

Yu Xiang

CONTACT INFORMATION	Senior Research Scientist NVIDIA Research (Robotics) 4545 Roosevelt Way, 6th Floor Seattle, WA 98105	yux@nvidia.com http://yuxng.github.io/ Google Scholar GitHub
RESEARCH INTERESTS	Robotics, Computer Vision, Machine Learning, Deep Learning	
EDUCATION	University of Michigan , Ann Arbor, Michigan, USA Ph.D. in Electrical Engineering: Systems Dissertation: 3D Object Representations for Recognition Advisor: Prof. Silvio Savarese Fudan University , Shanghai, China M.S. in Computer Science Dissertation: Graphic Models for Semantic Context Modeling in Automatic Image Annotation Advisor: Prof. Xiangdong Zhou Fudan University , Shanghai, China B.S. in Computer Science	Sep 2010 – Dec 2015 Sep 2007 – Jul 2010 Sep 2003 – Jul 2007
EXPERIENCE	NVIDIA Research , Seattle, Washington, USA <i>Senior Research Scientist</i> NVIDIA Research , Seattle, Washington, USA <i>Postdoctoral Researcher</i> University of Washington , Seattle, Washington, USA <i>Postdoctoral Researcher</i> <ul style="list-style-type: none">• Advisor: Prof. Dieter Fox Stanford University , Stanford, California, USA <i>Postdoctoral Researcher</i> <ul style="list-style-type: none">• Advisor: Prof. Silvio Savarese Stanford University , Stanford, California, USA <i>Visiting Student Researcher</i> <ul style="list-style-type: none">• Advisor: Prof. Silvio Savarese NEC Laboratories America, Inc. , Cupertino, California, USA <i>Summer Research Intern</i> <ul style="list-style-type: none">• Department: Media Analytics	Jun 2018 – present Jan 2018 – May 2018 Aug 2016 – Dec 2017 Jan 2016 – Jul 2016 Sep 2013 – Dec 2015 Jun 2015 – Sep 2015 May 2014 – Aug 2014
PUBLICATIONS	Goal-Auxiliary Actor-Critic for 6D Robotic Grasping with Point Clouds Lirui Wang, Yu Xiang and Dieter Fox In <i>arXiv</i> , 2021. Learning Composable Behavior Embeddings for Long-horizon Visual Navigation Xiangyun Meng, Yu Xiang and Dieter Fox In <i>IEEE Robotics and Automation Letters (RA-L)</i> , 2021. Unseen Object Instance Segmentation for Robotic Environments Christopher Xie, Yu Xiang , Arsalan Mousavian and Dieter Fox In <i>IEEE Transactions on Robotics (T-RO)</i> , 2021. PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking Xinke Deng, Arsalan Mousavian, Yu Xiang , Fei Xia, Timothy Bretl and Dieter Fox In <i>IEEE Transactions on Robotics (T-RO)</i> , 2021.	

Learning RGB-D Feature Embeddings for Unseen Object Instance Segmentation

Yu Xiang, Christopher Xie, Arsalan Mousavian and Dieter Fox

In *Conference on Robot Learning (CoRL)*, 2020.

Manipulation Trajectory Optimization with Online Grasp Synthesis and Selection

Lirui Wang, Yu Xiang and Dieter Fox

In *Robotics: Science and Systems (RSS)*, 2020.

LatentFusion: End-to-End Differentiable Reconstruction and Rendering for Unseen Object Pose Estimation

Keunhong Park, Arsalan Mousavian, Yu Xiang and Dieter Fox

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.

Scaling Local Control to Large-Scale Topological Navigation

Xiangyun Meng, Nathan Ratliff, Yu Xiang and Dieter Fox

In *International Conference on Robotics and Automation (ICRA)*, 2020.

Self-supervised 6D Object Pose Estimation for Robot Manipulation

Xinke Deng, Yu Xiang, Arsalan Mousavian, Clemens Eppner, Timothy Bretl and Dieter Fox

In *International Conference on Robotics and Automation (ICRA)*, 2020.

