

# Davin Choo

Postdoctoral Fellow @ Harvard SEAS

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## EDUCATION

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NATIONAL UNIVERSITY OF SINGAPORE

Singapore

### Computer Science PhD

Aug 2021 – Nov 2024

- Advisors: Arnab Bhattacharyya and Seth Gilbert
- AI Singapore (AISG) PhD Fellow
- Awarded NUS School of Computing Research Achievement Award
- *PhD Thesis*: Learning Probabilistic and Causal Models with(out) Imperfect Advice

ETH ZÜRICH

Zürich, Switzerland

### Computer Science MSc

Jul 2020

- *Focus track*: Theoretical Computer Science
- *Masters Thesis* (Advisor: David Steurer)  
Studied the statistical-computational gap of sparse tensor PCA, and designed distinguishing & recovery algorithms

NATIONAL UNIVERSITY OF SINGAPORE

Singapore

### Computer Science and Mathematics Double Degree Programme

May 2016

- *Computer Science*: Completed focus areas in “Algorithms & Theory” and “Artificial Intelligence”
- *Mathematics*: Majored in Applied Mathematics with additional Mathematics courses such as graduate Recursion Theory
- *Honours*: First Class Honours in Computer Science, First Class Honours in Applied Mathematics, and Dean’s List (top 5%)
- *University Scholars Programme*: A selective (180 students) multidisciplinary academic programme for undergraduates  
Awarded President’s Honour Roll which recognizes outstanding academic accomplishments and student-led co-curricular activities
- *Computer Science Thesis* (Advisor: Seth Gilbert)  
Designed methods to maintain dynamic maximal independent sets  
Nominated for NUS Outstanding Undergraduate Researcher Prize (an annual, university-wide competition)
- *Mathematics Thesis* (Advisor: Frank Stephan)  
Studied notions of Kolmogorov complexity of binary strings in automata theory and CFGs

## AWARDS

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- *NUS School of Computing Research Achievement Award*: Awarded in 2023
- *AISG PhD Fellowship*: Awarded in 2021
- *President’s Honour Roll, USP Scholar*: Awarded in 2016
- *DSTA-DSO Undergraduate Scholarship*: Awarded in 2011

## PUBLICATIONS

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1. [Davin Choo](#), Chandler Squires, Arnab Bhattacharyya, David Sontag. *Probably approximately correct high-dimensional causal effect estimation given a valid adjustment set*. Conference on Causal Learning and Reasoning (CLeaR), 2025.
2. Arnab Bhattacharyya, [Davin Choo](#), Sutanu Gayen, Dimitrios Myrisiotis. *Learnability of Parameter-Bounded Bayes Nets*. AAAI Conference on Artificial Intelligence (AAAI), 2025. Also presented in ICML workshop Structured Probabilistic Inference & Generative Modeling (SPIGM), 2024.
3. [Davin Choo](#), Themistoklis Gouleakis, Chun Kai Ling, Arnab Bhattacharyya. *Online bipartite matching with imperfect advice*. International Conference on Machine Learning (ICML), 2024.
4. [Davin Choo](#), Yan Hao Ling, Warut Suksompong, Nicholas Teh, Jian Zhang. *Envy-free house allocation with minimum subsidy*. Operations Research Letters (ORL), 2024.
5. [Davin Choo](#), Kirankumar Shiragur, Caroline Uhler. *Causal discovery under off-target interventions*. International Conference on Artificial Intelligence and Statistics (AISTATS), 2024.
6. [Davin Choo](#), Joy Qiping Yang, Arnab Bhattacharyya, Clément L. Canonne. *Learning bounded degree polytrees with samples*. International Conference on Algorithmic Learning Theory (ALT), 2024.
7. Simina Brânzei, [Davin Choo](#), Nicholas Recker. *The Sharp Power Law of Local Search on Expanders*. Symposium on Discrete Algorithms (SODA), 2024.
8. Yuval Dagan, Constantinos Daskalakis, Anthimos-Vardis Kandiros, [Davin Choo](#). *Learning and Testing Latent-Tree Ising Models Efficiently*. Conference on Learning Theory (COLT), 2023.
9. [Davin Choo](#), Kirankumar Shiragur. *Adaptivity Complexity for Causal Graph Discovery*. Uncertainty in Artificial Intelligence (UAI), 2023.

