

# Luwei Zhou

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## EDUCATION

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### University of Michigan

Ann Arbor, Michigan, USA

*Ph.D. program in Robotics (Computer Vision)*

*Sept. 2015 – May 2020 (expected)*

- **Research Interests:** Vision and language, video understanding, deep learning
- **Courses:** Advanced Computer Vision, Natural Language Processing, Machine Learning, Optimization
- **Academics:** Curriculum GPA: **4.00/4.00**

### Nanjing University

Nanjing, Jiangsu, China

*Bachelor of Engineering in Automation*

*Sept. 2011 – Jun. 2015*

- **Courses:** Computer Vision, Artificial Intelligence, Advanced Programming Language, Data Structure
- **Academics:** Overall GPA: **91.8/100**, Major GPA: **93.0/100**

## SELECTED PUBLICATIONS (see all at [Google Scholar](#))

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**L. Zhou**, Y. Kalantidis, X. Chen, J. J. Corso, and M. Rohrbach, “Grounded Video Description”, CVPR 2019. (oral) AR: 5.6%; h5: 188

**L. Zhou**, Y. Zhou, J. J. Corso, R. Socher, and C. Xiong, “End-to-End Dense Video Captioning with Masked Transformer”, CVPR 2018. (spotlight) AR: 9%; h5: 158

**L. Zhou**, C. Xu, and J. J. Corso, “Towards Automatic Learning of Procedures from Web Instructional Videos”, AAAI 2018. (oral) AR: 11%; h5: 56

H. Huang, **L. Zhou**, W. Zhang, J. J. Corso, and C. Xu, “Dynamic Graph Modules for Modeling Object-Object Interactions in Activity Recognition”, BMVC 2019. AR: 30%; h5: 42

**L. Zhou**, N. Louis, and J. J. Corso, “Weakly-Supervised Video Object Grounding from Text by Loss Weighting and Object Interaction”, BMVC 2018. AR: 30%; h5: 42

**L. Zhou**, et al., “Multi-agent Reinforcement Learning with Sparse Interactions by Negotiation and Knowledge Transfer”, IEEE Transactions on Cybernetics 2017, 47 (5): 1238 - 1250. *SCI IF: 7.38; h5: 73*

**L. Zhou**, C. Xu, P. Koch, and J. J. Corso, “Watch What You Just Said: Image Captioning with Text-Conditional Attention”, ACM Multimedia (Thematic Workshops) 2017: 305-313. (pitch)

**L. Zhou**, Y. Shi, J. Wang, and P. Yang, “A Balanced Heuristic Mechanism for Multi-robot Task Allocation of Intelligent Warehouses”, Mathematical Problems in Engineering 2014: 1–10. *SCI IF: 0.80; h5: 39*

## WORK EXPERIENCE

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### Facebook AI Research (FAIR)

Menlo Park, CA, USA

*Research Intern with Marcus Rohrbach, Yannis Kalantidis, and Xinlei Chen*

*May 2018 – Aug. 2018*

### Microsoft Research

Redmond, WA, USA

*Research Intern with Hamid Palangi, Lei Zhang, and Jianfeng Gao*

*May 2019 – Aug. 2019*

### Salesforce Research (Metamind)

Palo Alto, CA, USA

*Deep Learning Research Intern with Caiming Xiong and Richard Socher*

*May 2017 – Aug. 2017*

### University of Michigan, EECS

Ann Arbor, MI, USA

*Graduate Student Instructor on Justin Johnson’s Deep Vision class*

*Sept. 2019 – present*

## INVITED TALKS

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### NVIDIA AI Lab

*Hosted by Dr. Sanja Fidler*

Toronto, Ontario, Canada

*Dec. 2018*

### SAMSUNG AI Centre

*Hosted by Dr. Afsaneh Fazly and Dr. Allan Jepson*

Toronto, Ontario, Canada

*Dec. 2018*

## PROFESSIONAL ACTIVITIES

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*Co-organizer*, CVPR 2018 Workshop on Fine-grained Instructional Video Understanding (FIVER), with Jason Corso, Josef Sivic and Ivan Laptev

*Program Committee Member / Reviewer*: CVPR, TPAMI, IJCV, AAAI, NIPS, ACM MM, ITS, ICRA

*Volunteer*, RSS 2016

## HONORS AND AWARDS

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*Outstanding Winner Awards (0.2%)*, Mathematical Contest in Modeling (MCM) 2013

*Sienhua New and Tsu Way Shen Memorial Award (Top 1)*, of University of Michigan 2015

*Best Undergrad Thesis (Top 1)*, of Jiangsu Province 2015

*National Scholarship (1%)*, of Nanjing University 2012

*Red Sun Scholarship*, of Nanjing University 2014

## RESEARCH EXPERIENCE (open-source projects on [Github](#))

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### Grounded Video Description

Facebook AI Research

*Supervisors: Dr. Marcus Rohrbach, Dr. Yannis Kalantidis, and Dr. Xinlei Chen* May 2018 – present

- Introduced a large-scale video description and grounding dataset, called ActivityNet-Entities, where we annotated noun phrases (& objects) from sentence descriptions in videos as spatial bounding boxes. ActivityNet-Entities contains over 158k labelled boxes for 52k video clips.
- Proposed a unified framework for video and image description, where a grounding module dynamically detects objects in the scene and provides visual clues to the captioning module.
- Set new state-of-the-art performance on video description and image description and demonstrated that our generated sentences are more explainable through grounding.

