

Haichen Dong

+86 189 8081 7322 • oscarhcdong@gmail.com • oscarhdc

Education

Shanghai Jiao Tong University, Shanghai, China

Sept. 2018 - Present

Bachelor of Engineering in Computer Science and Technology

- Member of **ACM Honors Class**, an elite program for the **top 5%** CS students at SJTU.
- GPA: **90.81/100**, Ranking: **6/33**.

Research Interests

My research interests lie in the area of **theoretical computer science**, with a focus on machine learning, optimization, and online algorithms. I aim to provide insights and establish theoretical guarantees for widely-applied algorithms.

Research Experiences

Department of Computer Science, Duke University

June 2021 - Present

Research Intern, advised by Prof. Rong Ge and Prof. Yu Cheng

- **Non-Convex Phase Retrieval against a Semi-Random Adversary**
 - Examined the landscape of non-convex optimization problems including matrix completion and phase retrieval under the semi-random setting, where an adversary can choose to reveal additional information.
 - Constructed a counter-example where spurious local optima can be created by adding a small fraction of observations while the empirical covariance matrix is not affected.
 - Proposed an optimization-based preprocessing algorithm to ensure the top eigenvector of the preprocessed intensity-weighted covariance matrix is close enough to the ground truth with high probability.

ITCS, Shanghai University of Finance and Economics

Aug. 2020 - May 2021

Undergraduate Researcher, advised by Prof. Pinyan Lu

- **Semi-Online Scheduling on Unrelated Machines with Optimum Makespan**
 - Reanalyzed the bounded greedy algorithm using a potential method and improved the upper bound from $\log_{1+1/\gamma}(\frac{\gamma}{\gamma-1}m)$ ($\gamma > 1$) to $\log_2 m + 1$.
 - Obtained a general lower bound of $\lfloor \log_2 m + 1 \rfloor$ on the hardness side together with an improved bound where the binary representation of m has no more than two '1' bits.
 - Solved this scheduling problem nearly optimally with only an additive gap of constant 1.

Selected Awards

Huawei Scholarship (Top 2% in SJTU)

2020

Shanghai Jiao Tong University

Zhiyuan Honorary Scholarship (Top 5% in SJTU)

2018, 2019, 2020

Shanghai Jiao Tong University





Finalist (Top 20 among over 1000 teams)

2021

KDD CUP 2021 City Brain Challenge

Silver Medalist <i>China Team Selection Competition for IOI 2018</i>	2017
The First Price <i>National Olympiad in Informatics in Provinces</i>	2016, 2017
Bronze Medalist <i>Asia and Pacific Informatics Olympiad</i>	2017

Selected Projects

Mx Compiler ,  <i>Oscardhc/MxSwift</i>	May 2020
<ul style="list-style-type: none"> • Coursework of "Compiler Design and Implementation". (Score 100/100) • A nearly complete compiler that compiles Mx*(a Java-like toy language) source code into RISC-V assembly. • Implemented LLVM Intermediate Representation and optimization passes like global value numbering, conditional constant propagation, function inlining, and loop optimization. The compiler outperformed GCC-O1 in most cases. 	
Wukefenggao ("No Comment"),  <i>Oscardhc/Forum</i>	Nov. 2020
<ul style="list-style-type: none"> • An anonymous forum for SJTU students with over 2000 active users. • Built fully-functional frontend and backend from scratch and published it on App Store. 	
Pintos ,  <i>Oscardhc/Pintos</i>	May 2020
<ul style="list-style-type: none"> • Coursework of "Operating System". (Score 30/30) • Implemented a simple OS framework for the 80x86 architecture supporting kernel threads, user programs, and a file system. 	
RISC-V CPU ,  <i>Oscardhc/RISC-V_CPU</i>	Jan. 2020
<ul style="list-style-type: none"> • Designed and implemented a 5-stage pipelined RISC-V CPU in Verilog HDL with branch prediction and instruction cache. • The CPU ran on an FPGA at over 120 MHz. 	

Teaching Experiences

Teaching Assistant Data Structure (CS 152), <i>Shanghai Jiao Tong University</i>	Spring 2020
<ul style="list-style-type: none"> • Co-built an Online Judge, redesigned group project assignments, and prepared exams. 	
Teaching Assistant Programming (CS 151), <i>Shanghai Jiao Tong University</i>	Fall 2019
<ul style="list-style-type: none"> • Prepared for programming exam problems and course assignments and gave lectures on specific topics. 	

Additional Skills

- **Programming Languages:** C/C++, Swift, Python, \LaTeX , Java, Wolfram Language, MATLAB.
- **Packages and Frameworks:** PyTorch, NumPy, UIKit, SwiftUI, Flask.