Xinchao Wang

CONTACT INFORMATION

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xinchao.w@gmail.com

HOMEPAGE

https://sites.google.com/site/sitexinchaowang/

RESEARCH INTERESTS

(In Alphabetical Order) Artificial Intelligence, Computer Vision, Combinatorial Optimization, Machine Learning, Media Image Analysis, Multimedia, Signal Processing

ACADEMIC POSITIONS

Tenure-Track Assistant Professor — From Mar. 2021
Department of Electrical and Computer Engineering,
National University of Singapore (NUS),
Singapore

Tenure-Track Assistant Professor — Nov. 2017 to Aug. 2021
Department of Computer Science,
Stevens Institute of Technology,
New Jersey, United States

Visiting Scholar — Sept. 2017 to Oct. 2017
Peking University (PKU),
Beijing, China
Host: Wen Gao

SNSF Postdoctoral Fellow — May 2016 to Oct. 2017
University of Illinois Urbana-Champaign (UIUC),
Illinois, United States
Advisor: Thomas S. Huang

Postdoctoral Fellow — Jul. 2015 to Mar. 2016
École Polytechnique Fédérale de Lausanne (EPFL),
Lausanne, Switzerland
Advisor: Pascal Fua

Doctoral Research Assistant — Sep. 2010 to Jul. 2015
École Polytechnique Fédérale de Lausanne (EPFL),
Lausanne, Switzerland
Advisor: Pascal Fua

Visiting Scholar — Oct. 2015 to Oct. 2015
University of Heidelberg,
Heidelberg, Germany
Host: Fred Hamprecht

Visiting Scholar — Jul. 2014 to Sep. 2014
Czech Technical University (CTU),
Prague, Czech Republic
Host: Tomas Pajdla

Research Assistant Jun. 2009 to Aug. 2009
Nanyang Technological University (NTU),
Singapore
Advisor: Dacheng Tao

EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Ph.D. in Computer Vision, July 2015

- Thesis: Tracking Interacting Objects in Image Sequences
- Advisor: Pascal Fua

The Hong Kong Polytechnic University (HKPU), Kowloon, Hong Kong

Hons. in Computing, November 2010

- Highest honors in computing, full GPA (4.0/4.0), Rank #1 in the department
- Most Outstanding Final Year Project Award
- Awarded the Hong Kong Government Scholarship (Highest Scholarship in Hong Kong)

EDITORSHIP

Associate Editor

- IEEE Transactions on Circuits Systems and Video Technology (TCSVT)
- Pattern Recognition (PR)
- Journal of Visual Communication and Image Representation (JVCI)

CONFERENCE CHAIRS

Area Chair	CVPR 2021, 2022
Area Chair	ICCV 2021
Area Chair	NeurIPS 2021
Senior Program Committee	AAAI 2019, 2021
Senior Program Committee	IJCAI 2019, 2020, 2021
Poster Chair	ISMAR 2020
Area Chair	ICME 2019
Area Chair	ICIP 2019, 2020, 2021

TEACHING AWARDS

Outstanding Teaching Recognition, Stevens Institute of Technology, 2019 Fall
Outstanding Teaching Recognition, Stevens Institute of Technology, 2020 Fall

JOURNAL REVIEWERS

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
IEEE Transactions on Image Processing (TIP)
IEEE Transactions on Medical Imaging (TMI)
Medical Image Analysis (MIA)
IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
ACM Transactions on Knowledge Discovery from Data (TKDD)
IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
Computer Vision and Image Understanding (CVIU)
Pattern Recognition (PR)

RESEARCH GRANT REVIEWERS

Hong Kong General Research Fund

Conference Reviewers

Program Committee	CVPR 2017, 2018, 2019, 2020
Program Committee	ICCV 2019
Program Committee	ECCV 2018, 2020
Program Committee	NeurIPS 2020
Program Committee	ICML 2021
Program Committee	ICLR 2021
Program Committee	IJCAI 2017, 2018, 2019
Program Committee	ACM Multimedia 2017, 2018
Program Committee	AAAI 2017, 2020
Program Committee	ACCV 2018
Program Committee	BMVC 2019

Received Funding

Principal Investigator, "Adaptive Perception for Semantic Robot-Human Interaction",
Centre for Advanced Robotics Technology Innovation (CARTIN),
National Research Foundation (NRF), Singapore
SGD 1,466,358, Aug 2021 - Aug 2026.

Principal Investigator, "Deep Incremental Learning in the Wild: Towards General-purpose Multi- Modality and Multi-Task Incremental Learning",
Advanced Research and Technology Innovation Centre (ARTIC), NUS
SGD 365,400, Aug 2021 - Aug 2024.

Principal Investigator, "AI-Guided Sonographic Examination of the Fetal Central Nervous System: Detecting Neurological Abnormalities in Babies Better",
NUS Engineering in Medicine,
SGD 50,000, Oct 2021 - Sep 2023.

Co-Principal Investigator, "Adversarial Attack & Defence Assessment for Autonomous Driving",
AI Singapore, PI: Michael Kasper (Nanyang Technological University)
SGD 249,996, Jan 2022 - July 2023.

Co-Principal Investigator, "AI-SICH: Artificial Intelligence Solutions for Prognostication and Development of a Clinician-Decision Support System in Spontaneous Intracerebral Hemorrhage",
NUS Engineering in Medicine, PI: Robby Tan (NUS)
SGD 50,000, Oct 2021 - Sep 2023.