10. Davin Choo, Kirankumar Shiragur. *New metrics and search algorithms for weighted causal DAGs*. International Conference on Machine Learning (ICML), 2023.
11. Davin Choo, Themistoklis Gouleakis, Arnab Bhattacharyya. *Active causal structure learning with advice*. International Conference on Machine Learning (ICML), 2023.
12. Davin Choo, Kirankumar Shiragur. *Subset verification and search algorithms for causal DAGs*. Artificial Intelligence and Statistics (AISTATS), 2023.
13. Davin Choo, Kirankumar Shiragur, Arnab Bhattacharyya. *Verification and search algorithms for causal DAGs*. Conference on Neural Information Processing Systems (NeurIPS), 2022.
14. Arnab Bhattacharyya, Davin Choo, Rishikesh Gajjala, Sutanu Gayen, Yuhao Wang. *Learning Sparse Fixed-Structure Gaussian Bayesian Networks*. Artificial Intelligence and Statistics (AISTATS), 2022.
15. Davin Choo, Tommaso d’Orsi. *The Complexity of Sparse Tensor PCA*. Conference on Neural Information Processing Systems (NeurIPS), 2021.
16. Mélanie Cambus, Davin Choo, Havu Miikonen, Jara Uitto. *Massively Parallel Correlation Clustering in Bounded Arboricity Graphs*. International Symposium on Distributed Computing (DISC), 2021.
17. Davin Choo, Christoph Grunau, Julian Portmann, and Václav Rozhoň. *k-means++: few more steps yield constant approximation*. International Conference on Machine Learning (ICML), 2020.
18. Davin Choo, Mate Soos, Kian Ming A Chai, and Kuldeep S Meel. *Bosphorus: Bridging ANF and CNF Solvers*. Design, Automation & Test in Europe Conference & Exhibition (DATE), pages 468–473. IEEE, 2019.
19. Jing Lim, Joshua Wong, Minn Xuan Wong, Lee Han Eric Tan, Hai Leong Chieu, Davin Choo, and Neng Kai Nigel Neo. *Chemical Structure Elucidation from Mass Spectrometry by Matching Substructures*. Machine Learning for Molecules and Materials (MLMM, a NeurIPS Workshop), 2018.

## PREPRINTS

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1. Jia Peng Lim, Davin Choo, Hady W. Lauw. *A partition cover approach to tokenization*, 2025. Preprint available at <https://arxiv.org/abs/2501.06246>.
2. Arnab Bhattacharyya, Davin Choo, Philips George John, Themistoklis Gouleakis. *Learning multivariate Gaussians with imperfect advice*, 2024. Preprint available at <https://arxiv.org/abs/2411.12700>.
3. Davin Choo, Chun Kai Ling. *A short note about the learning-augmented secretary problem*, 2024. Preprint available at <https://arxiv.org/abs/2410.06583>.

## PROFESSIONAL SERVICE

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- Reviewer for Conference on Neural Information Processing Systems (NeurIPS), 2024; **Top reviewer**
- Reviewer for International Conference on Machine Learning (ICML), 2024
- Reviewer for International Joint Conference on Artificial Intelligence (IJCAI), 2024
- Reviewer for International Conference on Artificial Intelligence and Statistics (AISTATS), 2024
- Subreviewer for Innovations in Theoretical Computer Science (ITCS), 2024
- Reviewer for Conference on Neural Information Processing Systems (NeurIPS), 2023; **Top reviewer**
- Subreviewer for Symposium on Theory of Computing (STOC), 2023
- Subreviewer for International Colloquium on Automata, Languages, and Programming (ICALP), 2023
- Reviewer for International Conference on Artificial Intelligence and Statistics (AISTATS), 2023
- Subreviewer for Conference on Learning Theory (COLT), 2022
- Subreviewer for Scandinavian Symposium and Workshops on Algorithm Theory (SWAT), 2022
- Subreviewer for European Symposium on Algorithms (ESA), 2020

