

## Changling (Xavier) Li

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[GitHub](#)

[xavierchanglingli.github.io](https://xavierchanglingli.github.io)

### RESEARCH INTERESTS

Machine Learning, Reinforcement Learning, Multi-agent Systems, Robotics, Computer Vision

### EDUCATION

[Colby College](#), Waterville, ME, USA

*B.A. Computer Science, Astrophysics*

2018 - 2022

GPA: 3.96/4.00

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

[Li Po Chun United World College](#), Hong Kong

IB Diploma: 41/45

### RESEARCH EXPERIENCE

Multi-agent Reinforcement Learning for Energy Efficient Trajectory Planning

*Department of Computer Science, Colby College*

January 2021 - Present

PI: Professor [Ying Li](#)

- Modified deep Q-learning Network model (DQN) to multi-agent DQN and assess the model with OpenAI Gym.
- Formulated case-specific reward function and create scalable environment for drones' trajectory planning.
- Trained the model with 9 agents and the trajectories of the drones are visualized and analyzed.
- Presented academic poster at 2021 Colby College Undergraduate Research Retreat.

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 using Panda, Numpy, Matplotlib 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 random 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

- Analyze and document 10+ relevant research paper.

- Develop theorems with proofs on generating Euler Diagram with given abstract description.

## ON-GOING RESEARCH PROJECT

Identification of Independent Moving Object in Curvilinear Self-motion  
*Department of Computer Science, Colby College*      October 2021 - Present  
 PI: Professor [Oliver W. Layton](#)

Comparison of Collaborative and Competitive Environment for Multi-Agent Reinforcement Learning  
*Department of Computer Science, Colby College*      September 2021 - Present  
 PI: Professor [Ying Li](#)

## POSTERS PRESENTATION

1. Changling Li, Jiyao Chen, Ying Li, *Reinforcement Learning for Energy-Efficient Trajectory Planning of Drone Networks*, 2021 Colby College Undergraduate Research Retreat.

## PUBLICATIONS

1. Under Construction...

## TEACHING EXPERIENCE

Department of Computer Science, Colby College      Spring 2019 - Present  
 Teaching Assistant

- CS 353: Interactive System.
- CS 251: Data Analysis and Visualization.
- CS 231: Data Structure and Algorithm.
- CS 152: Computational Thinking: Science.
- CS 151: Computational Thinking: Visual Media.

Department of Physics, Colby College      Fall 2019 - Spring 2021  
 Teaching Assistant

- PH 241: Modern Physics I.
- PH 242: Modern Physics II.

## SKILLS

- *Python*: Extensive expertise in the language and its usage for data analysis, visualization and machine learning.
- *Java*: Proficient in OOD, data structure and algorithms.
- *C, C++*: Built Arduino applications, familiar with data structure and algorithms.
- *JavaScript*: Intermediate level experience with full stack website development.

## PROJECTS

Chinese Digital Humanity Platform

- A public digital platform providing access to digital Chinese magazine database and an interface to analyze the digital humanities data.
- Designed and implemented the full stack website.
- Performed OCR for text recognition for both simplified and traditional Chinese.

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.

### HONORS PRIZES

1. UWC Davis Scholar
2. Dean's List F'18, S'19, F'19 (2020 and 2021 - cancelled due to COVID-19)

### SERVICE

The Bridge, Colby College Spring 2019 - Present  
Co-Leader & Logistician

- 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
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#### Hannen(Hannah) Wolfe

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[Oliver W. Layton](#)

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- Postdoctoral Researcher, Rensselaer Polytechnic Institute
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