

Xinshuo Weng

[Personal Website](#) / [Google Scholar](#) / [GitHub](#) / [Linkedin](#) / [Twitter](#) / [Facebook](#)

Email: xinshuow@cs.cmu.edu

RESEARCH INTERESTS

Fields: Computer Vision, Machine Learning, Robotics, Multimedia

Topics: 3D Computer Vision, Autonomous Driving, Graph Neural Networks, Generative Modeling, Point Cloud Processing, Video Analysis

EDUCATION

Carnegie Mellon University , Ph.D. in Robotics	2018 - Present
Carnegie Mellon University , M.S. in Computer Vision	2016 - 2018
Wuhan University , B.S. in Electrical Engineering	2012 - 2016

INDUSTRY EXPERIENCE

Oculus Research Pittsburgh (now Facebook Reality Lab), Research Engineer	2018
Facebook , Research Intern	2017

FELLOWSHIP/SCHOLARSHIP AWARDS

Qualcomm Innovation Fellowship , \$100k award, 1 out of 13 in North America	2020 - 2021
IBM PhD Fellowship nomination, 1 out of 3 at CMU Robotics Institute	2020
Microsoft Research PhD Fellowship nomination, 1 out of 3 at CMU Robotics Institute	2020
Microsoft Research Ada Lovelace Fellowship nomination, 1 out of 3 at CMU Robotics Institute	2019
Google PhD Fellowship nomination, 1 out of 3 at CMU Robotics Institute	2019
University Scholarship, RMB 3k award per year	2013, 2015, 2016
Yang Gui Scholarship, Wuhan University, RMB 3k award	2015
Undergraduate Innovation and Entrepreneurship Fellowship, RMB 8k award	2014, 2015
National Scholarship, RMB 10k award	2014

CONTRIBUTED FACULTY AWARDS

Toyota Research Institute Research Grant, \$1.13 million award	2021 - 2024
NSF, National Robotics Initiative Research Grant, \$860k award	2020 - 2023

INVITED TALKS

CVPR 2021, Keynote Speaker at Workshop on Autonomous Navigation in Unconstrained Environments	2021
CVPR 2021, Keynote Speaker at Workshop on Robust Video Scene Understanding	2021
ECCV 2020, Keynote Speaker at Benchmarking Trajectory Forecasting Workshop [Slides]	2020
CVPR 2020, Keynote Speaker at Scalability in Autonomous Driving Workshop [Slides] [Video]	2020
CMU, Invited Talk at Robots Perceiving and Doing Lab [Slides1] [Slides2]	2018

Updated on October 18, 2020

JOURNAL PUBLICATIONS

1. Supervision by Registration and Triangulation for Landmark Detection
Xuanyi Dong, Yi Yang, Shi-En Wei, **Xinshuo Weng**, Yaser Sheikh, Shoou-I Yu
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2020
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [BibTex](#)

CONFERENCE PUBLICATIONS

2. Inverting the Forecasting Pipeline with SPF2: Sequential Pointcloud Forecasting for Sequential Pose Forecasting
Xinshuo Weng, Jianren Wang, Sergey Levine, Kris Kitani, Nick Rhinehart
Conference on Robot Learning (CoRL), 2020
[PDF](#) | [Code](#) | [Website](#) | [BibTex](#)
3. 3D Multi-Object Tracking: A Baseline and New Evaluation Metrics
Xinshuo Weng, Jianren Wang, David Held, Kris Kitani
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020
(Oral Presentation)
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
4. When We First Met: Visual-Inertial Source Localization for Co-Robot Rendezvous
Xi Sun, **Xinshuo Weng**, Kris Kitani
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020
(Oral Presentation)
[PDF](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
5. Single Camera Worker Detection, Tracking and Action Recognition in Construction Site
Hiroaki Ishioka, **Xinshuo Weng**, Yunze Man, Kris Kitani
International Symposium on Automation and Robotics in Construction (ISARC), 2020
[PDF](#) | [BibTex](#)
6. GNN3DMOT: Graph Neural Network for 3D Multi-Object Tracking with 2D-3D Multi-Feature Learning
Xinshuo Weng, Yongxin Wang, Yunze Man, Kris Kitani
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2020
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
7. Forecasting Time-to-Collision from Monocular Video: Feasibility, Dataset, and Challenges
Aashi Manglik, **Xinshuo Weng**, Eshed Ohn-Bar, Kris Kitani
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019
(Oral Presentation)
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [BibTex](#)
8. Learning Spatio-Temporal Features with Two-Stream Deep 3D CNNs for Lipreading
Xinshuo Weng, Kris Kitani
British Machine Vision Conference (BMVC), 2019
[PDF](#) | [Code](#) | [Poster](#) | [BibTex](#)
9. GroundNet: Monocular Ground Plane Normal Estimation with Geometric Consistency
Yunze Man, **Xinshuo Weng**, Xi Li, Kris Kitani
ACM International Conference on Multimedia (ACMMM), 2019