The Best of Both Modes: Separately Leveraging RGB and Depth for Unseen Object Instance Segmentation

Christopher Xie, Yu Xiang, Arsalan Mousavian and Dieter Fox

In *Conference on Robot Learning (CoRL)*, 2019.

PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking

Xinke Deng, Arsalan Mousavian, Yu Xiang, Fei Xia, Timothy Bretl and Dieter Fox

In *Robotics: Science and Systems (RSS)*, 2019.

Object Discovery in Videos as Foreground Motion Clustering

Christopher Xie, Yu Xiang, Dieter Fox and Zaid Harchaoui

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

Neural Autonomous Navigation with Riemannian Motion Policy

Xiangyun Meng, Nathan Ratliff, Yu Xiang and Dieter Fox

In *International Conference on Robotics and Automation (ICRA)*, 2019.

Deep Object Pose Estimation for Semantic Robotic Grasping of Household Objects

Jonathan Tremblay, Thang To, Balakumar Sundaralingam, Yu Xiang, Dieter Fox and Stan Birchfield

In *Conference on Robot Learning (CoRL)*, 2018.

DeepIM: Deep Iterative Matching for 6D Pose Estimation

Yi Li, Gu Wang, Xiangyang Ji, Yu Xiang and Dieter Fox

In *European Conference on Computer Vision (ECCV)*, 2018 **-Oral**.

PoseCNN: A Convolutional Neural Network for 6D Object Pose Estimation in Cluttered Scenes

Yu Xiang, Tanner Schmidt, Venkatraman Narayanan and Dieter Fox

In *Robotics: Science and Systems (RSS)*, 2018.

Recurrent Autoregressive Networks for Online Multi-Object Tracking

Kuan Fang, Yu Xiang, Xiaocheng Li and Silvio Savarese

In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018.

DA-RNN: Semantic Mapping with Data Associated Recurrent Neural Networks

Yu Xiang and Dieter Fox

In *Robotics: Science and Systems (RSS)*, 2017.

Subcategory-aware Convolutional Neural Networks for Object Proposals and Detection

Yu Xiang, Wongun Choi, Yuanqing Lin and Silvio Savarese

In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 924–933, 2017.

Anticipating Accidents in Dashcam Videos

Fu-Hsiang Chan, Yu-Ting Chen, Yu Xiang and Min Sun

In *Asian Conference on Computer Vision (ACCV)*, pp. 136–153, 2016 **-Oral**.

ObjectNet3D: A Large Scale Database for 3D Object Recognition

Yu Xiang, Wonhui Kim, Wei Chen, Jingwei Ji, Christopher Choy, Hao Su, Roozbeh Mottaghi, Leonidas Guibas and Silvio Savarese

In *European Conference on Computer Vision (ECCV)*, pp. 160–176, 2016 **-Spotlight Oral**.

Pose Estimation Errors, the Ultimate Diagnosis

Carolina Redondo-Cabrera, Roberto López-Sastre, **Yu Xiang**, Tinne Tuytelaars and Silvio Savarese

In *European Conference on Computer Vision (ECCV)*, pp. 118–134, 2016.

Deep Metric Learning via Lifted Structured Feature Embedding

Hyun Oh Song, **Yu Xiang**, Stefanie Jegelka and Silvio Savarese

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 4004–4012, 2016 **-Spotlight Oral**.

Learning to Track: Online Multi-Object Tracking by Decision Making

Yu Xiang, Alexandre Alahi and Silvio Savarese

In *International Conference on Computer Vision (ICCV)*, pp. 4705–4713, 2015 **-Oral**.

Data-Driven 3D Voxel Patterns for Object Category Recognition

Yu Xiang, Wongun Choi, Yuanqing Lin and Silvio Savarese

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1903–1911, 2015 **-Oral**.

A Coarse-to-Fine Model for 3D Pose Estimation and Sub-category Recognition

Roozbeh Mottaghi, **Yu Xiang** and Silvio Savarese

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 418–426, 2015.

Monocular Multiview Object Tracking with 3D Aspect Parts

Yu Xiang^{*}, Changkyu Song^{*}, Roozbeh Mottaghi and Silvio Savarese (^{*}equal contribution)

In *European Conference on Computer Vision (ECCV)*, pp. 220–235, 2014.