Principal Investigator, "Learning Evolutionary Data Association",
NUS FRC/AcRF Tier 1 Grant,
SGD 250,000, July 2021 - June 2025.

Principal Investigator, "Cutting-edge research topics on AutoML",
Huawei Technologies Co., Ltd., *Transferred from J. Feng*,
SGD 561,600, Feb 2020 - Feb 2022

Principal Investigator, "Real-time Detection of on-road",
Desay SV Automotive Singapore, *Transferred from J. Feng*,
SGD 222,000, Aug 2019 - Aug 2023.

Co-Principal Investigator, "Applied Natural Language Processing",
Robert Bosch, PI: Haizhou Li (NUS)
SGD 148,000, Jan 2019 - Jan 2023.

Co-Principal Investigator, "Malay Large Vocabulary Continuous Speech Recognition Engine",
KLASS Engineering & Solutions, PI: Haizhou Li (NUS)
SGD 266,666.66, Aug 2020 - Dec 2022.

Co-Principal Investigator, "Scene Tracking",
IBM, PI: Enrique Dunn (Stevens Institute of Technology)
USD 220,000, October 2018 - April 2019.

Principal Investigator, Startup Funding
Stevens Institute of Technology
USD 110,000 + 4-month summer support + 4 RA years, November 2017 - August 2021.

Principal Investigator, "Tracking Multiple Deformable Objects",
Swiss NSF,
USD 72,000, May 2016 - November 2017.

PUBLICATIONS

In total 92 papers. 67 papers in top-tier venues (including 58 since 2018): CVPR, ICCV, ECCV, NeurIPS, AAAI, IJCAI, MICCAI, TPAMI, IJCV, TIP, TKDE, TMI, TNNLS.
`https://scholar.google.ch/citations?user=w69Buq0AAAAJ`

1. **[2021 TPAMI(a)]**
   J. Qiu, **X. Wang**, P. Fua, and D. Tao,
   "Matching Seqlets: An Unsupervised Approach for Locality Preserving Sequence Matching",
   IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2021.
2. **[2021 TPAMI(b)]**
   W. Pan, Y. Yin, **X. Wang**, Y. Jing, and M. Song,
   "Seek-and-Hide: Adversarial Steganography viaDeep Reinforcement Learning",
   IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2021.
3. **[2021 NeurIPS]**
   G. Fang, Y. Bao, J. Song, **X. Wang**, D. Xie, C. Shen, and M. Song
   "Mosaicking to Distill: Knowledge Distillation from Out-of-Domain Data",
   Neural Information Processing Systems (**NeurIPS**), 2021.
4. **[2021 ICCV(a)]**
   S. Huang, **X. Wang**, and D. Tao
   "Stochastic Partial Swap: Enhanced Model Generalization and Interpretability for Fine-grained Recognition",
   International Conference on Computer Vision (**ICCV**), 2021.
5. **[2021 ICCV(b)]**
   Y Chen, F. Mao, J. Song, **X. Wang**, H. Wang, and M. Song
   "Self-born Wiring for Neural Trees",
   International Conference on Computer Vision (**ICCV**), 2021.
6. **[2021 ICCV(c)]**
   Y Jing, Y. Yang, **X. Wang**, M. Song, and D. Tao
   "Meta-Aggregator: Learning to Aggregate for 1-bit Graph Neural Networks",
   International Conference on Computer Vision (**ICCV**), 2021.
7. **[2021 ICCV(d)]**
   Z. Feng, Z. Wang, **X. Wang**, Y. Mao, T. Li, J. Lei, Y. Wang, and M. Song
   "Mutual-Complementing Framework for Nuclei Detection and Segmentation in Pathology Image",
   International Conference on Computer Vision (**ICCV**), 2021.

8. **[2021 IJCAI(a)]**
   G. Fang, J. Song, **X. Wang**, C. Shen, X. Wang, and M. Song
   "Contrastive Model Inversion for Data-Free Knowledge Distillation",
   International Joint Conference on Artificial Intelligence (**IJCAI**), 2021.

9. **[2021 IJCAI(b)]**
   M. Xue, J. Song, **X. Wang**, Y. Chen, X. Wang, and M. Song
   "KDExplainer: A Task-oriented Attention Model for Explaining Knowledge Distillation",
   International Joint Conference on Artificial Intelligence (**IJCAI**), 2021.

10. **[2021 IJCAI(c)]**
    L. Cheng, Z. Feng, **X. Wang**, Y. Liu, J. Lei, and M. Song
    "Boundary Knowledge Translation based Reference Semantic Segmentation",
    International Joint Conference on Artificial Intelligence (**IJCAI**), 2021.

