

# ARAVINTH KRISHNAN RAVI

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## EDUCATION

### Kansas State University

Current

- PhD in Pure Mathematics (GPA: 4.00/4.00)
- Expected Graduation: 2027
- Coursework:
  - Algebraic Topology I, Algebraic Geometry I and Real Analysis

### Nanyang Technology University (NTU), Singapore

Aug-2018 - June 2022

- Bachelor of Science in Mathematical Sciences (with a Specialisation in Pure Mathematics)
- Gpa: 4.39/5.00
- Coursework:
  - Advanced Investigations in Calculus II, Supervised Independent Study I – Methods in Problem solving, Mathematical Problem Solving, Real Analysis I, Abstract Algebra I & II, Special Topics in Pure Mathematics (Point set Topology, Fundamental group and homotopy theory, Zariski Topology and Topological Groups), Introduction to Topology & Surfaces, Complex Analysis, Algebraic Topology, Galois Theory, Lie Groups & Lie Algebra (Graduate Coursework)
  - Courses I am going to take in final year: Probability and Introduction to Statistics, Special Topics in Applied Mathematics (Character Theory of finite groups), Stochastic Processes, Analysis II, Differential Geometry & Partial Differential Equations, Mathematical Statistics (Graduate Coursework), Basic Geometric Mechanics (Graduate Coursework)

### Tampines Junior College

Jan 2014 - Dec 2015

- Pure Science Student: Took H3 Mathematics, H2 Biology, Chemistry, Mathematics, H1 Economics
- Took part in various mathematics competition and olympiads (New South Wales Maths Competition - Merit, Australian Maths Competition - Distinction, American Math Competition - Merit, Singapore Mathematical Olympiad)

## RESEARCH EXPERIENCE

### Final Year Project

August 2021 - Present

- Built a python software to generate finite type covering surfaces of the wedge sum of 2 circles and to calculate the virtual spectral homological radii of pseudo-Anosov mapping for each finite type cover generated to test a conjecture on how the radii is related to the volume of the mapping torus

### Odyssey Research Program

June 2021 - July 2021

- Paid undergraduate research in the area of Dynamical Systems
- Explored Ordinary Differential Equations, mechanical systems, numerical methods, Principle of Variation and Discretization of ODEs
- Also, introduced to current research in nonlinear dynamical systems by reading papers such as “Koopman Invariant Subspaces and Finite Linear Representations of Nonlinear Dynamical Systems for Control” and “Koopman Operator, Geometry & Learning”
- Applying numerical methods in matlab to study more about the behaviour of different types of Differential Equations and analyse the advantages and disadvantages of various numerical methods

**Undergraduate Research on Campus (URECA)****August 2020 – June 2021**

- For URECA 20/21 under Prof Andrew James Kricker, I am studying Thurston's Work on Surfaces, Homological Eigenvalues of Lifts of Pseudo-Anosov Mapping Classes to finite covers. We explore the fact that the rate of growth of the fundamental groups is in fact the Mahler Measure from the previous URECA project.

**Undergraduate Research on Campus (URECA)****August 2019 – June 2020**

- Continued my project in Undergraduate Research in Mathematics I with URECA under prof Andrew James Kricker
- Applied functional analysis on the setting of algebraic topology how Fourier transform maps the space  $l^2(Z)$  to  $L^2(S^1)$  and how we can use the functional analysis tools in  $L^2(S^1)$  to calculate the Fuglede-Kadison determinant for infinite-dimensional linear operators in  $l^2(Z)$  and how it relates to the Mahler Measure.

**Undergraduate Research in Mathematics I****May 2019 – June 2019**

- Undergraduate Research in the field of Functional Analysis with Prof Tang Wee Kee
- Using the book Kreyszig Introductory Functional Analysis, I built up the foundations for functional Analysis, then did a literature review of the paper: Isometries of  $l^p$  norm by Chi-Kwong Li and Wasin So

**Making & Tinkering****May 2019 – June 2019**

- Computer Vision Project: Created a program in OpenMV that plays music from a given music sheet at which the camera is pointing at
- Skills used: OpenMV, Python

**WORK EXPERIENCE****Project Officer, Nanyang Technological University****May 2022 - July 2022**

- Extension of his final year project
- Worked on generalising the python code for generating finite type covers of the figure 8 and computing the virtual homological spectral radii

**Machine Learning Intern, Institute of Infocomm Research, Communications & Network Department, A-Star****July 2021 – December 2021**

- Project title: Predicting Remaining Useful Life of Crane Components
- Learnt how to generate and clean data, feature engineering & data cleaning
- Gained expertise with these Python libraries: Scikit-Learn, Numpy, scipy, matplotlib, pandas, pillow

**Private Tutor (Part-time Job)****May 2018 – May 2022**

- Teach Junior College mathematics at all levels (H1 & H2 Mathematics)
- Taught IB SL, HL Mathematics
- Have a 100% Track record of As/7 from all my students
- Demonstrated resourcefulness in sourcing for tuition students

**CO-CURRICULAR EXPERIENCE****Business Management IC, NTU Dive Team****Aug 2020 – Present**

- Lead a team of divers to promote scuba diving and marine conservation to the NTU community through bi-annual dive certification courses and other events, both overseas and local with up to 90+ participants
- Establish a business direction and strategy for the club over the course of the academic year

- Oversee and coordinate members in my subcommittee to ensure goals are met and in line with the club direction
- Be familiar with members' skillsets to delegate roles and tasks more efficiently
- Adapt and adjust club business activities such as sales and sourcing of dive equipment according to ever changing COVID-19 restrictions
- Part of the team that pioneered new initiatives (intertidal walks and discover scuba) to increase engagement within the NTU community, especially with new restrictions on overseas travel
- Collaborated with other NTU sport clubs business managers to increase fund-sourcing opportunities

#### **NTU Intervarsity Water Polo Team**

**Aug 2019 – Present**

#### **Head Publicity and Media & Main Committee, NTU Crescent Hall**

**Dec 2018 – Aug 2019**

- Facilitated in overall camp to engage more than 300 NTU students
- Liaised between my Publicity subcommittee and other subcommittees to conduct necessary activities such as pre-camp photoshoots & videoing of the camp plot video
- Oversaw the management of the Instagram page publicity to promote the camp and the posters, shirt designs
- Managed the team of 5 photographers during the 3 day event itself

#### **Publicity & Publications IC, NTU Dive Team**

**Aug 2019 – Present**

- Design publicity materials including posters and character design for major university-wide promotion of dive team events
- Maintain the NTU Dive Team Instagram page
- Spearheaded Instagram mini-video series on our past and present dive committee members personal trips to show our followers different/unique dive sites that they can explore

#### **Group Leader, NTU Crescent Hall**

**Dec 2018 – Aug 2019**

- Facilitated in overall camp to engage more than 300 NTU students
- Enforced stellar standards and mentored over 25 undergraduates to integrate into the university and cope with the academic rigour

### **Awards**

#### **NTU President Research Scholar**

**2020, 2021**

#### **Singapore Armed Forces Young Leaders Award**

**January 2015**

### **SKILLS**

- Languages: Proficient in English (written and spoken)
- Programming Language: R, Matlab, Python
- Digital Skills: Microsoft Office: Excel, Word, PowerPoint, Google: Drive, Sheets