

# Ryann Sim Wei Jian

ENGINEERING SYSTEMS AND DESIGN  
SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN  
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## Profile

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I am a fourth year Ph.D. student at SUTD in the Engineering Systems and Design pillar, with a particular research interest in learning in games. Through research and industry experience, I am looking to utilize game theory, optimization and economics to better understand the mechanisms of real-life processes and networks.

## Education

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### Singapore University of Technology and Design

PH.D., ENGINEERING SYSTEMS AND DESIGN

Singapore

Sep. 2019 - Exp. Sep 2023

- Awarded SUTD President's Graduate Fellowship

### Singapore University of Technology and Design

B.E., ENGINEERING SYSTEMS AND DESIGN (SUMMA CUM LAUDE)

Singapore

May 2016 - Aug. 2019

- Awarded Wilmar Scholarship
- Focus Track : Operations Research

## Publications

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- [1] Stratis Skoulakis, Tanner Fiez, Ryann Sim, Georgios Piliouras, and Lillian Ratliff. Evolutionary game theory squared: Evolving agents in endogenously evolving zero-sum games. In *AAAI Conference on Artificial Intelligence*, 2021.
- [2] Tanner Fiez, Ryann Sim, Stratis Skoulakis, Georgios Piliouras, and Lillian Ratliff. Online learning in periodic zero-sum games. *Advances in Neural Information Processing Systems*, 34, 2021.
- [3] Ryann Sim, Stratis Skoulakis, Lillian J Ratliff, and Georgios Piliouras. Fast convergence of Optimistic Gradient Ascent in network zero-sum extensive form games. In *International Symposium on Algorithmic Game Theory*. Springer, 2022.
- [4] Georgios Piliouras, Ryann Sim, and Stratis Skoulakis. Beyond time-average convergence: Near-optimal uncoupled online learning via Clairvoyant Multiplicative Weights Update. *Advances in Neural Information Processing Systems*, 35, 2022.
- [5] Georgios Piliouras, Rahul Jain, and Ryann Sim. Matrix Multiplicative Weights Updates in quantum zero-sum games: Conservation laws & recurrence. *Advances in Neural Information Processing Systems*, 35, 2022.
- [6] Wayne Lin, Georgios Piliouras, Ryann Sim, and Antonios Varvitsiotis. Game dynamics and quantum bilinear optimization. Submitted to QIP 2023.

## Undergraduate Research Experience

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### Data Driven Robust Portfolio Optimization

UNDERGRADUATE RESEARCH OPPORTUNITY PROGRAM, SUTD

Singapore

Jan. 2019 - Sep. 2019

- The project uses asset returns data to create a robust portfolio optimization model that performs better than the standard minimum-variance portfolio.

### **Predicting Driver State & Environment with LSTM**

Singapore

UNDERGRADUATE RESEARCH OPPORTUNITY PROGRAM, SUTD

Jan. 2018 - Jul. 2018

- Extending upon previous work done on binary classification of 6-second epochs of driver micro-glances, we sought to explore categorical classification using RNN and LSTM. We also explored vector embedding to convert macro glances into vector-based interpretations.

### **Augmented Human (Asian Leadership Program)**

Hangzhou, China

INTERNATIONAL DESIGN CENTER, ZHEJIANG UNIVERSITY

Sep. 2016 - Mar. 2017

- Designed an indoor navigation API called JANUS using Android Studio and Python that shows the path to an indoor destination as an augmented reality display on users' mobile phones.

### **Autonomous Unmanned Aerial Vehicle with Innovative Obstacle**

Singapore

### **Avoidance and Operation in Low Light Conditions (SAFMC)**

UNDERGRADUATE RESEARCH OPPORTUNITY PROGRAM, SUTD

Sep. 2016 - Mar. 2017

- Created a semi-autonomous drone with proprietary GPS navigation and high structural strength. Used the drone in the Singapore Amazing Flying Machine Competition 2017.

## **Professional Experience**

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### **British Petroleum Singapore**

Singapore

CORE DATA STRATEGY INTERN

May 2018 - Aug. 2018

- Implemented quarterly charts, navigation widgets and bug fixes in Python and HTML for a price dashboard used by traders globally.
- Developed and deployed an easy-to-use Python module that allows shiptrackers to perform logical checks on multi-source information, and create their own checks if required. Currently used across three benches in BP Singapore.

### **British Petroleum Business Service Centre Malaysia**

Kuala Lumpur, Malaysia

MASTER DATA MANAGEMENT INTERN

Nov. 2015 - Mar. 2016

- Organized HR records for over 300 employees working in the Business Service Centre using Excel VBA.

## **Teaching Experience**

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### **Teaching Assistant, 40.012 Manufacturing and Service Operations**

Singapore

ENGINEERING SYSTEMS AND DESIGN, SUTD

Spring 2021

- Ran tutorial sessions and organized project meeting sessions.

### **Teaching Assistant, 40.015 Simulation Modeling and Analysis**

Singapore

ENGINEERING SYSTEMS AND DESIGN, SUTD

Fall 2020

- Ran tutorial sessions and provided project mentorship.

