

EDUCATION

NATIONAL UNIVERSITY OF SINGAPORE Singapore
Computer Science and Mathematics Double Degree Programme Aug 2011 - May 2016
Bachelor of Computing (Computer Science) First Class Honours
Bachelor of Science (Applied Mathematics) First Class Honours

- *Computer Science*: 4.7/5 GPA; completed focus areas in “Algorithms & Theory” and “Artificial Intelligence”
- *Mathematics*: 4.5/5 GPA; majored in Applied Mathematics with additional Mathematics courses such as graduate Recursion Theory
- *Honours*: Dean’s List (top 5%), First Class Honours in Computer Science, and First Class Honours in Applied Mathematics
- *Valedictorian finalist*: One of the 3 final candidates to be considered for Valedictorian of School of Computing
- *Computer Science Thesis*: Designed methods to maintain dynamic maximal independent sets
Nominated for NUS Outstanding Undergraduate Researcher Prize (an annual, university-wide competition)
Dynamic Graph Problems (Advisor: Seth Gilbert)
Abstract We designed eager methods (with amortized bounds) and lazy methods (with worst case bounds) to maintain maximal independent sets (MIS) in dynamic graphs, where changes may occur in the graph of interest. Properties of special graphs such as planar graphs and bounded arboricity graphs were exploited and we also considered approximate/error-tolerant methods for maintaining MIS. We conjectured that the lower bound of for maintaining MIS in dynamic graphs is $\Omega(deg(u))$.
- *Mathematics Thesis*: Studied notions of Kolmogorov complexity of binary strings in automata theory and CFGs
Automatic complexity (Advisor: Frank Stephan)
Abstract We studied notions of Kolmogorov complexity of binary strings in automata theory and context free grammars. We proved upper and lower bounds for general strings and studied 5 specific classes of binary strings. In particular, one of the new results proved was that the infinite Morse-Thue sequence has a constant complexity in our complexity definition.
- *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
- *Student Exchange Programme*: University of North Carolina at Chapel Hill in Fall semester of 2013

TEMASEK JUNIOR COLLEGE (HIGH SCHOOL) Singapore
Singapore-Cambridge GCE ‘A’ Levels Jan 2006 - Dec 2008

- *National Olympiad in Informatics*: Singapore’s rendition of International Olympiad in Informatics (IOI). Bronze medal (2008)
- *Taiwan Immersion Programme*: Selected to participate in a national-level academic exchange programme with Taiwan in 2007
- *Information Technology Club*: Club Secretary; Won 2nd runner-up in TwentyFour (a national video making competition) with club

DUNMAN HIGH SCHOOL (SECONDARY SCHOOL) Singapore
Singapore-Cambridge GCE ‘O’ Levels Jan 2002 - Dec 2006

- *Gifted Education Programme (GEP)*: See <https://www.moe.gov.sg/education/programmes/gifted-education-programme>
- 汉语水平考试 *Chinese Proficiency Test (HSK)*: Obtained Grade A at Intermediate level in 2005

EXPERIENCE

DSO NATIONAL LABORATORIES Singapore
Defence Scientist — Cognitive Fusion Lab (CFL) Jun 2016 – Present

- Applied A.I. techniques to security related problems in military contexts, including cryptanalysis, SAT solving and reverse engineering
- Studied, designed and analyzed pruning methods to explore huge search spaces in domains including chemistry and circuit verification

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 for military applications
- Constructed a novel technique that uses High Order Semi-Conditional Random Field (HOSemiCRF) to improve accuracy
- Extracted and built features in a test dataset that attempts to transcribe a conversations with multiple speakers in a meeting

NATIONAL UNIVERSITY OF SINGAPORE Singapore
Research Assistant — SeSaMe (Augmented Reality Library) Aug 2012 – Dec 2012

- Worked in a team to build an augmented reality library system on mobile devices
- Designed a framework and protocol to interface mobile devices with the server and communicated it to other engineers
- Developed an algorithm that identifies spatial coordinates and orientation of user within a building using visual landmarks

DEFENCE SCIENCE & TECHNOLOGY AGENCY (DSTA) Singapore
Research Intern — C4I development (PC8) Feb 2011 – May 2011

- Worked with other engineers to harness and exploit science and technology to meet the defence needs of Singapore
- Designed an in-house Unmanned Aerial Vehicle (UAV) algorithm that maps image points to actual geolocation coordinates
- Generated test datasets to verify correctness of the developed algorithm with commercial software as ground truth