11. **[2021 CVPR(a)]**
    Y. Yang, Z. Ren, H. Li, C. Zhou, **X. Wang**, and G. Hua
    "Learning Dynamics via Graph Neural Networks for Human Pose Estimation and Tracking",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

12. **[2021 CVPR(b)]**
    J. Qiu, Y. Yang, **X. Wang**, and D. Tao
    "Scene Essence",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

13. **[2021 CVPR(c)]**
    Y. Jing, Y. Yang, **X. Wang**, M. Song, and D. Tao
    "Turning Frequency to Resolution: Video Super-resolution via Event Cameras",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

14. **[2021 CVPR(d)]**
    Y. Jing, Y. Yang, **X. Wang**, M. Song, and D. Tao
    "Amalgamating Knowledge from Heterogeneous Graph Neural Networks",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.
    (Oral)

15. **[2021 CVPR(e)]**
    S. Guo, J. Wang, **X. Wang**, and D. Tao
    "Online Multiple Object Tracking with Cross-Task Synergy",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

16. **[2021 CVPR(f)]**
    C. Shen, Y. Yin, **X. Wang**, X. Li, J. Song, and M. Song
    "Training Generative Adversarial Networks in One Stage",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

17. **[2021 CVPR(g)]**
    J. Song, H. Zhang, **X. Wang**, M. Xue, Y. Chen, L. Sun, D. Tao, and M. Song
    "Tree-like Decision Distillation",
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.

18. **[2021 AAAI(a)]**
    H. Liu, Y. Yang, and **X. Wang**,
    "Overcoming Catastrophic Forgetting in Graph Neural Networks",
    AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

19. **[2021 AAAI(b)]**
    S. Huang, **X. Wang**, and D. Tao,

"SnapMix: Semantically Proportional Mixing for Augmenting Fine-grained Data",
AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

20. **[2021 AAAI(c)]**
C. Shen, **X. Wang**, Y. Yin, J. Song, S. Luo, and M. Song,
"Progressive Network Grafting for Few-Shot Knowledge Distillation",
AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

21. **[2021 AAAI(d)]**
Z. Feng, L. Cheng, **X. Wang**, X. Wang, Y. Liu, X. Du, and M. Song,
"Visual Boundary Knowledge Translation for Foreground Segmentation",
AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

22. **[2021 AAAI(e)]**
Z. Feng, Z. Wang, **X. Wang**, X. Zhang, L. Cheng, J. Lei, Y. Wang, and M. Song,
"Edge-competing Pathological Liver Vessel Segmentation with Limited Labels",
AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

23. **[2021 TKDE]**
Y. Hao, **X. Wang**, X. Wang, X. Wang, C. Chen, and M. Song,
"Walking with Attention: Self-guided Walking for Heterogeneous Graph Embedding",
IEEE Transactions on Knowledge and Data Engineering (**TKDE**), 2021.

24. **[2021 TIP]**
W. Ren, **X. Wang**, J. Tian, Y. Tang, and A. Chan,
"Tracking-by-Counting: Using Network Flows on Crowd Density Maps for Tracking Multiple Targets",
IEEE Transactions on Image Processing (**TIP**), 2021.

25. **[2021 TCSVT]**
J. Chen, J. Wang, **X. Wang**, X. Wang, Z. Feng, R. Liu, and M. Song
"CoEvo-Net: Coevolution Network for Video Highlight Detection",
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2021.

26. **[2020 NeurIPS(a)]**
Y. Yang, Z. Feng, M. Song, and **X. Wang**,
"Factorizable Graph Convolutional Networks",
Neural Information Processing Systems (**NeurIPS**), 2020.

27. **[2020 NeurIPS(b)]**
Z. Feng, Y. He, **X. Wang**, X. Gao, J. Lei, C. Jin, and M. Song
"One-sample Guided Object Representation Disassembling",
Neural Information Processing Systems (**NeurIPS**), 2020.

28. **[2020 ECCV(a)]**
Y. Yang, J. Qiu, M. Song, D. Tao, and **X. Wang**,
"Learning Propagation Rules for Attribution Map Generation",
European Conference on Computer Vision (**ECCV**), 2020.

29. **[2020 ECCV(b)]**
J. Qiu, Y. Yang, **X. Wang**, and D. Tao,
"Hallucinating Visual Instances in Total Absentia",
European Conference on Computer Vision (**ECCV**), 2020.
(Spotlight)

30. **[2020 ECCV(c)]**
S. Luo, W. Pan, **X. Wang**, D. Wang, H. Tang, M. Song,
"Collaboration by Competition: Self-coordinated Knowledge Amalgamation for Multi-talent Student Learning",
European Conference on Computer Vision (**ECCV**), 2020.

31. **[2020 CVPR(a)]**
Y. Yang, J. Qiu, M. Song, D. Tao, and **X. Wang**,
"Distilling Knowledge from Graph Convolution Networks",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

32. **[2020 CVPR(b)]**
J. Ye, Y. Ji, **X. Wang**, X. Gao, and M. Song,
"Data-Free Knowledge Amalgamation via Group-Stack Dual-GAN",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

33. **[2020 CVPR(c)]**
T. Zhou, C. Ding, S. Lin, **X. Wang**, and D. Tao,
"Learning Oracle Attention for High-fidelity Face Completion",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

34. **[2020 CVPR(d)]**
J. Song, Y. Chen, J. Ye, **X. Wang**, C. Shen, F. Mao, and M. Song,
"DEPARA: Deep Attribution Graph for Deep Knowledge Transferability",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.
(Oral)

35. **[2020 IJCV]**
L. Lan, **X. Wang**, H. Gang, T. Huang, and D. Tao,
"Semi-online Multi-people Tracking by Re-identification",
International Journal of Computer Vision (**IJCV**), 2020.

36. **[2020 TIP(a)]**
C. Zhou, C. Ding, **X. Wang**, Z. Lu, and D. Tao,
"One-pass Multi-task Networks with Cross-task Guided Attention for Brain Tumor Segmentation",
IEEE Transactions on Image Processing (**TIP**), 2020.

