

# Changling (Xavier) Li

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## RESEARCH INTERESTS

Reinforcement Learning, Multi-agent Reinforcement Learning, Multi-agent Systems, Cooperative Autonomous Robots, Ethics in Multi-agent Systems.

## EDUCATION

[Colby College](#), Waterville, ME, USA  
*B.A. Computer Science, Astrophysics* 2018 - 2022  
GPA: 3.98/4.00

- Relevant Course: Neural Networks, Computer Vision, Interactive System, Real-World Database Design, Data Structure and Algorithms, Data Analysis and Visualization, Analysis of Algorithms, Data Science in Astrophysics, Programming Languages, Computer Organization.

[Li Po Chun United World College](#), Hong Kong  
IB Diploma: 41/45 2016 - 2018

## RESEARCH EXPERIENCE

Energy-Aware Multi-Agent Reinforcement Learning for Collaborative Execution in Mission-Oriented Drone Networks  
*Department of Computer Science, Colby College* January 2021 - Present  
PI: Professor [Ying Li](#)

- Created DQN network and formulated case-specific reward function.
- Created scalable simulation environment for drone networks.
- Presented academic poster at 2021 Colby College Undergraduate Research Retreat.
- Conference paper currently under review.

Random Drawing Generation with Recurrent Neural Network  
*Department of Computer Science, Colby College* January 2020 - May 2021  
PI: Professor [Hannen\(Hannah\) Wolfe](#)

- Created core workflow for data processing and animation to investigate the correlation between eye focusing and drawing.
- Modified LSTM neural network and implemented poly-simplification algorithm to improve training efficiency.
- Monitored the training process with TensorBoard and generated sketches with the trained model.
- This project will be employed as a tool in Colby College Art Department.

Generation of Euler Diagram with Given Abstract Description  
*Department of Mathematics, Colby College* Spring 2019  
PI: Professor Nora Youngs

- Analyzed and documented 10+ relevant research paper.
- Developed theorems with proofs on generating Euler Diagram with given abstract description.

<b>ON-GOING RESEARCH PROJECT</b>	Comparison of Collaborative and Competitive Environment of Multi-Agent Reinforcement Learning for drone networks <i>Department of Computer Science, Colby College</i> PI: Professor <a href="#">Ying Li</a>	September 2021 - Present
	Evaluate the Effect of Ethics on Solving Conflicts in Multi-agent Systems <i>Department of Computer Science, Colby College</i>	February 2022 - Present
<b>PUBLICATIONS</b>	3. Under Construction... 2. Under Construction... 1. Y. Li, <b>C. Li</b> , J. Chen, and C. Roinou. Energy Energy-Aware Multi-Agent Reinforcement Learning for Collaborative Execution in Mission-Oriented Drone Networks. (currently under review at ICCCN conference)	
<b>POSTERS PRESENTATION</b>	1. <b>C. Li</b> , J. Chen, Y. Li, Reinforcement Learning for Energy-Efficient Trajectory Planning of Drone Networks, <i>2021 Colby College Undergraduate Research Retreat</i> .	
<b>HONORS PRIZES</b>	1. Phi Beta Kappa 2. Sigma Pi Sigma 3. UWC Davis Scholar 4. Dean's List F'18, S'19, F'19, F'21 (2020 and S'21 - cancelled due to COVID-19)	
<b>TEACHING EXPERIENCE</b>	Department of Computer Science, Colby College Teaching Assistant	Fall 2019 - Present
	<ul style="list-style-type: none"> <li>• CS 353: Interactive System.</li> <li>• CS 251: Data Analysis and Visualization.</li> <li>• CS 231: Data Structure and Algorithm.</li> <li>• CS 152: Computational Thinking: Science.</li> <li>• CS 151: Computational Thinking: Visual Media.</li> </ul>	
	Department of Physics, Colby College Teaching Assistant	Fall 2019 - Spring 2021
	<ul style="list-style-type: none"> <li>• PH 241: Modern Physics I.</li> <li>• PH 242: Modern Physics II.</li> </ul>	
<b>SKILLS</b>	<ul style="list-style-type: none"> <li>• <i>Python</i>: Extensive expertise in the language and its usage for data analysis, visualization and machine learning.</li> <li>• <i>Java</i>: Proficient in OOD, data structure and algorithms.</li> <li>• <i>C, C++</i>: Built Arduino applications, computer vision programs using openCV, familiar with data structure and algorithms.</li> <li>• <i>JavaScript</i>: Intermediate level experience with full stack website development.</li> </ul>	

## PROJECTS

### Better Housing Lottery System

- A room selection website targeting at student users.
- Designed accessible features and implemented the full stack website.
- Ran user testing with clients and adopted agile for team development.

### Chinese Digital Humanities Platform

- A public digital platform providing access to digital Chinese magazine database and an interface to analyze the digital humanities data.
- Helped design and implement the full stack website.
- Performed OCR for text recognition for both simplified and traditional Chinese.
- The school recently interviewed and published the relevant work on the [official news website](#).

### Advocacy for Incorporation of Data Ethics in Computer Science Education.

- Researched on the cases of racial biases in AI and its correlation to the traditional education system.
- Collaborated with Education department and created a zine to discuss its causes from the perspective of education system.
- Distributed the zines to professors of computer science department to advocate the incorporation of data ethics as part of the education principle.

### Cookies

- A prototype of communicational robots with simple information transmission and emotion representation to help people stay connected during pandemic.
- Wired the circuit on Arduino board and connected microphone, LED light, Bluetooth, rumble motor, and motion sensor.
- Implemented the visual representation of emotion perceived by microphone and the motion representation of user's gesture perceived by motion sensor.

### [Shadow Puppet](#)

- A role-playing maze computer game.
- Designed the game concept and method of playing as part of a team.
- Built physically realistic character control using Pygame and led the visual art design using Photoshop and Illustrator.
- Evaluated game experience and debugged the program which contribute to the finish of final version of the game.

### Simple CPU Construction

- Creation of simple CPU with a ROM for computer memory, a RAM for data memory, and a separate ALU circuit using VHDL.
- Achieved general mathematical calculation functionality.

## SERVICE

WatervilleCreates!, Waterville, ME

September 2021 - Present

3D Printing Volunteer

- Develop and lecture 3D printing workshops to local artists.
- Cooperate with artists and performers for collaborative artworks.

The Bridge, Colby College  
Co-Leader & Logistician

February 2019 - September 2021

- Cooperate with academic departments and external organizations to develop partnerships for LGBTQIA+ events.
- Organize yearly Transgender November and Pride Month with partners and negotiate on funding.

Coral Monitoring, Li Po Chun UWC

September 2016 - June 2018

Co-Leader & Data analyst

- Led group planning sessions for scuba diving and cooperated with 20+ students to collect data weekly.
- Processed and analyzed the collected numerical data of corals and contributed to coral watch online dataset.
- Partnered with World Wildlife Fund to deliver environmental education to thousands of students in Hong Kong.

## REFERENCES

[Ying Li](#)

- Colby College
- Assistant Professor, Department of Computer Science
- 5852 Mayflower Hill, Waterville, ME 04901
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