NATIONAL SERVICE (NS) Singapore
Statutory uniformed service for all male Singaporean citizens Dec 2008 – Dec 2010

- Participated in three joint military exercises; Participated in National Day Parade 2010 as part of the 12,000-strong contingent

TEACHING AND SERVICE

NATIONAL UNIVERSITY OF SINGAPORE

Singapore

Teaching Assistant — CS1101S, CS1231, CS2020, CS3230, CS4344, GET1031 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
- Sample anonymous feedbacks
 - CS1231 Discrete Structures
 - * He is very knowledgeable on the subject but is still able to look at the subject from our perspective, thus he is able to provide very good explanations. As what we are learning in this module is an entirely new thing for most people, the explanations are crucial and a good explanation will help students a long way. He provides a recap of the subject material at the start of every tutorial which is very helpful as it sets the tone for the tutorial and it also serves as a quick revision of the content material. He goes out of his way to help students by holding extra consultation sessions on weekends and during recess/reading week, as well as giving individual feedback on our midterms. Most people are able to glean more by engaging in one-to-one consultations, thus these consultation sessions are very effective as the feedback and answers are more personalised.
 - * He is very dedicated in helping us and ensuring that we have understood the various concepts that are being taught. His teaching style is also very good as he provides a recap of the topic at the start of every tutorial, which serves as a mini-refresher and revision. He goes beyond what is required of him by holding consultations every Saturday, as well as booking an entire classroom for consultation during both the recess week and reading week. This allows students to clarify stuff which they are unsure of in a more private environment, which is definitely more effective compared to the classroom setting. During the reading week consultation, he had also gone through the past year papers and thus provided the solutions for us to check our own answers against. This was extremely helpful since there was a dearth of practice questions with answers for the module outside of the tutorial questions. After our midterms, he also made the effort to go through our midterm paper with us one-on-one, pointing out our mistakes and helping us understand why we had gotten a particular question wrong. For some questions, he made us try it again before providing the solutions; this was helpful as it forced us to think instead of simply listening to him give the answers. Overall, he is very knowledgeable on the subject and very good at bringing his point across, as well as being very dedicated to ensure that we have successfully grasped the concepts.
 - CS2020 Data Structures and Algorithms (Accelerated)
 - * His dedication. Davin emphasizes on learning and provides additional questions for his DG group. He teaches his students to how to approach and solve a problem rather than merely providing the solution. Davin also goes beyond his duty as a TA. He holds weekly consultation for a whole day in his own free time. This is testament to his commitment towards helping his juniors to learn more about the module. On top of that, he organises DG outings and set up a chat group for his students to network with other students, providing support and structure for peer learning. On the whole, he is an excellent teacher, senior and friend. He is the best TA I have met and will ever meet.
 - CS3230 Design and Analysis of Algorithms
 - * Able to convert hard concepts to a very intuitive manner. Very caring and provides a lot of feedback.
 - * Best tutor I have met for a computing module. Very dedicated to his job as a tutor such that he entertains questions after class. Patient and yet keen to teach more than what we need to know. Always offers his opinion regarding our learning material and wants the best for his students. Keep it up!

NATIONAL UNIVERSITY OF SINGAPORE

Singapore

University Scholars Programme (USP) Mentor

Aug 2012 – May 2016

- Helped first-year USP students navigate through a variety of academic requirements and placated their various concerns
- Set up a cohesive network for Computer Science students in the USP where juniors easily seek advice and mingle
- Met up regularly with juniors to ensure their well-being and connect them with appropriate seniors and/or faculty members

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
- Planned and conducted 11 sessions of enrichment courses that teaches computational thinking and problem-solving
- Concluded the course with 7 students expressing further interest in game development

TEMASEK JUNIOR COLLEGE

Singapore

Junior College Student

Jan 2006 - Dec 2008

- *Mazarin Project - Peer Tutoring Scheme*: Facilitated and helped out as a peer tutor to juniors who require academic assistance
- *Project Collection in Aid of the Needy (Project C.A.N.)*: Spearheaded and coordinated a class community service project in 2008
- *Overseas Outreach 2007 (Prey Veng, Cambodia)*: Built a library, dug wells, conducted classes and interacted with village locals

ADDITIONAL INFORMATION

- *DSTA-DSO Scholarship*: Awarded in 2011
- *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
- *RoCoCo*: Used constraint programming to design a web-based round robin tournament scheduling algorithm
- *Poker AI Bot*: Implemented a 2 Player Limit Texas Hold'em Poker bot using Monte Carlo Tree Search techniques
- *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