37. **[2020 TIP(b)]**
Y. Zhang, X. Tian, **X. Wang**, and D. Tao,
"Principal Component Adversarial Example",
IEEE Transactions on Image Processing (**TIP**), 2020.

38. **[2020 TIP(c)]**
J. Ye, Y. Jing, **X. Wang**, K. Ou, D. Tao and M. Song,
"Edge-Sensitive Human Cutout with Hierarchical Granularity and Loopy Matting Guidance",
IEEE Transactions on Image Processing (**TIP**), 2020.

39. **[2020 AAAI(a)]**
Y. Jing, X. Liu, Y. Ding, **X. Wang**, E. Ding, M. Song, and S. Wen,
"Dynamic Instance Normalization for Arbitrary Style Transfer",
AAAI Conference on Artificial Intelligence (**AAAI**), 2020.
(Oral)

40. **[2020 AAAI(b)]**
M. Qiao, J. Yu, T. Liu, **X. Wang**, and D. Tao,
"Diversified Bayesian Nonnegative Matrix Factorization",
AAAI Conference on Artificial Intelligence (**AAAI**), 2020.

41. **[2020 AAAI(c)]**
Y. Zhao, R. Xu, **X. Wang**, P. Hou, H. Tang, and M. Song
"Hearing Lips: Improving Lip Reading by Distilling Speech Recognizers",
AAAI Conference on Artificial Intelligence (**AAAI**), 2020.

42. **[2020 ACCV]**
H. Wang, **X. Wang**, J. Song, J. Lei, and M. Song,

"Faster Self-adaptive Deep Stereo",
Asian Conference on Computer Vision (**ACCV**), 2020.

43. **[2020 T-Cybernetics]**
F. Wu, J. Cheng, **X. Wang**, L. Wang, and D. Tao,
"Image Hallucination from Attribute Pairs",
IEEE Transactions on Cybernetics, 2020.

44. **[2020 IEEE Access]**
H. Xiong, C. Wang, **X. Wang**, D. Tao,
"Deep Representation Calibrated Bayesian Neural Network for Semantically Explainable Face Inpainting and Editing",
IEEE Access, 2020.

45. **[2020 ISCAS]**
J. Chen, J. Meng, **X. Wang**, J. Yuan,
"Dynamic Graph CNN for Event-Camera Based Gesture Recognition",
International Symposium on Circuits and Systems (**ISCAS**), 2020.

46. **[2019 NeurIPS]**
J. Song, Y. Chen, **X. Wang**, C. Shen, and M. Song,
"Deep Model Transferability from Attribution Maps",
Neural Information Processing Systems (**NeurIPS**), 2019.

47. **[2019 ICCV(a)]**
J. Wang, S. Huang, **X. Wang**, and D. Tao,
"Not All Parts Are Created Equal: 3D Pose Estimation by Modeling Bi-directional Dependencies of Body Parts",
International Conference on Computer Vision (**ICCV**), 2019.
(Oral, Acceptance Rate: 178 / 4303 = 4.3%)

48. **[2019 ICCV(b)]**
C. Shen, M. Xue, **X. Wang**, J. Song, L. Sun, and M. Song,
"Customizing Student Networks from Heterogeneous Teachers via Adaptive Knowledge Amalgamation",
International Conference on Computer Vision (**ICCV**), 2019.

49. **[2019 IJCAI(a)]**
Y. Yang, **X. Wang**, M. Song, J. Yuan, and D. Tao,
"SPAGAN: Shortest Path Graph Attention Network",
International Joint Conference on Artificial Intelligence (**IJCAI**), 2019.

50. **[2019 IJCAI(b)]**
J. Ye, **X. Wang**, Y. Ji, K. Ou, and M. Song,
"Amalgamating Filtered Knowledge: Learning Task-customized Student from Multi-task Teachers",
International Joint Conference on Artificial Intelligence (**IJCAI**), 2019.

51. **[2019 IJCAI(c)]**
S. Luo, **X. Wang**, G. Fang, Y. Hu, D. Tao, and M. Song,
"Knowledge Amalgamation from Heterogeneous Networks by Common Feature Learning",
International Joint Conference on Artificial Intelligence (**IJCAI**), 2019.

52. **[2019 CVPR(a)]**
J. Qiu, **X. Wang**, S. Maybank, and D. Tao,
"World from Blur",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019.

53. **[2019 CVPR(b)]**
J. Ye, Y. Ji, **X. Wang**, K. Ou, D. Tao, and M. Song,

"Student Becoming the Master: Knowledge Amalgamation for Joint Scene Parsing, Depth Estimation, and More",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019.

54. **[2019 AAAI(a)]**
C. Shen, **X. Wang**, J. Song, L. Sun, and M. Song,
"Amalgamating Knowledge towards Comprehensive Classification",
AAAI Conference on Artificial Intelligence (**AAAI**), 2019.

55. **[2019 AAAI(b)]**
Y. Fu, Y. Wei, Y. Zhou, H. Shi, G. Huang, **X. Wang**, Z. Yao, and T. Huang,
"Horizontal Pyramid Matching for Person Re-identification",
AAAI Conference on Artificial Intelligence (**AAAI**), 2019.