### **Teaching Assistant, 40.014 Engineering Systems Architecture**

Singapore

ENGINEERING SYSTEMS AND DESIGN, SUTD

Spring 2019

- Helped students during office hours, helping improve their skills in Capella and R.
- Mentored students for their respective final projects, which involved designing an educational game using systems design rules.

### **Instructor, Introduction to $\text{\LaTeX}$**

Singapore

INDEPENDENT ACTIVITY PERIOD, SUTD

21 Jan. 2019

- Helped create material and teach a class to help 35 participants learn how to use  $\text{\LaTeX}$  in their research and coursework.

### **Teaching Assistant, 10.004 Advanced Mathematics II**

Singapore

CLUSTER OF SCIENCE AND MATH, SUTD

Fall 2018

- Guided first-year students in the course, which focused on Multi-variable Calculus and Ordinary Differential Equations

**Instructor, Freshmore Learning Hub**

Singapore

SCIENCE AND MATH CLUSTER, SUTD

Fall 2018

- Taught various topics in Multi-variable Calculus and Ordinary Differential Equations, in supplement to the material taught in 10.004.

**Teaching Assistant, 10.007 Modelling the Systems World**

Singapore

SCIENCE AND MATH CLUSTER, SUTD

Spring 2018

- Guided first year students in course material that spanned various topics in Systems Modelling and Systems Optimization.
- Held review sessions before exams and ran a  $\text{\LaTeX}$  workshop to help students prepare for report submissions.

**Teaching Assistant, 3.007 Introduction to Design**

Singapore

SCIENCE AND MATH CLUSTER, SUTD

Fall 2017

- Mentored first-year students while they were designing their respective products, with a focus on design thinking.

**Teaching Assistant, 10.001 Advanced Mathematics I (BootCamp)**

Singapore

SCIENCE AND MATH CLUSTER, SUTD

Summer 2017

- Assisted students who had previously failed the course, helping them understand concepts in Differentiation and Integration.
- Graded homework assignments to ensure students understood material and stayed on track.

**Instructor, Introduction to HTML and CSS**

Singapore

INDEPENDENT ACTIVITY PERIOD, SUTD

9 Jan. 2017

- Helped instruct a class that sought to help participants learn how to create their own website.

## Honors & Awards

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2019	<b>President's Graduate Fellowship</b> , SUTD	Singapore
2019	<b>Meritorious Winner</b> , COMAP Interdisciplinary Contest in Modeling (ICM) Problem D	Singapore
2017	<b>Best Video Award, 1st Position</b> , Singapore Amazing Flying Machine Competition 2017 (Category D Semi-Autonomous)	Singapore
2016	<b>Math II Honors Class (Linear Algebra)</b> , Faculty of Science and Math	Singapore
2016	<b>Wilmar Scholarship</b> , Wilmar International	Singapore

## Extracurricular Activities

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**SUTD Graduate Student Association (GSA)**

Singapore

VICE-PRESIDENT

Mar. 2020 - Present

- Helped plan and implement several events, including 3 Minute Thesis and Graduate Student Matriculation Afterparty.

**SUTD Student Government (ROOT)**

Singapore

DEPUTY VICE-PRESIDENT OF COMMUNICATIONS

Sep. 2017 - Sep. 2018

- Led a team of 11 members to make student life in SUTD more fulfilling by acting as a bridge between the student body and management.
- Founded a team made of passionate individuals to change SUTD culture in collaboration with the Lee Kuan Yew Centre for Innovative Cities.
- Created a website for the student government, which provides information and resources to the student body.

**'Into the G.R.I.D.' Orientation Committee**

Singapore

DEPUTY PROGRAMS DIRECTOR

Sep. 2016 - May 2017

- Organized and executed an Orientation camp for 450 freshmen in order to promote integration among students.
- Designed a 3 day itinerary with innovative and fun activities for all students. Novel technologies were used, such as Python scheduling to release clues for a treasure hunt.

## **SUTD Choir**

*Singapore*

### **PRESIDENT**

*Nov. 2016 - Nov. 2017*

- Led the choir in expanding our repertoire, with a particular focus on vocal technique.
- Participated in various concerts and performances in Singapore, including a performance at the Esplanade.

## **SUTD Vocomotives**

*Singapore*

### **MUSIC DIRECTOR**

*Nov. 2016 - Nov. 2017*

- Held training sessions twice a week to help the acapella group members improve vocal technique.

## **SUTD University Ambassadors**

*Singapore*

### **MEMBER**

*Jun. 2016 - Present*

- Took part in various Acceptance Tea events, where I served as a campus guide and student ambassador.
- Emcee and student helper for SUTD Open House 2018.

## **Languages and Skills**

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### **Programming**

Proficient in Python, R,  $\text{\LaTeX}$ , SQL, HTML and CSS

Intermediate in JavaScript, Mathematica, MATLAB, AMPL, VBA and PyTorch

### **Tools/Software**

Proficient in Microsoft Office, Adobe Premiere Pro and Adobe After Effects

Intermediate in Tableau, Adobe Illustrator and Unity

### **Languages**

Fluent in English, Mandarin and Malay (written and spoken)

### **Hobbies**

Reading poetry, cooking, playing tabletop role-playing games and watching/analyzing films