### Fine-grained Instructional Video Understanding

University of Michigan

*Supervisor: Prof. Jason Corso*

*Sept. 2016 – present*

- Introduced [YouCook2](#) dataset, which contains temporally localized recipe sentence annotations and bounding boxes for 2000 YouTube cooking videos.
- Tackled a series of problems related to instructional video understanding: i) event proposal (AAAI 2018), ii) dense video captioning (CVPR 2018), iii) weakly supervised object grounding from language description (BMVC 2018).
- *Event proposal*: Proposed an event proposal and sequential modeling network that can temporally localize procedure steps in web instructional videos and capture the temporal structure of the video.
- *Dense video captioning*: Caption generation for event proposals. See Page 3 for more details.
- *Weakly supervised object grounding*: Given a video and the corresponding description, localize the

objects mentioned from the description in the video as bounding boxes. No box is given for training.

- Current focuses: Action-conditioned object grounding, modeling of object state transitions, multi-task learning of object grounding, action recognition, and captioning on videos.

### **Dense-Captioning Events in Video and Temporal Action Proposal**

Salesforce Research

*Supervisors: Dr. Caiming Xiong and Dr. Richard Socher*

*May 2017 – Aug. 2017*

- Introduced a Self-attention-based video captioning model and improved our previously proposed action/event proposal network with carefully-designed Temporal Convolutional Networks.
- Proposed to bridge event proposal and captioning by a differentiable visual mask and achieved state-of-the-art results on dense video captioning.

### **Text-conditional Visual Captioning with Guiding LSTM**

University of Michigan

*Supervisor: Prof. Jason Corso*

*Mar. 2016 – Nov. 2016*

- Proposed an encoder-decoder image captioner though explicit text-conditional image guidance.
- Extended the work to video captioning by leveraging audio features for the extra guidance.

### **End-to-End Grasping with Deep Reinforcement Learning**

University of Michigan

*Supervisor: Prof. Satinder Singh*

*Sept. 2015 – Apr. 2016*

- Applied state-of-the-art Deep RL algorithm named Deep Q-network (DQN) to robot grasping tasks.
- Built an API between physics engine MuJoCo and the DQN module.

### **Research on Multi-Agent Reinforcement Learning with Sparse Interactions**

Nanjing University

*Supervisors: Prof. Chunlin Chen, Dr. Pei Yang, Dr. Yang Gao*

*Dec. 2014 – Jul. 2015*

- Introduced the concept of equilibrium into traditional sparse-interaction-based MARL algorithms and proposed a knowledge transfer approach to initialize the joint-state Q table.
- Applied the proposed algorithm in a real-world setting, i.e., our intelligent warehouse simulator.

### **Multi-Robot Task Allocation and Path Planning in Dynamic Environments**

Nanjing University

*Supervisor: Dr. Pei Yang*

*Nov. 2013 – Jul. 2014*

- Proposed a Balanced Heuristic Mechanism to balance task allocation in multi-robot systems.
- Built an intelligent warehouse simulator from scratch using C/OpenGL for model evaluation.

## **PROFICIENCY AND SKILLS**

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*Technical Skills:* PyTorch/Torch, Python, C/C++, Linux, Git, LaTeX, Matlab, Caffe, HTML, CSS, JS etc.

*Languages:* English (proficient) and Mandarin (native)

## **REFERENCES**

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**Prof. Jason Corso**, Associate Professor, University of Michigan, [jjcorso@umich.edu](mailto:jjcorso@umich.edu)

**Prof. Chenliang Xu**, Assistant Professor, University of Rochester, [chenliang.xu@rochester.edu](mailto:chenliang.xu@rochester.edu)

**Dr. Jianfeng Gao**, Partner Research Manager, Microsoft Research, [jfgao@microsoft.com](mailto:jfgao@microsoft.com)

**Dr. Lei Zhang**, Principle Research Manager, Microsoft Research, [leizhang@microsoft.com](mailto:leizhang@microsoft.com)

**Dr. Marcus Rohrbach**, Research Scientist, Facebook AI, [mrf@fb.com](mailto:mrf@fb.com)

**Dr. Yannis Kalantidis**, Research Scientist, Facebook AI, [yannisk@fb.com](mailto:yannisk@fb.com)