56. **[2019 TIP]**
B. Fan, Q. Kong, **X. Wang**, Z. Wang, C. Pan, and P. Fua,
"A Performance Evaluation of Local Features for Image-based 3D Reconstruction",
IEEE Transactions on Image Processing (**TIP**), 2019.

57. **[2019 TNNLS]**
X. Tian, Y. Li, T. Liu, **X. Wang**, and D. Tao,
"Eigenfunction-Based Multitask Learning in a Reproducing Kernel Hilbert Space",
IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**), vol. 30, pp. 1818-1830, 2019.

58. **[2019 BMVC]**
Z. Shen, H. Shi, J. Yu, H. Phan, R. Feris, L. Cao, D. Liu, **X. Wang**, and T. Huang,
"Improving Object Detection from Scratch via Gated Feature Reuse",
British Machine Vision Conference (**BMVC**), 2019.

59. **[2019 WACV]**
D. Liu, X. Zhao, **X. Wang**, Y. Hu, L. Zhang, and T. Huang,
"Improving 3D Human Pose Estimation via 3D Part Affinity Fields",
IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2019.

60. **[2019 MIPR(a)]**
J. Deng, H. Yu, Z. Wang, **X. Wang**, and T. Huang,
"Self-Reproducing Frame Interpolation",
IEEE Conference on Multimedia Information Processing and Retrieval (**MIPR**), 2019.

61. **[2019 MIPR(b)]**
H. Yu, Y. Fu, H. Yu, Y. Wei, **X. Wang**, J. Jiao, M. Bramlet, T. Kesavadas, H. Shi, Z. Wang, B. Wen, and T. Huang,
"A Novel Framework for 3D-2D Vertebra Matching",
IEEE Conference on Multimedia Information Processing and Retrieval (**MIPR**), 2019.

62. **[2018 NeurIPS]**
Z. Feng, **X. Wang**, C. Ke, A. Zeng, D. Tao, and M. Song,
"Dual Swap Disentangling",
Neural Information Processing Systems (**NeurIPS**), 2018.

63. **[2018 ECCV]**
X. Yin, **X. Wang**, J. Yu, M. Zhang, P. Fua, and D. Tao,
"FishEyeRecNet: A Multi-Context Collaborative Deep Network for Fisheye Image Rectification",
European Conference on Computer Vision (**ECCV**), 2018.

64. **[2018 CVPR]**
F. Wang, L. Zhao, X. Li, **X. Wang**, and D. Tao,
"Geometry-Aware Scene Text Detection with Instance Transformation Network",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018.

65. **[2018 MICCAI]**
C. Zhou, C. Ding, Z. Lu, **X. Wang**, and D. Tao,
"One-pass Multi-task Convolutional Neural Networks for Efficient Brain Tumor Segmentation",
Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2018

66. **[2018 TIP(a)]**
L. Lan, **X. Wang**, S. Zhang, D. Tao, W. Gao and T. Huang,
"Interacting Tracklets for Multi-object Tracking",
IEEE Transactions on Image Processing (**TIP**), vol. 27, pp. 4585-4597, 2018.

67. **[2018 TIP(b)]**
D. Liu, Z. Wang, Y. Fan, X. Liu, Z. Wang, S. Chang, **X. Wang**, and T. Huang,
"Learning Temporal Dynamics for Video Super-Resolution: A Deep Learning Approach",
IEEE Transactions on Image Processing (**TIP**), vol. 27, pp. 3432-3445, 2018.

68. **[2018 SPL]**
Y. Zhang, **X. Wang**, X. Bi, and D. Tao,
"A Light Dual-Task Neural Network for Haze Removal",
IEEE Signal Processing Letters (**SPL**), vol. 25, pp. 1231-1235, 2018.

69. **[2018 CVPRW(a)]**
H. Shi, Z. Wang, Y. Zhang, **X. Wang**, and T. Huang,
"Geometry-aware Traffic Flow Analysis by Detection and Tracking",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), *NVIDIA AI City Challenge workshop*, 2018.

70. **[2018 CVPRW(b)]**
R. Timofte, ..., **X. Wang**, ... et. al,
"NTIRE 2018 Challenge on Single Image Super-Resolution: Methods and Results",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), *New Trends in Image Restoration and Enhancement workshop*, 2018.

71. **[2017 ICCV]**
A. Maksai, **X. Wang**, F. Fleuret, and P. Fua,
"Non-Markovian Globally Consistent Multi-Object Tracking",
International Conference on Computer Vision (**ICCV**), 2017.

72. **[2017 CVPR]**
X. Yu, T. Liu, **X. Wang**, and D. Tao,
"On Compressing Deep Models by Low Rank and Sparse Decomposition",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017.
(Spotlight Oral, Acceptance Rate: 215 / 2680 = 8.0%) [Talk Video]

73. **[2017 TIP]**
X. Wang, B. Fan, S. Chang, Z. Wang, X. Liu, D. Tao, and T. Huang,
"Greedy Batch-based Minimum-cost Flows for Tracking Multiple Objects",
IEEE Transactions on Image Processing (**TIP**), vol. 26, pp. 4765-4776, 2017.

