

# IOU-JEN (ADAM) LIU

• [iliu3@illinois.edu](mailto:iliu3@illinois.edu) • <https://ioujenliu.github.io/>

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## RESEARCH INTERESTS

Multi-Agent Systems, Reinforcement Learning, Autonomous Agents, Embodied AI

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## EDUCATION

**PhD**, Electrical and Computer Engineering 2022 (Expected)  
University of Illinois at Urbana-Champaign (UIUC), IL, U.S.A.  
Advisor: Prof. Alexander Schwing

**Master of Science**, Electronic Design Automation 2014  
National Taiwan University (NTU), Taipei, Taiwan  
Advisor: Prof. Yao-Wen Chang

**Bachelor of Science**, Electrical Engineering 2012  
National Taiwan University (NTU), Taipei, Taiwan

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## PUBLICATIONS

- [12] **Bridging the Imitation Gap by Adaptive Insubordination.** [\[arxiv\]](#)[\[project\]](#)  
Luca Weihs\*, Unnat Jain\*, **Iou-Jen Liu**, Jordi Salvador, Svetlana Lazebnik, Aniruddha Kembhavi, Alexander Schwing  
(NeurIPS'21) *Neural Information Processing Systems, 2021*
- [11] **GridToPix: Training Embodied Agents with Minimal Supervision.** [\[arxiv\]](#)[\[project\]](#)  
Unnat Jain, **Iou-Jen Liu**, Svetlana Lazebnik, Aniruddha Kembhavi, Luca Weihs, Alexander Schwing  
(ICCV'21) *IEEE/CVF International Conference on Computer Vision, 2021*
- [10] **Semantic Tracklets: An Object-Centric Representation for Efficient Visual Multi-Agent Reinforcement Learning.** [\[arxiv\]](#)[\[project\]](#)  
**Iou-Jen Liu**\*, Zhongzheng Ren\*, Raymond A. Yeh\*, Alexander G. Schwing  
(IROS'21) *IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021*
- [9] **Coordinated Exploration for Multi-Agent Deep Reinforcement Learning.** [\[arxiv\]](#)[\[project\]](#)  
**Iou-Jen Liu**, Unnat Jain, Raymond A. Yeh, Alexander G. Schwing  
(ICML'21) *International Conference on Machine Learning, 2021*  
with long talk presentation (top 3.0%)
- [8] **High-Throughput Synchronous Deep Reinforcement Learning.** [\[arxiv\]](#)[\[project\]](#)  
**Iou-Jen Liu**, Raymond A. Yeh, Alexander G. Schwing  
(NeurIPS'20) *Neural Information Processing Systems, 2020*
- [7] **PIC: Permutation Invariant Critic for Multi-Agent Deep RL.** [\[arxiv\]](#)[\[project\]](#)  
**Iou-Jen Liu**\*, Raymond A. Yeh\*, Alexander G. Schwing  
(CoRL'19) *Conference on Robot Learning, 2019*
- [6] **Accelerating Distributed Reinforcement Learning with In-Switch Computing.** [\[pdf\]](#)  
Youjie Li, **Iou-Jen Liu**, Yifan Yuan, Deming Chen, Alexander G. Schwing, Jian Huang  
(ISCA'19) *ACM/IEEE International Symposium on Computer Architecture, 2019*
- [5] **Knowledge Flow: Improve upon Your Teachers.** [\[arxiv\]](#)  
**Iou-Jen Liu**, Jian Peng, Alexander G. Schwing  
(ICLR'19) *International Conference on Learning Representations, 2019*
- [4] **Overlay-Aware Detailed Routing for Self-Aligned Double Patterning Lithography Using the Cut Process.** [\[pdf\]](#)

**Iou-Jen Liu**, Shao-Yun Fang, Yao-Wen Chang

(TCAD'16) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Vol. 35, 2016

- [3] **Stitch-Aware Routing for Multiple E-Beam Lithography.** [\[pdf\]](#)

