

# YEN-LING KUO

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## EDUCATION

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- 2016/09 – Present **Massachusetts Institute of Technology**, Cambridge, MA  
Ph.D. Candidate in Electrical Engineering and Computer Science, minor in Cognitive Science
- Thesis Topic: Robotic Planning with Natural Language
- 2009/09 – 2012/01 **National Taiwan University**, Taipei, Taiwan  
M.S. in Computer Science and Information Engineering (CSIE)
- Thesis: A Multiagent Reasoning System for Commonsense Knowledge Integration
- 2011/09 – 2011/12 **Massachusetts Institute of Technology**, Cambridge, MA  
Visiting Student in Media Arts and Sciences
- 2005/09 – 2009/06 **National Taiwan University**, Taipei, Taiwan  
B.S. in Computer Science and Information Engineering, minor in Physics

## RESEARCH EXPERIENCE

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- 2016/09 – Present **InfoLab, MIT CSAIL** Advisor: Dr. Boris Katz and Andrei Barbu
- **Planning with Deep Compositional Models:** Creating planners that integrate compositional sequence models to extend robots' capabilities to follow commands, plan in dynamic environments, and generalize in novel scenarios. [1, 3, 4]
  - **Planning with Logics:** Creating reinforcement learning agents that plan actions by incorporating constraints and rules expressed as linear temporal logic in discrete [2] and continuous state space [in prep].
  - **Inverse Planning and Tool Use:** Developing experiments and computational models to understand how humans use tools and understand other agent's actions and intents.
- 2011/09 – 2011/12 **Software Agent Group, MIT Media Lab** Advisor: Dr. Henry Lieberman
- **Language Explorer:** Created a mobile language learning app that adapts to a learner's context and capability by leveraging ConceptNet and Foursquare to automatically arrange materials and generate dialogues.
  - **ConceptNet 5:** Participated in the early design and implementation of the multilingual knowledge base to integrate data from Chinese ConceptNet, ReVerb, and GoalNet.
- 2008/06 – 2012/01 **Intelligent Agents Lab, NTU CSIE** Advisor: Prof. Jane Yung-jen Hsu
- **Multi-agent Reasoning System:** Built a multi-agent system to provide commonsense reasoning results from multiple knowledge bases for application developers to use. [5]
  - **Crowdsourcing of Chinese Commonsense Knowledge:** Created human computation games on social platforms and designed analogical reasoning algorithms to build the largest Chinese commonsense knowledge base (over one million sentences) in the world. The collected data is contributed to the MIT Open Mind Common Sense project. [6, 7]

## WORK EXPERIENCE

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- 2017, 2018, 2019 **Teaching Assistant**, *Marine Biology Lab* Woods Hole, MA  
August
- Course: *Brains, Minds, and Machines Summer Course*
  - Taught Deep Learning and Reinforcement Learning tutorials.
  - Supervised student projects, including human plan understanding, multi-agent communication and coordination, better tracing for bio-inspired drones, social interaction recognition from videos, and composition of policies to form complex behaviors.
- 2018/09 – 2018/12 **Teaching Assistant**, *Massachusetts Institute of Technology* Cambridge, MA
- Course: *Aspects of a Computational Theory of Intelligence*
  - Reviewed, provided feedback, and graded student projects. Held weekly office hours to discuss and answer students' questions.
- 2012/10 – 2016/08 **Software Engineer**, *Google Inc.* Mountain View, CA
- Tech Lead for Shop the Look feature, which integrates outfit search and visually similar items to Google search. (*posts on [Google AdWords blog](#) and [TechCrunch](#)*)
  - Developed advanced shopping search features for shopping queries on different platforms.
  - Developed machine learning algorithms and crowd-sourcing infrastructure to extract product attributes from image content and product metadata.
- 2011/06 – 2011/08 **Software Engineering Intern**, *Google Inc.* Kirkland, WA
- Developed algorithms and pipeline to automatically build entity attribute comparison tables for any entity using large-scale crawled web data.
  - Won **Third Place** in Google Kirkland intern project showcase among 20+ interns.
- 2010/02 – 2011/05 **Teaching Assistant**, *National Taiwan University* Taipei, Taiwan
- Courses: *Artificial Intelligence, Advanced Artificial Intelligence*
  - Held weekly TA hours to discuss class, homework, and term projects with students.
  - In charge of both written and programming assignments for over 100 students.