Beyond PASCAL: A Benchmark for 3D Object Detection in the Wild

Yu Xiang, Roozbeh Mottaghi and Silvio Savarese

In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 75–82, 2014.

Object Detection by 3D Aspectlets and Occlusion Reasoning

Yu Xiang and Silvio Savarese

In *IEEE Workshop on 3D Representation and Recognition (3dRR)*, pp. 530–537, 2013.

Object Co-detection

Sid Yingze Bao, **Yu Xiang** and Silvio Savarese

In *European Conference on Computer Vision (ECCV)*, vol. 7572, pp. 86–101, 2014.

Estimating the Aspect Layout of Object Categories

Yu Xiang and Silvio Savarese

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 3410–3417, 2012.

Semantic Context Modeling with Maximal Margin Conditional Random Fields for Automatic Image Annotation

Yu Xiang, Xiangdong Zhou, Zuotao Liu, Tat-Seng Chua and Chong-Wah Ngo

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 3368–3375, 2010.

Learning Contextual Metrics for Automatic Image Annotation

Zuotao Liu, Xiangdong Zhou, **Yu Xiang** and Yan-Tao Zheng

In *Advances in Multimedia Information Processing - PCM*, vol. 6297, pp. 124–135, 2010.

A Revisit of Generative Model for Automatic Image Annotation using Markov Random Fields

Yu Xiang, Xiangdong Zhou, Zuotao Liu, Tat-Seng Chua and Chong-Wah Ngo

In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1153–1160, 2009.

Adaptive Model for Web Image Semantic Automatic Image Annotation

Hongtao Xu, Xiangdong Zhou, **Yu Xiang** and Baile Shi

In *Journal of Software (in Chinese)*, vol. 21, no. 9, pp. 2183–2195, 2009.

Exploiting Flickr's Related Tags for Semantic Annotation of Web ImagesHongtao Xu, Xiangdong Zhou, **Yu Xiang** and Baile ShiIn *ACM International Conference on Image and Video Retrieval (CIVR)*, no. 46, 2009.**Automatic Web Image Annotation via Web-Scale Image Semantic Space Learning**Hongtao Xu, Xiangdong Zhou, Lan Lin, **Yu Xiang** and Baile ShiIn *Advances in Data and Web Management*, vol. 5446, pp. 211–222, 2009.**TEACHING
EXPERIENCE****Artificial Intelligence**, University of Washington, Seattle, Washington, USA

2017

Guest Lectures for Prof. Dieter Fox**Computer Vision**, University of Washington, Seattle, Washington, USA

2017

Guest Lecture for Prof. Linda Shapiro**Computer Vision**, Stanford University, Stanford, California, USA

2016

Guest Lectures for Prof. Silvio Savarese**The C Programming Language**, Fudan University, Shanghai, China

Sep 2009 – Jan 2010

*Teaching Assistant***STUDENT
MENTORSHIP**

Lirui Wang, Master Student, University of Washington

Sep 2017 – present

NVIDIA Research Internship Program:

Xiangyun Meng, PhD Student, University of Washington

2021

Luyang Zhu, PhD Student, University of Washington

2020

Xinke Deng, PhD Student, UIUC

2018, 2019

Keunhong Park, PhD Student, University of Washington

2019

Corinne Jones, PhD Student, University of Washington

2019

Raluca Scona, PhD Student, Edinburgh Center for Robotics

2019

Fei Xia, PhD Student, Stanford University

2018

Rui Wang, PhD Student, TUM

2018

Christopher Xie, PhD Student, University of Washington

2018

**AWARDS AND
HONORS**

ICCV Doctoral Consortium Award

2015

Outstanding Master's Thesis Award of Shanghai

2012

**PROFESSIONAL
SERVICE**

Journal Reviewer

- International Journal of Robotics Research (IJRR)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- International Journal of Computer Vision (IJCV)
- Computer Vision and Image Understanding (CVIU)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- IEEE Transactions on Multimedia (TMM)
- IEEE Transactions on Signal Processing (TSP)

