Ryan Y.W Tan

Undergraduate Researcher, Analyst

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Summary

Ryan is a final year mechanical engineering undergraduate from the National University of Singapore, with a strong interest in research on complex adaptive systems for policy/planning. He has worked as a research assistant in various research centres conducting case studies in the Asian context with regards to water resource management, disaster resilience, livelihood systems, urban connectivity and accessibility. Additionally, he is experienced in white box modelling techniques such as system dynamics, geographical information systems and network analysis.

Education

National University of Singapore (NUS)   Singapore
B. Eng. Mechanical Engineering, Honours (Highest Distinction), CAP: 4.63/5.00   Aug 18 – Present
- University Town College Programme: Systems Thinking/ System Dynamics
- Modules: Mechanical Engineering, Urban Planning, Policy, Philosophy

Nanyang Technological University (NTU)   Singapore
Singapore Universities Student Exchange Programme   Jan 21 – May 21
- Modules: Pattern Recognition and Machine Learning, Network Analysis, Data Science, Sensing Systems

Hanyang University (HYU)   Seoul, Korea
International Summer School   July 19
- Modules: Fluid Mechanics, Engineering and Society, Project Management

Research Experience

Residential College 4, National University of Singapore (NUS)   Singapore
Social Network Analysis Research Assistant   Nov 21 – Present
- "Disciplinary diversity within the University Town College Programme: a case study of Residential College 4"
  - Topics: Social Network Analysis, Cross-Disciplinary Mixing, Transferability

Department of Mechanical Engineering, National University of Singapore (NUS)   Singapore
B.Eng Dissertation (SP: Prof Marcelo H. Ang, Jr)   Aug 21 – Present
- "Implementation and Comparison of Mobile Robot Localisation Techniques"
  - Topics: Computer Vision, Graph Algorithms, Graph Optimization

13th International Space Syntax Symposium, with UCL Space Syntax   International
Spatial Data Researcher   Apr 21 – Present
- "Expanding on Connectivity Graphs (J-Graphs) to analyse Spatial Configurations in Complex Buildings"
- "Using popular mobile games and gameplay as an interface to teach spatial logic and build spatial intuition to diploma-level, vocational school students"
  - Topics: Spatial Networks, Network Layouts, Teaching Pedagogy, Design Thinking

International Centre for Integrated Mountain Development (ICIMOD)   Nepal/Singapore
System Dynamics Researcher (PI: Dr Erica Udas, Dr Arabinda Mishra)   Jan 21 – Present
- "Uncovering Resilience Markers in social-ecological livelihood systems"
  - Topics: Policy Analysis, Livelihood Systems, Value Chain Management, System Dynamics

Institute of Water Policy (IWP), Lee Kuan Yew School of Public Policy   Singapore
Public Policy Research Assistant (PI: Dr Cecilia Tortajada)   May 20 – Nov 20
- Responsibilities include Text Mining & Analysis, Systematic Reviews, Case Studies
  - Topics: Discourse Analysis, Sustainability Reporting, Water Management, Structured Topic Modelling

National University of Singapore (NUS)   Singapore
System Dynamics Research Student (SP: Prof Robert Wasson, Dr Navarun Varma)   Nov 19 – Dec 20
- "System dynamics across three scales in the Brahmaputra River Basin - Exploring a Himalayan social-hydrological system"
  - Topics: Policy Analysis, Social-ecological Systems, Disaster Resilience, System Dynamics

Professional & Work Experience _____

Spatial Design Proposal for GEMS World Academy   Singapore
Spatial Design Analyst - Inully Architecture Design Studio + CIAP Architects, Bescon, ARUP   Jan 21 – Apr 21
- Planned the new campus through analysing multi-scale connectivity and functionality of spaces

Centre for Liveable Cities (CLC), Ministry of National Development   Singapore
Intern/Research Assistant - Complexity Science Team (SP: Dr Limin Hee)   Jul 20 – Jan 21
- Supported projects aimed to bridge knowledge and foster discussions between stakeholders and agencies
- Conducted urban geospatial (GIS) modelling and analysis for government agencies
- Designed a spatial network model (Space Syntax) and conducted analysis on choice accessibility on multiple scales

17 C4I Battalion, Singapore Armed Forces   Singapore
Signal Operator and Armourer in Charge (National Service)   April 16 – Feb 18
- Managed vehicular communcations for an active battalion and was presented with the batch's best detachment award