## SELECTED PUBLICATIONS

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- [1] **Yen-Ling Kuo**, Andrei Barbu, and Boris Katz. Compositional Networks Enable Systematic Generalization for Grounded Language Understanding. *Under review*.
- [2] **Yen-Ling Kuo**, Andrei Barbu, and Boris Katz. Encoding Formulas as Deep Networks: Reinforcement Learning from Zero-shot Execution of LTL Formulas. In *Proceeding of 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-2020)*, October 2020. ([pdf](#))
- [3] **Yen-Ling Kuo**, Andrei Barbu, and Boris Katz. Deep Compositional Robotic Planners that Follow Natural Language Commands. In *Proceeding of 2020 International Conference on Robotics and Automation (ICRA-2020)*, June 2020. ([pdf](#))
- [4] **Yen-Ling Kuo**, Andrei Barbu, and Boris Katz. Deep Sequential Models for Sampling-based planning. In *Proceeding of 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-2018)*, October 2018. ([pdf](#))
- [5] **Yen-Ling Kuo** and Jane Yung-jen Hsu. Planning for Reasoning with Multiple Common Sense Knowledge Bases. *ACM Transactions on Interactive Intelligent Systems (TiiS-2012)*, Vol. 2, No. 3, Article 17, pp. 1-24, September 2012. ([pdf](#))
- [6] **Yen-Ling Kuo** and Jane Yung-jen Hsu. Resource-bounded Crowd-sourcing of Commonsense Knowledge. In *Proceedings of the 22nd International Joint Conference on Artificial Intelligence (IJCAI-2011)*, July 2011. ([pdf](#))

- [7] **Yen-Ling Kuo**, Kai-yang Chiang, Cheng-wei Chan, Jong-Chuan Lee, Rex Wang, Edward Shen, and Jane Yung-jen Hsu. Community-based Game Design: Experiments on Social Games for Commonsense Data Collection. In *Proceeding of 2009 KDD Workshop on Human Computation (HCOMP-2009)*, June 2009. ([pdf](#))

## SELECTED PROJECTS

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- 2016/10 – Present **ScienceVR: Science Experiments in VR**  
Developing real-time physics simulations in WebXR/VR that allow users to perform science experiments and re-experience the discoveries in history. Demos at <http://sciencevr.com>.
- Finalist of 2016 AT&T AR/VR Challenge.
  - Was invited to the VR Screening in Marche Du Film, Cannes Film Festival, in 2017.
  - Is funded by MIT Sandbox Innovation Fund (2018-Present) and Epic MegaGrants (2020).
- 2013/01 – Present **MovISee and MovIPrint: Capturing Body Movements for Digital Fabrication**  
Developing a digital platform that uses information from depth cameras to create mixed reality for people to explore the selected digital files and transform their body movements to visual outputs and fabrications. Demos at <http://movisee.com> and <https://yentingcho.com/>.
- Exhibited at
    - “The Lab Project” in Camden Arts Centre and Kingsgate Studio in London (2015);
    - “Manchester Science Festival” in Manchester, UK (2016);
    - “SIGGRAPH Asia Art Gallery” in Macau, China (2016);
    - “ACM MM Multimedia Art Exhibition” in Nice, France (2019).
  - Winner of **Gold Award** in the Fashion category of **International Design Awards** (2021).
- 2010/04 – 2011/07 **Flora: Mobile Flower Image Recognition Service**  
Developed an iPhone app that recognizes flower photos taken by the general public to provide information of flowers in the 2010 Taipei International Flora Exposition ([demo video](#)).
- Winner of **2010 Hinet Telesoft Competition** and **8th YuShow Cup Creativity Award**.