74. **[2017 TMI]**
E. Turetken*, **X. Wang***, C. Becker, C. Haubold, and P. Fua,
"Network Flow Integer Programming to Track Elliptical Cells in Time-Lapse Sequences",
IEEE Transactions on Medical Imaging (**TMI**), vol. 36, pp. 942-951, 2017.
(***joint first authors**)

75. **[2017 GRSL]**
G. Wang, **X. Wang**, B. Fan, and C. Pan,
"Feature Extraction by Rotation Invariant Matrix Representation for Object Detection in Aerial Image",
IEEE Geoscience and Remote Sensing Letters (**GRSL**), vol. 14, pp. 851-855, 2017.

76. **[2017 BMVC]**
Z. Wang, J. Liu, S. Huang, **X. Wang**, and S. Chang,
"Transformed Anti-Sparse Learning for Unsupervised Hashing",
British Machine Vision Conference (**BMVC**), 2017.

77. **[2017 ICIP]**
H. Yu, D. Liu, H. Shi, H. Yu, Z. Wang, **X. Wang**, B. Cross, M. Bramlet, and T. Huang,
"Computed Tomography Super-Resolution using Convolutional Neural Networks",
International Conference on Image Processing (**ICIP**), 2017.

78. **[2017 CVPRW(a)]**
Y. Fan, J. Yu, W. Han, D. Liu, H. Yu, H. Shi, Z. Wang, **X. Wang**, and T. Huang,
"Balanced Two-stage Residual Networks for Image Super-Resolution",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), *New Trends in Image Restoration and Enhancement workshop*, 2017.

79. **[2017 CVPRW(b)]**
R. Timofte, ..., **X. Wang**, ... et. al,
"NTIRE 2017 Challenge on Single Image Super-Resolution: Methods and Results",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), *New Trends in Image Restoration and Enhancement workshop*, 2017.

80. **[2017 AIC]**
H. Shi, Z. Liu, Y. Fan, **X. Wang**, and T. Huang,
"Effective Object Detection from Traffic Camera Videos",
NVIDIA AI City Challenge Workshop, 2017.

81. **[2016 CVPR]**
A. Maksai, **X. Wang**, and P. Fua,
"What Players do with the Ball: A Physically Constrained Interaction Modeling",
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2016.
(Spotlight Oral, Acceptance Rate: 206 / 2145 = 9.6%) [Talk Video]

82. **[2016 TPAMI]**
X. Wang, E. Turetken, F. Fleuret, and P. Fua,
"Tracking Interacting Objects Using Intertwined Flows",
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), vol. 38, pp. 2312-2326, 2016.

83. **[2016 MVA]**
V. Belagiannis, **X. Wang**, H. Ben Shitrit, K. Hashimoto, R. Stauder, Y. Aoki, M. Kranzfelder, A. Schneider, S. Ilic, H. Feussner, P. Fua, and N. Navab,
"Parsing Human Skeletons in an Operating Room",
Machine Vision and Applications (**MVA**), vol. 27, pp. 1035-1046, 2016.

84. **[2016 CVPRW]**
B. Fan, Q. Kong, W. Sui, Z. Wang, **X. Wang**, S. Xiang, C. Pan, and P. Fua,
"Do We Need Binary Features for 3D Reconstruction?"
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), *Robust Features for Computer Vision Workshop*, 2016.

85. **[2014 ECCV]**
X. Wang, E. Turetken, F. Fleuret, and P. Fua,
"Tracking Interacting Objects Optimally Using Integer Programming",
European Conference on Computer Vision (**ECCV**), 2014.
(Oral, Acceptance Rate: 38 / 1444 = 2.6%) [Talk Video]

86. **[2014 CVIU]**
X. Wang, V. H. Ablavsky, H. Ben Shitrit, and P. Fua,
"Take your Eyes off the Ball: Improving Ball-Tracking by Focusing on Team Play",
Computer Vision and Image Understanding (**CVIU**), vol. 119, pp. 102-115, 2014.

87. **[2014 ECCVW]**
V. Belagiannis, **X. Wang,** B. Schiele, P. Fua, S. Ilic, and N. Navab,
"Multiple Human Pose Estimation with Temporally Consistent 3D Pictorial Structures",
European Conference on Computer Vision (**ECCV**), *ChaLearn Looking at People Workshop*, 2014.

88. **[2013 TIP]**
X. Wang, W. Bian, and D. Tao,
"Grassmannian Regularized Structured Multi-View Embedding for Image Classification",
IEEE Transactions on Image Processing (**TIP**), vol. 22, pp. 2646-2660, 2013.

89. **[2011 TIP]**
X. Wang, Z. Li, and D. Tao,
"Subspaces Indexing Model on Grassmann Manifold for Image Search",
IEEE Transactions on Image Processing (**TIP**), vol. 20, pp. 2627-2635, 2011.

90. **[2011 ICME]**
X. Wang, Z. Li, L. Zhang, and J. Yuan,
"Grassmann Hashing for Approximate Nearest Neighbor Search in High Dimensional Space",
IEEE International Conference on Multimedia and Expo (**ICME**), 2011.
(Acceptance Rate: 223 / 744 = 29.9%)

91. **[2010 SP]**
X. Wang, D. Tao, and Z. Li,
"Entropy controlled Laplacian regularization for least square regression",
Signal Processing, vol. 90, pp. 2043-2049, 2010.

92. **[2010 DEST]**
W. Lin, **X. Wang**, G. Yu, and A. Wong,
"A Novel Flagging System to Make Intelligent Dynamic Buffer Tuning Realistic for Real-time Applications over the Mobile Internet",
IEEE International Conference on Digital Ecosystems and Technologies, 2010.