Teaching Experience _____

_MODULES
12DS3I - Design Research Studio, 12DAI - Data Analytics for Design   Singapore
School of Design and Environment, Ngee Ann Polytechnic   Jan 21 – Aug 21
Co-Lecturer/ Course Developer – Diploma in Design (Product Innovation/Architecture)

DSA4264 - Sense-making Case Analysis: Public Policy and Society   Singapore
Department of Statistics, National University of Singapore   May 20 – Nov 20
Support: Mined Data and Code used as Teaching Material

ME1102 - Engineering Principles and Practice 1   Singapore
Faculty of Engineering, National University of Singapore   Aug 19 – Nov 21
Teaching Assistant – Mechanical Engineering

_WORKSHOPS & GUEST LECTURES
Spatial Analysis Workshop for Final Year Module - "Atelier Space, Inclusion & Belonging"   Singapore
School of Architecture and the Built Environment, Singapore Polytechnic + Lee Kuan Yew School of Public Policy   Nov 21, Dec 21
Guest Lecturer & Critique – Diploma in Design (Interior Design)

Modelling Techniques for Seminar **-** "Navigation in Singapore Waters - Bridges and Barriers"   Singapore
Residential College 4, National University of Singapore   May 20, May 21
Guest Speaker for UTS2708/ UTC2717 (NUS), a module on Systems Thinking and Water Policy

Articles & Publications _____

System dynamics across three scales in the Brahmaputra River Basin- Exploring a Himalayan social-hydrological system
Ryan Tan, Navarun Varma, Robert Wasson, Shukla Archajee. (2021). *2021 International System Dynamics Conference Proceedings.*

Making the most out of every drop of Singapore's water
Cecilia Tortajada, Ryan Tan**.** (2020, Nov 25). *The Business Times.* [Opinion Piece].

_Pending Papers
Expanding on Connectivity Graphs (J-Graphs) to analyse Spatial Configurations in Complex Buildings
Ryan Tan, Genevieve Shaun Lin, Luther Seet**.** (2022). *13th Space Syntax Symposium.* [Submitted].

Using popular mobile games and gameplay as an interface to teach spatial logic and build spatial intuition to diploma-level, vocational school students
Ryan Tan, Genevieve Shaun Lin**.** (2022). *13th Space Syntax Symposium.* [Submitted].

Community Involvement _____

South Asian Studies, Faculty of Arts & Social Science, National University of Singapore
- Research work on the Brahmaputra River Basin (BRB) presented at a university-wide webinar

2021 International System Dynamics Conference
- Presenter and Reviewer for the biggest conference on System Dynamics and Systems Thinking

School of Design and Environment, Ngee Ann Polytechnic
- Advised collaborative evidence-based design projects with industry partners: National Environment Agency, Jalan Besar Town Council, City Sprouts, Red Cross, Yong En Care Centre
- Projects aimed to rejuvenate and develop public spaces - Parks, Playgrounds, Void Decks, Gardens, Urban Farms, etc

Self-Initiated Projects & Writings

Slopes, A Hidden Weight of Accessibility	*https://ryantanyiwei.wixsite.com/blog/slopes*
Hawker Centres: Morning Markets or Supper Spots?	*https://ryantanyiwei.wixsite.com/blog/hawker-centres-time*
20 Minutes Neighbourhood Analysis of East Coast	*https://ryantanyiwei.wixsite.com/blog/20-mins-neighbourhood*
Space Syntax Connectivity Graph Web App	*https://rtyw.shinyapps.io/igraph/*
Spatial Configurations of Singapore's Street Networks	*https://ryantanyiwei.wixsite.com/blog/spatial-configuration*
Visibility Analysis of Among Us' Skeld	*https://ryantanyiwei.wixsite.com/blog/visibility-among-us*

Certifications

Syntax_101 (Space Syntax)	Jun 21
Syntax_202 (Space Syntax)	May 21
AnalyticsX: Big Data Analytics	Jun 20
Solid Edge 2019 Certified Associate II	Aug 19

Skills

- System Dynamics Modelling (Vensim)
- Spatial/Social Network Modelling (Space Syntax, SNA)
- Geographic Information Systems (QGIS)
- CAD Software (SolidWorks, Solid Edge, SketchUp)
- o **Languages:** English (Native), Chinese Mandarin (Fluent)

- R, Python & C Programming
- Packages/ Frameworks: ggplot2, dplyr, rvest, selenium, quanteda, stm, igraph, rdepthmap, sp, rgdal, shiny, pandas, numpy, sklearn, pytorch, opencv, ROS