Conference Reviewer

- Robotics: Science and Systems Conference (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robot and Human Interactive Communication (ROMAN)
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- International Conference on Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- Asian Conference on Computer Vision (ACCV)
- British Machine Vision Conference (BMVC)
- International Conference on 3D Vision (3DV)
- Neural Information Processing Systems (NIPS)

Program Chair

- The Visual Learning and Reasoning for Robotic Manipulation workshop at RSS, 2020

Program Chair

- 5th International IEEE Workshop on 3D Representation and Recognition, 2015

Program Committee

- 4th International IEEE Workshop on 3D Representation and Recognition, 2013

Tutorial Organizer

- 3D Object Geometry from Single Image Tutorial at International Conference on 3D Vision, 2016

TALKS

Learning RGB-D Feature Embeddings for Unseen Object Instance Segmentation

In NVIDIA Research, Seattle, Washington, 10/12/2020.

PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking

In University of Washington, Seattle, Washington, 9/27/2019.

Object Perception for Robot Manipulation

In Toyota Research Institute, Cambridge, Massachusetts, 7/12/2019.

PoseCNN: A Convolutional Neural Network for 6D Object Pose Estimation in Cluttered Scenes

In Robotics: Science and Systems (RSS), CMU, Pittsburgh, Pennsylvania, 6/26/2018.

Perceiving the 3D World from Images and Videos

In Nvidia Research, Redmond, Washington, 11/07/2017; University of Michigan, 3/15/2018.

3D Object Recognition and Scene Understanding from RGB-D Videos

In GRASP Lab at University of Pennsylvania, 10/11/2017; Microsoft Research, Redmond, 10/17/2017; Vision Lab at Stanford University, 10/23/2017.

3D Object Recognition and Scene Understanding

In Mitsubishi Electric Research Laboratories, Boston, Massachusetts, 7/14/2017.

DA-RNN: Semantic Mapping with Data Associated Recurrent Neural Networks

In Robotics: Science and Systems, Massachusetts Institute of Technology, Massachusetts, 7/13/2017.

Subcategory-aware Convolutional Neural Networks for Object Proposals and Detection

In IEEE Winter Conference on Applications of Computer Vision, Santa Rosa, California, 3/29/2017.

Tutorial on 3D Object Recognition

In International Conference on 3D Vision, Stanford University, 10/28/2016.

3D Object Representations for Recognition

In Carnegie Mellon University, 3/28/2016; University of Toronto, 4/4/2016; Massachusetts Institute of Technology, 4/12/2016; University of California, Berkeley, 4/21/2016; University of Illinois at Urbana-Champaign, 5/5/2016; University of Washington, 5/31/2016.

3D Object Detection and Pose Estimation

In the 1st International Workshop on Recovering 6D Object Pose in conjunction with ICCV, Santiago, Chile, 12/17/2015.

Learning to Track: Online Multi-Object Tracking by Decision Making

In International Conference on Computer Vision, Santiago, Chile, 12/16/2015.

Data-Driven 3D Voxel Patterns for Object Category Recognition

In IEEE Conference on Computer Vision and Pattern Recognition, Boston, Massachusetts, 06/08/2015.

Monocular Multiview Object Tracking with 3D Aspect Parts

In the 1st Stanford-SNU Workshop on Automated Driving, Stanford University, 02/24/2015.

Beyond PASCAL: A Benchmark for 3D Object Detection in the Wild

In IEEE Winter Conference on Applications of Computer Vision, Steamboat Springs, Colorado, 03/24/2014.

Object Detection by 3D Aspectlets and Occlusion Reasoning

In the 4th International IEEE Workshop on 3D Representation and Recognition in conjunction with ICCV, Sydney, Australia, 12/08/2013.

Estimating the Aspect Layout of Object Categories

In Midwest Vision Workshop, University of Illinois at Urbana-Champaign, 09/21/2012.

SKILLS AND LANGUAGES

Programming Languages: Python, C/C++, CUDA

Libraries: PyTorch, Tensorflow, OpenCV, OpenGL, ROS

Operating Systems: Linux, Windows and Mac OS X

Languages: English, Chinese