**Iou-Jen Liu**, Shao-Yun Fang, Yao-Wen Chang

(TCAD'15) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Vol. 34, 2015

- [2] **Overlay-Aware Detailed Routing for Self-Aligned Double Patterning Lithography Using the Cut Process.** [\[pdf\]](#)

**Iou-Jen Liu**, Shao-Yun Fang, Yao-Wen Chang

(DAC'14) *ACM/IEEE Design Automation Conference*, 2014

- [1] **Stitch-Aware Routing for Multiple E-Beam Lithography.** [\[pdf\]](#)

Shao-Yun Fang, **Iou-Jen Liu**, Yao-Wen Chang

(DAC'13) *ACM/IEEE Design Automation Conference*, 2013

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## INTERNSHIPS & RESEARCH EXPERIENCE

**University of Illinois at Urbana-Champaign**, Research Assistant, 2018 - present

- *Advisor: Prof. Alexander Schwing*
- I aim to train autonomous agents in multi-agent systems more efficiently. That is, using less time and less data to learn the desired policies. We address the problem in four directions:
  - (1) Better representation learning and interaction modeling (Publications [5, 7, 10]).
  - (2) Parallel and distributed training, which largely reduces training time (Publications [6, 8]).
  - (3) Improved multi-agent exploration (Publications [9]).
  - (4) RL with efficient imitation learning (Publications [11, 12]).

**Microsoft Research**, Research Intern, Summer 2021

- *Mentor: Marc-Alexandre Côté and Xingdi (Eric) Yuan*
- Works on agents that are capable of asking useful questions and leveraging external knowledge to solve tasks more efficiently.

**D-wave Systems**, Research Intern, Summer 2017

- Works on machine learning with quantum computing.

**TSMC-NTU Research Center**, Research Assistant, 2012 - 2015

- *Advisor: Prof. Yao-Wen Chang*
- Works on Electronic Design Automation with an emphasis on physical design and design for manufacturing (Publications [1-4]).

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## SKILLS

- Programming Languages: Python, C/C++, CUDA, Matlab
- Deep Learning Platform: Pytorch, Tensorflow

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## SELECTED AWARDS

- **Third Place, CAD Programming Contest** at ACM/IEEE International Conference on Computer-aided Design (ICCAD), 2012
- **Best Master Thesis Award**, Taiwan IC Design Society, 2014
- **Graduate Scholarship**, National Taiwan University, 2014 (Top 10% student in one academic year)
- **Teachers Ranked as Excellent**, University of Illinois, Sp17, Sp18, Fa18, Sp19, Fa19 (Student rating higher than 4.3 out of 5)
- **Graduate Student SSBG Fellowship**, University of Illinois, Summer 2020

## ACADEMIC SERVICES

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### Program Committee (Reviewer)

- International Conference on Machine Learning (ICML), 2021 - present
- Neural Information Processing Systems (NeurIPS), 2021 - present
- International Conference on Learning Representations (ICLR), 2021 - present
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2016

## TEACHING

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**University of Illinois at Urbana-Champaign**, Head Teaching Assistant / Instructor

ECE220 Computer System and Programming, Sp17, Fa17, Sp18, Su18, Fa18, Sp19, Su19, F19, Sp20, Fa20, Sp21, Fa21

- Teach weekly C/C++ programming studios and maintain online grading system (PrairieLearn) for machine-based tests.

**National Taiwan University**, Teaching Assistant

EE5026 Physical Design for VLSI, Sp14

## REFERENCES

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**Alexander Schwing**, Assistant Professor, UIUC, aschwing@illinois.edu

[Ph.D. Thesis Advisor]

**Yao-Wen Chang**, Dean, College of EECS, NTU, ywchang@ntu.edu.tw

[Master Thesis Advisor]

**Raymond Yeh**, Research Assistant Professor, TTIC, yehr@ttic.edu

[Collaborator]

**Yuting Chen**, Teaching Associate Professor, UIUC, ywchen@illinois.edu

[Teaching Assistant Supervisor]