[PDF](#) | [Poster](#) | [BibTex](#)

10. Supervision-by-Registration: An Unsupervised Approach to Improve the Precision of Facial Landmark Detectors
Xuanyi Dong, Shouou-I Yu, **Xinshuo Weng**, Shi-En Wei, Yi Yang, Yaser Sheikh
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2018
[PDF](#) | [Code](#) | [Demo](#) | [Slides](#) | [BibTex](#)
11. Rotational Rectification Network: Enabling Pedestrian Detection for Mobile Vision
Xinshuo Weng, Shangxuan Wu, Fares Beainy, Kris Kitani
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2018
(Oral Presentation)
[PDF](#) | [Code](#) | [Poster](#) | [Slides](#) | [BibTex](#)

WORKSHOP PAPERS

12. AB3DMOT: A Baseline for 3D Multi-Object Tracking and New Evaluation Metrics
Xinshuo Weng, Jianren Wang, David Held, Kris Kitani
European Conference on Computer Vision (ECCV) Workshops, 2020
(Oral Presentation)
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
13. End-to-End 3D Multi-Object Tracking and Trajectory Forecasting
Xinshuo Weng*, Ye Yuan*, Kris Kitani
European Conference on Computer Vision (ECCV) Workshops, 2020
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
14. Graph Neural Network for 3D Multi-Object Tracking
Xinshuo Weng, Yongxin Wang, Yunze Man, Kris Kitani
European Conference on Computer Vision (ECCV) Workshops, 2020
(Spotlight Presentation)
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
15. 4D Forecasting: Sequential Forecasting of 100,000 Points
Xinshuo Weng, Jianren Wang, Sergey Levine, Kris Kitani, Nick Rhinehart
European Conference on Computer Vision (ECCV) Workshops, 2020
(Spotlight Presentation)
[PDF](#) | [Code](#) | [Demo](#) | [Website](#) | [Slides](#) | [BibTex](#)
16. Monocular 3D Object Detection with Pseudo-LiDAR Point Cloud
Xinshuo Weng, Kris Kitani
IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, 2019
[PDF](#) | [Code](#) | [Poster](#) | [BibTex](#)

PRE-PRINTS

17. All-in-One Drive: A Large-Scale and Comprehensive Perception Dataset with High-Density Long-Range Point Cloud
Xinshuo Weng, Yunze Man, Dazhi Cheng, Jinhyung Park, Matthew O'Toole, Kris Kitani
arXiv, 2020
[PDF](#) | [Code](#) | [BibTex](#)

18. Joint Detection and Multi-Object Tracking with Graph Neural Networks
Yongxin Wang, **Xinshuo Weng**, Kris Kitani
arXiv:2006.13164, 2020
[PDF](#) | [BibTex](#)
19. Joint 3D Tracking and Forecasting with Graph Neural Network and Diversity Sampling
Xinshuo Weng*, Ye Yuan*, Kris Kitani
arXiv:2003.07847, 2020
[PDF](#) | [Code](#) | [Website](#) | [BibTex](#)
20. Learning Shape Representations for Clothing Variations in Person Re-Identification
Yu-Jhe Li, Zhengyi Luo, **Xinshuo Weng**, Kris Kitani
arXiv:2003.07340, 2020
[PDF](#) | [BibTex](#)
21. Deep Reinforcement Learning for Autonomous Driving
Sen Wang, Daoyuan Jia, **Xinshuo Weng**
arXiv:1811.11329, 2018
[PDF](#) | [BibTex](#)
22. CyLKs: Unsupervised Cycle Lucas-Kanade Network for Landmark Tracking
Xinshuo Weng, Wentao Han
arXiv:1811.11325, 2018
[PDF](#) | [Code](#) | [BibTex](#)
23. Image Labeling with Markov Random Fields and Conditional Random Fields
Shangxuan Wu, **Xinshuo Weng**
arXiv:1811.11323, 2018
[PDF](#) | [BibTex](#)
24. Visual Compiler: Synthesizing a Pedestrian Pose Estimator from a Single Image
Namhoon Lee, **Xinshuo Weng**, Vishnu Naresh Boddeti, Yu Zhang, Fares Beainy, Kris Kitani, Takeo Kanade
arXiv:1612.05234, 2016
[PDF](#) | [BibTex](#)

UNRELEASED WORKS

25. Automatic Camera Pose Estimation for Large-Scale Scenes
Yan Xu, Yu-Jhe Li, **Xinshuo Weng**, Kris Kitani
Under Review, 2020
26. Automatic and Dynamic Detection Selection for 3D Multi-Object Tracking
Xinshuo Weng, Kris Kitani
In Progress, 2020
27. Stochastic Data Association for 3D Multi-Object Tracking using Variational GNNs
Xinshuo Weng*, Ye Yuan*, Kris Kitani
In Progress, 2020
28. Modeling Intention with Variational GNNs for Multi-Modal Trajectory Forecasting
Ye Yuan*, **Xinshuo Weng***, Kris Kitani
In Progress, 2020

