Dan Tan

| **sjtan@uwaterloo.ca** | **https://dantan.me/** | **https://github.com/dantan123** |

EDUCATION

University of Waterloo (Waterloo, CA) **September 2015 – October 2020**

Civil Engineering, Honours BASc (w/ graduate-level coursework)

- **Relevant Courses:** Algorithms & Data Structures, Optimization, Pattern Recognition, Traffic Simulation/Modelling
  - Systems Programming & Concurrency: Implemented asynchronous network and multi-threaded programs (synchronization patterns, deadlock detection & recovery, file systems) using C in Linux environment
  - Databases & Software Design: Designed and built 3-tier web applications using Ruby on Rails; Designed relational database schemas and wrote queries using SQL; Gained exposure with agile methodologies, CI/CD, TDD, design patterns (SOLID) & antipatterns
  - Artificial Intelligence: Utilized Python & libraries (Pandas, Scikit-learn, TensorFlow) to create AI models through techniques including minimax, model checking, Bayesian network, HMM, simulated annealing, backtracking search, random forest, SVM, Q-learning, CNN & RNN, sentiment analysis, and skip-gram

University of Leeds (Leeds, UK) **January – June 2019**

- **Computational Fluid Dynamics Project:** Investigated the effects of fluid flow and heat transfer in microchannels through the finite volume method (MATLAB & Ansys Fluent)

SAMPLE PROJECTS

- **Dungeons & Dragons:** Developed a full-stack D&D app that helps users manage spellbooks (Ruby on Rails)
  - **URL:** https://dd-spellbooks.herokuapp.com
- **Crossword:** Wrote an AI that generates and solves crossword games through backtracking & heuristics (Python)
  - **URL:** https://github.com/dantan123/AI/tree/master/crossword
- **Traffic:** Created a CNN model that classifies and predicts traffic signs with 97% accuracy (TensorFlow)
- **Fifth Grader:** Designed a math game UI with various operations and difficulty levels (React)
- **Web Crawler:** Implemented asynchronous I/O with cURL for web crawling PNG files (C)

EXPERIENCE

Research Assistant – Hydrologic Model Development & Analysis

Water Institute, Waterloo **April – August 2018**

- Modified the subroutines of the hydrologic model **–** MESH in collaboration with researchers and developers at the University of Saskatchewan
- Performed model validation through different geographical soil data to test and improve model accuracy
- Reviewed research journals of the numerical interflow and infiltration algorithms as well as statistical flood farecasting methodologies
- Presented the research summary at the 2018 Canadian Geophysical Union Conference (CGU) in Niagara Falls
- Conducted statistical and time series analysis of hydrologic data by utilizing regression, ARIMA, and dynamic time warping techniques through R
- https://github.com/dantan123/pattern_recognition/blob/master/dynamic_time_warping/DTW%20Review.pdf/

Technical Intern

Simpson Gumpertz & Heger, San Francisco **September – December 2019**

- Developed and presented algorithmic flowcharts and decision trees based on engineering documentation and specifications, thus helping to pinpoint minimal standard requirements to clients
- Identified and investigated engineering (building enclosure) design issues and revised architectural drawings based on underlying scientific principles, in collaboration with senior project consultants and managers
- Displayed effective written/verbal communication and organizational abilities by drafting 10+ technical reports and verifying product submittals based on shop drawings and datasheets

Project Coordinator
EllisDon – Ottawa Light Rail Transit Project, Ottawa **September – December 2017**

- Documented meeting minutes and detailed daily progress by interfacing with subcontractors, QA personnel, consultants and engineers in a 200+ people team
- Tracked project progress and updated weekly schedules to meet changing priorities
- Verified material quantities (estimating) and invoices as well as creating lists of necessary submittal items for cost control, successfully reducing the project closure phase

Structural Modelling Intern
HongRun Construction Group, Shanghai **February – April 2017**

- Built structural models and evaluated the model output with respect to the building code
- Drafted structural dimensions and details through AutoCAD

LEADERSHIP

Hult Prize Waterloo Finalist – Craft Collective (For Us, By Us)

- Conducted in-depth research, survey, and analysis of rural unemployed female youth in developing countries
- Selected as one of the top 8 finalist teams to pitch youth unemployment solutions out of 20+ teams
- **URL:** https://uwaterloo.ca/conrad-school-entrepreneurship-business/news/student-entrepreneurs-pitch-solutions-youth-unemployment

UW EWB Podcast – Ideas Without Borders

- Advocated systems-thinking to engineers and university students through podcasts
- **Topics:** Feedback loops, big data, biases & heuristics, sustainable transportation, and healthy food options
- **URL:** https://anchor.fm/uwaterlooewb/

Tennis Canada Instructor

- Implemented Tennis Canada's "Learn to Play" curriculum for teaching starter players serve, rally, and score
- Effectively lead students by presenting clear visual demonstrations and concise explanations as well as providing positive feedback for tactical and technical improvements
- Set up and organized games and practices while maintaining a safe and fun environment

UW Varsity Tennis

- Selected as one of the top 9 roster players and successfully managed to balance academic workload while committing to 10 hrs of training per week
- **URL:** https://athletics.uwaterloo.ca/sports/mens-tennis/roster/2018-19

Stepping Stones English Teacher

- Taught weekly a class of 15+ migrant children in rural Shanghai and prepared interactive learning materials and exercises to increase English test score

Emmaus Leeds

- Fundraised for the UK Emmaus branch through jailbreak hitchhike from Leeds to Cologne, Germany
- **URL:** https://emmaus.org.uk/leeds/students-complete-jailbreak-hitch-for-emmaus-leeds/

TECHNICAL SKILLS

- **Languages:** C++, C, Python, R, MATLAB, SQL, HTML, CSS, JavaScript, Ruby
- **Frameworks and Libraries:** Rails, React, Bootstrap, Pandas, Scikit-learn, TensorFlow
- **Tools:** Git, Valgrind & Helgrind, RSpec, unittest