CHALLENGE AWARDS

First Place
NTIRE Super-resolution Challenge, 2018
Team Member
[official link]

First Place
NVIDIA AI City Challenge, 2017
Team Member
[official link] [UIUC Link] [paper]

Third Place
CVPR NVIDIA AI City Challenge: Traffic Flow Analysis, 2018
Team Member
[official link]

Fifth Place (Accuracy) and Second Place (Efficiency)
NTIRE Challenge on Single Image Super-Resolution, 2017
Team Member
[link] [paper]

Second Place
ImageNet Video Detection, 2017

Collaborator
[UIUC link]

PATENTS

E. Turetken, F. Fleuret and P. Fua and **X. Wang**,
"Systems and methods for tracking interacting objects",
US Patent Number 9794525, granted October 17, 2017.

TECHNICAL REPORTS (EXCLUDING PUBLISHED PAPERS)

1. **[2018 arXiv(a)]**
   X. Yin, X. Dai, **X. Wang**, M. Zhang, D. Tao, and L. Davis,
   "Deep Motion Boundary Detection",
   arXiv:1804.04785, 2018.
2. **[2018 arXiv(b)]**
   F. Hao, J. Cheng, L. Wang, **X. Wang**, J. Cao, X. Hu, and D. Tao,
   "Anchor-based Nearest Class Mean Loss for Convolutional Neural Networks",
   arXiv:1804.08087, 2018.
3. **[2018 arXiv(c)]**
   J. Yu, Y. Fan, J. Yang, N. Xu, Z. Wang, **X. Wang**, and T. Huang,
   "Wide Activation for Efficient and Accurate Image Super-Resolution",
   arXiv:1808.08718, 2018.
4. **[2017 arXiv(a)]**
   B. Fan, Q. Kong, X. Wang, **X. Wang**, S. Xiang, C. Pan, and P. Fua,
   "A Performance Evaluation of Local Features for Image Based 3D Reconstruction",
   arXiv:1712.05271, 2017.
5. **[2017 arXiv(b)]**
   Z. Shen, H. Shi, R. Feris, L. Cao, S. Yan, D. Liu, **X. Wang**, X. Xue, and T. Huang,
   "Learning Object Detectors from Scratch with Gated Recurrent Feature Pyramids",
   arXiv:1712.00886, 2017.
6. **[2015 arXiv]**
   B. Tekin, X. Sun, **X. Wang**, V. Lepetit and P. Fua,
   "Predicting People's 3D Poses from Short Sequences",
   arXiv:1504.08200, 2015.

OTHER SERVICES

Faculty Hiring Committee, Dept. of Computer Science, Stevens Institute of Technology, 2018

TEACHING EXPERIENCE

Pattern Recognition (undergraduate),
Lecturer, National University of Singapore, 2021 -

Image Processing and Analysis (undergraduate),
Lecturer, National University of Singapore, 2021 -

Advanced Topics on Vision and Machine Learning (graduate),
Lecturer, National University of Singapore, 2021 -

Machine Learning: Models and Applications (undergraduate),
Lecturer, NUS (Suzhou) Research Institute, 2021 -

Computer Vision (undergraduate),
Lecturer, Stevens Institute of Technology, 2019 - 2021

Machine Learning, Fundamental and Applications (undergraduate),
Lecturer, Stevens Institute of Technology, 2018 - 2021

INDUSTRY SOFTWARE CONTRIBUTION

The tracking software developed by EFPL CVLab, to which I contributed the first prototype of ball tracking, has been deployed in the world's major sports events including **NBA**, **FIVB Volleyball World Championship**, and **FIBA Basketball World Cup**. It is covered by many media outlets including: **Forbes** [link], **Wall Street Journal** [link], **ABC News** [link], **Washington Post** [link], **MIT technology review** [link], **ESPN** [link].

"*If you're used to the usual basketball stats – points, assists, rebounds, blocked shots, free-throw percentage and the rest – get ready for a whole new vocabulary*. " – **The Washington Post**

"*With their software, teams can better understand tendencies and probabilities of complex game strategies by running data-driven analysis that takes seconds—work that previously could take months of human analysis*." – **The Wall Street Journal**

"*And instead of just relying on an intuitive eye test, which isn't always right, we can quantify our guesses and see how they measure up. Does DeAndre get easy shots? Yes, No.1. Is he still ridiculous at finishing?*" – **ABC News**

"*To find all the data to support that (the variations of plays), you couldn't do it before. It was way too time-consuming to go through every game and tag for that occurrence. Something that was a monthslong project now takes about 30 seconds."* – **Ben Alamar, director of sports analytics at ESPN**

"*As the interest in – and analysis of – data continues to grow around the world, we look forward to furthering the depth and reach of NBA data and analytics through our partnership with Sportradar and Second Spectrum."* – **Bill Koenig, NBA President**

My other software contributions to industry partners include:

Multi-view Basketball Tracking System
Swatch Group, Biel/Bienne, Switzerland.