## TEACHING

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NATIONAL UNIVERSITY OF SINGAPORE

**Teaching Assistant — GET1031, GEI1000**

Singapore

Aug 2021 – Dec 2021

- Collaborated with 2 faculty members on refining teaching materials and pedagogies to suit student needs
- Led discussion groups for a total of 64 students on the topic of computational thinking

NATIONAL UNIVERSITY OF SINGAPORE

**Teaching Assistant — CS1101S, CS1231, CS2020, CS3230, CS4344, GET1031**

Singapore

Aug 2012 – May 2016

- Collaborated with over 8 faculty members on refining teaching materials and pedagogies to suit student needs

- Led discussion groups for a total of 86 students across 6 different courses on topics including programming methodology, computational thinking, data structures and algorithms, design and analysis of algorithms, and discrete structures
- Averaged a feedback score of 4.7/5 across all tutored courses (faculty average: 4.16/5) with 15 nominations for Best Teaching

NATIONAL UNIVERSITY OF SINGAPORE

Singapore

**University Scholars Programme (USP) Mentor**

Aug 2012 – May 2016

TEMASEK JUNIOR COLLEGE

Singapore

**Course Instructor**

Jan 2014 – May 2014

- Initiated a student outreach programme to encourage young students to explore the field of Computer Science

## WORK EXPERIENCE

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HARVARD UNIVERSITY

Cambridge, Massachusetts

**Postdoctoral Fellow (in Teamcore with Milind Tambe)**

Dec 2024 – Present

ETH ZÜRICH

Zürich, Switzerland

**Post-diplomand (Post-graduate research position, with David Steurer)**

Aug 2020 – Mar 2021

DSO NATIONAL LABORATORIES

Singapore

**Research Scientist — Information Exploitation Lab (IEL)**

Jun 2016 – Sep 2018

- Applied AI techniques to security related problems, including cryptanalysis, SAT solving and reverse engineering

DSO NATIONAL LABORATORIES

Singapore

**Research Intern — Cognitive Fusion Lab (CFL)**

May 2013 – Jul 2013

- Worked on a research project to improve the performance of speech-to-text recognition

DEFENCE SCIENCE & TECHNOLOGY AGENCY (DSTA)

Singapore

**Research Intern — C4I development (PC8)**

Feb 2011 – May 2011

- Designed an in-house Unmanned Aerial Vehicle (UAV) algorithm that maps image points to actual geolocation coordinates

## ADDITIONAL INFORMATION

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- Visiting PhD student of Bernhard Schölkopf at Empirical Inference group of Max Planck Institute for Intelligent Systems: Summer 2023
- Visiting graduate student to the Simons Institute for the Theory of Computing under the Causality programme: Spring 2022
- *Languages/Technologies*: Java, C++, Python, Javascript, MiniZinc, C, C#, Scheme (Basic), Prolog (Basic)
- *Computer Science UROP*: Worked on a reductionist approach to computer vision with applications in robot grasping with uncertainty
- *(Class project) RoCoCo*: Used constraint programming to design a web-based round robin tournament scheduling algorithm
- *(Class project) Poker AI Bot*: Implemented a 2 Player Limit Texas Hold 'em Poker bot using Monte Carlo Tree Search techniques
- *(Class project) Robust Airport Scheduling*: Devised and analysed algorithms for airport gate scheduling. Solution was robust enough to minimise collisions when random delays were introduced to perturb a dataset of actual departure and arrival times