## HONORS & AWARDS

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- 2019 **Top 10%, ICFP Programming Contest 2019** (with Eric Stansifer, MIT)
- 2018 **CBMM Siemens Graduate Fellowship**, Siemens Healthineers
- 2016 **MIT Greater China Computer Science Fellowship**, Massachusetts Institute of Technology
- 2012 **Best Master Thesis Award**, Taiwanese Association of Artificial Intelligence (TAAI)  
Awarded annually to three master students for Best Thesis in AI research among all universities in Taiwan.
- 2011 **Irving T. Ho Memorial Scholarship**, Irving T. Ho Memorial Foundation  
Awarded annually to one EE/CSIE graduate student with exceptional research performance who has been selected by NTU as an overseas exchange student.
- 2011 **Third Place**, Google Kirkland Intern Project Showcase, Google Inc.  
Awarded to the top three intern projects among 20+ interns.
- 2011 **Google Anita Borg Memorial Scholarship**, Google Inc.  
Awarded to female students with outstanding academic performance and leadership demonstration.
- 2011 **Gold Award**, 8th YuShow Cup Creativity Award, Taiwan  
Awarded for Best Application in Technology and Design among 700+ projects across all universities.
- 2010 **First Place**, 2010 Hinet Telesoft Competition - Flora Expo Application Track, Taiwan  
Awarded for Best Application of Technology in Flora Expo among 600+ teams.

2010 **Outstanding Teaching Assistant Award**, *Department of CSIE, NTU*  
Awarded to CSIE Teaching Assistants with highest ratings from students.

## MENTORING

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### Master Research

- Emily Cheng (MEng, MIT)
- Bert Chen (Master in Computer Science, National Taiwan University)
- Sabrina Chen (Master in Data Science, HTW Berlin)
- Yu-Siang Wang (Master in Applied Computing, University of Toronto)

### Undergraduate Research

- Daniel Sun (UROP, MIT)
- Victor Turbiner (Undergrad Intern, now at Stanford)
- Michael Saterson (MIT Summer Research Program, City University of New York, now at Bloomberg LP)
- Justin Yu (UROP, MIT)

## LEADERSHIP & ACTIVITIES

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- 2018/06 – 2018/08 **Mentor**, *MIT Summer Research Program for Brain and Cognitive Science*
- 2018 **Mentor**, *MIT Undergraduate Women in EECS Buddy Program*
- 2017/06 – 2019/05 **SPTV Chair**, *MIT Sidney Pacific Graduate Residence*
- Developed and deployed features for Raspberry Pis across all floors in the building.
- 2016/08 **Student**, *Brains, Minds, and Machines Summer Course (admitted 30 students)*
- 2015/10 **Participant & Google Interviewer**, *Grace Hopper Celebration of Women in Computing*
- 2014/10 – 2016/08 **Website Developer**, *San Francisco Bay Area Taiwan UXD Gathering*
- 2013/01 – 2016/09 **Tech Intern Mentor & Interviewer**, *Google Inc.*
- Weekly career discussion with mentees; hosted 1 PhD and 6 undergraduate interns.
  - Conducted 80+ technical interviews to hire qualified engineers.
- 2011– Present **Reviewer** of *ACM IUI 2013, TAAI 2011, IJCAI 2019, RA-L 2019, ICRA 2021, CHI 2021*
- 2007/07 – 2008/07 **President**, *AIESEC (International Association of Students in Economics and Management, <http://aiesec.org>) National Taiwan University Local Committee*
- Initiated an overseas internship program based on social issues for NTU students.
  - Hosted a leadership development conference for 14 universities in Taiwan and Asia Pacific countries in June 2008.
  - Led more than 100 members to win the 2007-2008 **Best Local Committee Award**.

## SKILLS

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Programming Languages	C/C++, Python, Java, JavaScript, PHP, C#
Tools and Libraries	PyTorch/Tensorflow, NLTK, OpenCV, OpenGL, Matlab, Robot Operating System, Processing, Unreal, Unity, Max/MSP
Hardware Platforms	Kinect, Raspberry Pi, Arduino