29. Domain Adaption of Pseudo-LiDAR Point Cloud for Monocular 3D Object Detection
Rawal Khirodkar*, Xinshuo Weng*, Kris Kitani
In Progress, 2020
30. Sensor Blending 3D Object Detection with Single Photon LiDAR
Yunze Man, Xinshuo Weng, Matthew O’Toole, Kris Kitani
In Progress, 2020
31. ScenePCNet: Generating Scene Point Cloud from a Single Image
Xinshuo Weng, Kris Kitani
In Progress, 2020
32. Stochastic Sequential Pointcloud Forecasting with Sequential VAE
Xinshuo Weng, Sergey Levine, Kris Kitani, Nick Rhinehart
In Progress, 2020

ORGANIZING COMMITTEE

Co-Chair, Workshop on [Machine Learning for Autonomous Driving](#) at NeurIPS 2020 2020

CONTRIBUTED TALKS

ECCV 2020, Oral Paper Presentation at [Woman in Computer Vision](#) Workshop [[Slides](#)] [[Video](#)] 2020

ECCV 2020, Spotlight Presentation at [Benchmarking Trajectory Forecasting](#) Workshop [[Slides](#)] [[Video](#)] 2020

ECCV 2020, Spotlight Presentation Two at [4D Vision](#) Workshop [[Slides](#)] [[Video](#)] 2020

ECCV 2020, Spotlight Presentation One at [4D Vision](#) Workshop [[Slides](#)] [[Video](#)] 2020

IROS 2020, Oral Paper Presentation [[Slides](#)] [[Video](#)] 2020

WACV 2018, Oral Paper Presentation [[Slides](#)] 2018

INTERNAL TALKS

CMU, PhD Speaking Qualifier: 3D Multi-Object Tracking for Autonomous Driving [[Slides](#)] [[Video](#)] 2020

CMU, Seminar Presentation at [Klab: Games with Sequential Actions – Extensive Games](#) [[Slides](#)] 2019

CMU, Seminar Presentation at [Klab: Object Detection and Tracking in the 3D World](#) [[Slides](#)] 2019

CMU, Seminar Presentation at [Klab: Interpretability of Machine Learning for Computer Vision](#) [[Slides](#)] 2018

JOURNAL REVIEWER

TPAMI (Transactions on Pattern Analysis and Machine Intelligence) 2020

MTA (Multimedia Tools and Applications) 2019

TCSVT (Transactions on Circuits and Systems for Video Technology) 2018

CONFERENCE REVIEWER

CVPR (Conference on Computer Vision and Pattern Recognition) 2018, 2020, 2021

ECCV (European Conference on Computer Vision) 2020

ICCV (International Conference on Computer Vision) 2019

ICLR (International Conference on Learning Representations) 2021

ICML (International Conference on Machine Learning) 2020

NeurIPS (Conference on Neural Information Processing Systems)	2020
AAAI (Association for the Advancement of Artificial Intelligence)	2020, 2021
ICRA (International Conference on Robotics and Automation)	2020
IROS (International Conference on Intelligent Robots and Systems)	2020
WACV (Winter Conference on Applications of Computer Vision)	2020, 2021
BMVC (British Machine Vision Conference)	2020
ACCV (Asian Conference on Computer Vision)	2018, 2020
IV (Intelligent Vehicles Symposium)	2020

CONFERENCE WORKSHOP REVIEWER

CVPR, AI City Challenge	2020
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ACADEMIC AWARDS

Outstanding Graduate Award, Top 10%	2016
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INDUSTRY COLLABORATORS

Monu Surana (Qualcomm)	2020 - Present
Prasanna K. Sivakumar (DENSO Corporation)	2019 - Present
Daiji Watanabe (DENSO Corporation)	2019 - Present
Hiroaki Ishioka (Shimizu Corporation)	2018 - 2020

RESEARCH MENTORING

Yongxin Wang (CMU MSCV, now at Amazon)	2019 - Present
Jinhyung (David) Park (CMU Undergraduate)	2020
Jingjing Pan (CMU MSCV, now at Apple)	2020
Dazhi Cheng (CMU MSCS, now at Nuro)	2020
Yu-Jhe Li (CMU Intern, now RI PhD at CMU)	2019 - 2020
Jianren Wang (CMU Intern, now RI Master at CMU)	2019 - 2020
Xi Sun (CMU MSR, now at Amazon)	2019 - 2020
Yunze Man (CMU Intern, now RI Master at CMU)	2018 - 2020
Aashi Manglik (CMU MSR, now at Microsoft)	2019

TEACHING

Computer Vision (16-385), CMU	2019
Geometry-Based Methods in Computer Vision (16-822), CMU	2018

UNIVERSITY ACITIVITY

Thesis Committee, M.S. in Robotics, Yunze Man	2021
Admission Committee, M.S. in Computer Vision, CMU	2019, 2020