Multimedia, Taichung, Taiwan, Dec. 2018.
- The 19th IEEE Int. Symp. Multimedia, Taichung, Taiwan, Dec. 2017.
- IEEE Int. Conf. Multimedia Big Data, Taipei, Taiwan, Apr. 2016.
- IEEE Int. Conf. Cyber-enabled Distributed Computing and Knowledge Discovery, Chengdu, China, Oct., 2016.
- IEEE Int. Conf. Open Source Systems & Technologies, Lahore, Pakistan, Dec. 2016.
- The 6th Int. Conf. on Ambient Systems, Networks and Tech (ANT2015), June 2015, London, United Kingdom.

Reviewer:

- IEEE Access
- IEEE Sensors Journal
- Neurocomputing
- IEEE Transactions on Multimedia
- IEEE Transactions on Computational Imaging
- IEEE Transactions on Signal Processing
- IEEE Transactions on Circuits and Systems of Video Technology
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Open Journal of Circuits and Systems
- Security and Communication Networks
- SPIE Journal of Electronic Imaging
- Springer Journal of Signal, Image and Video Processing
- Elsevier Journal of Visual Communication and Image Representation
- Elsevier International Journal of Electronics and Communications
- Journal of Circuits, Systems, and Computers
- MDPI Sensors
- IEEE International Workshop on Machine Learning for Signal Processing, 2019
- Asia-Pacific Signal and Information Processing Association Annual Summit and Conference, 2019
- IEEE International Conference on Communications, 2016
- IEEE International Conference on Multimedia Big Data, BigMM2016
- IEEE Sensor Array and Multichannel Signal Processing Workshop, 2018
- IEEE International Conference on Cyber-enabled Distributed Computing and Knowledge Discovery, 2016
- The 15th International Conference on Algorithms and Architectures for Parallel Processing, 2015

Member of Societies:

- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of the International Society for Optics and Photonics (SPIE)
- Member of the IEEE Signal Processing Society
- Member of the IEEE Communications Society
- Member of the IEEE Computer Society

SANTA CLARA
UNIVERSITY
SERVICES

School of Engineering:
- Lecturer, Summer Engineering Seminar, July 2021
- Graduate Fellowship Committee, Jan. 2021
- Research Showcase Judge, 2020

Department:
- Senior Project Coordinator, Winter 2021
- Faculty Search Committee, 2019/2020
- PhD Prelim Exam Proctor, 10/10/2020

AWARDS AND
HONORS

- Certificate of Recognition (for influential work to support student career development and success at Santa Clara University in the 2018-2019 school year), Career Center, Santa Clara University, 2019.
- Blavatnik Regional Awards for Young Scientists Nominee, 2017.
- First Place of "Three-Minute Presentation", Annual Postdoctoral Research Symposium, The State University of New York at Buffalo, June 2016.
- Best Paper Selection: "Two-stage tensor locality-preserving projection face recognition," in *Proc. IEEE Int. Conf. Multimedia Big Data (IEEE BigMM)*, Taipei, Taiwan, April 2016, by Ying Liu, D. A. Pados, and Chia-Hung Yeh.
- Excellent Undergraduate Dissertation, Beijing University of Posts and Telecommunications (BUPT), June 2006.
- Excellent Summer Intern Paper, Beijing University of Posts and Telecommunications (BUPT), 2005.