People Tracking System
Honeywell, Inc., Prague, Czech Republic

SELECTED MEDIA PRESENCE

"*From E.T. to AI to the NBA and Beyond: Sci-Fi Movies Helped Inspire Stevens' Xinchao Wang to Bring Artificial Intelligence to Real-World Applications*", **Stevens Research and Innovation**, Ocotber 2019, [link]

"*Bringing AI to the NBA*", **The Stute**, October 2019. [link]

"*Teaching A.I. to See: How Computer Vision Is Reshaping Medicine, Security, YouTube and the NBA*. " **Stevens Institute of Technology News**, July 2019. [link]

"Illinois Claims Victory at NVIDIA AI City Challenge", **UIUC ECE**, October 2017. [link]

"Illinois IFP places second in ImageNet Challenge", **UIUC Beckman Institute**, July 2017. [link]

"PhD Student Leads Team to Success at Global Visual Recognition Challenge", **UIUC ECE**,

July 2017. [link]

"The NBA's Six Year, $250 Million Data Deal", **Forbes**, September 2016. [link]

"NBA announces new deal for stats, player tracking", **NBA**, September 2016. [link]

"SportRadar And Second Spectrum Close To Working With The NBA To Provide Betting Data Solutions For Fans", **SportTechie**, August 2016. [link]

"Second Spectrum Shoots for Artificial Intelligence in NBA Finals", **Wall Street Journal**, June 2106. [link]

"What advanced tracking data reveals about NBA shooters", **ABC News**, May 2016. [link]

"How data geeks are taking over basketball", **Washington Post**, March 2016. [link]

"Visualizing the coaching tricks that unleash Curry and LeBron", **ESPN**, June 2016. [link]

"Computer Taught to Watch Football", **MIT Technology Review**, November 2015. [English] [Chinese] [Spanish] [Russian] [Hungarian]

APPLICATIONS

V. Ablavsky, **X.Wang**, H. Ben Shitrit and P. Fua, "Basketball Roulette", http://bball-roulette.epfl.ch/.

TECHNICAL DEMOS

V. Ablavsky, **X.Wang**, H. Ben Shitrit and P. Fua, "Take Your Eyes Off the Ball: Tracking the Invisible in Team Sports", *IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2013.

SELECTED HONORS

2017/18/19/20	Who's Who in America by Marquis
2016	Outstanding Overseas Scholar of the Hundred Talents program by the Chinese Academic of Science (CAS).
2015	Swiss NSF Early Postdoc Mobility Fellowship (Awarded to the most promising fresh Ph.D. graduates)
2010	EPFL EDIC Fellowship (Awarded to top ranked candidates in the Faculty of IC)
2010	The Hong Kong Government Scholarship (Highest student award in Hong Kong, HKD 80,000)
2010	HKPU Most Outstanding Final Year Project Award (Sole recipient in the Dept. of Computing)
2010/09/08	HKPU Post Entry Scholarship (Award for students with full GPA, HKD 50,000 each)
2010/09	HKPU CMA & Donors Scholarship
2010	HKPU Grace Hopper Scholarship

INVITED TALKS

Deep Reuse

- Brandeis University, 2021
- University of Copenhagen, 2021
- Rice University, 2020
- National University of Singapore, 2020

MOT By X

- University at Buffalo, New York, 2018
- Zhejiang University, Hangzhou, China, 2018
- Yunnan University, Kunming, China, 2018

Eyes and Brains Everywhere: Intelligent Video Analytics

- Siemens Healthcare, New Jersey, 2018
- Pennsylvania State University, 2017
- Michigan State University, 2017
- University of Hong Kong, 2017
- Arizona State University, 2017
- University of Tennessee, Knoxville, 2017
- Stevens Institute of Technology, 2017

Tracking Multiple Targets in Image Sequences
- Bell Labs, New Jersey, 2018
- Peking University, 2017

On Compressing Deep Models by Low Rank and Sparse Decomposition
- CVPR, Hawaii, 2017. (2,000+ Audience) [Talk Video]

Behind, Besides and Beyond the $250 Million Data Deal:
Multiple Object Tracking and Analytics in Videos
- City University of Hong Kong, 2016

On-line Minimum-cost Flows for Tracking Multiple Objects
- Beckman Institute, UIUC, 2016

Multi-object Tracking Using Network Flow Programming
- SIAT, Chinese Academy of Science, Shenzhen, 2016
- Beckman Institute, UIUC, 2016
- NLPR, Chinese Academy of Science, Beijing, 2016
- Graph-vision Seminar, EPFL, 2015.
- EDIC Open House, EPFL, 2015.

Tracking Interacting Objects Optimally Using Integer Programming
- ECCV, Zurich, 2014. (1,500 Audience) [Talk Video]
- Czech Academy of Sciences, Prague, Czech Republic, 2014.
- Honeywell Laboratory, Prague, Czech Republic, 2014.

Conservation Tracking
- CVLAB Research Seminar, EPFL, 2013.

Tracking Basketball from Multiple Cameras
- EDIC Open House, EPFL, 2012.
- SwissTiming, Leipzig, Germany, 2012.

Grassmann Hashing for Approximate Nearest Neighbor Search
- ICME, Barcelona, Spain, 2011.

Subspace Indexing Model on Grassmann Manifold for Large Scale Image Search
- Nanyang Technological University, Singapore, 2010.
- The Hong Kong Polytechnic University, Hong Kong, 2010.

INDUSTRY EXPERIENCE

July 2014 - Sept. 2014	Neovision s.r.o, Prague, Czech Republic Computer Vision Researcher
May 2008 - Aug. 2008	Liaoxing Technological Development Corp., China Programmer and database operator

PROFESSIONAL MEMBERSHIP

Senior Member, IEEE (Since 2020)