

Joel Sleeba

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Education

Master of Science in Mathematics

Indian Institute of Science Education and Research — GPA: 8.38/10

October 2021 – May 2023

Thiruvananthapuram, Kerala

- Relevant coursework: linear algebra, functional analysis, topology, measure theory, probability theory, machine learning

Bachelor of Science in Mathematics

Madras Christian College — GPA: 8.04/10.0

June 2018 – May 2021

Chennai, Tamil Nadu

- Relevant coursework: linear algebra, real analysis, complex analysis, abstract algebra

Research Experience

Extendibility of Positive Maps

October 2023 – Present

Research Project

Dr. P Shankar, Prof. M N N Namboodiri, CUSAT

- Exploring the attempts to generalize Arveson's extension theorem to positive maps on operator systems.
- Currently reading *Counterexamples to the Extendibility of Positive Unital Norm-One Maps*, Chiribella et al. and .
- Learned about completely positive maps, Choi's theorem, and Steinspring dilation theorem.
- References: *Completely Bounded Maps and Operator Algebras*, Vern Paulsen and *Completely Positive Maps on Complex Matrices*, Man-Duen Choi

Introduction to C* Algebras

June 2023 – Sept. 2023

Summer Reading Project

Dr. P Shankar, Cochin University of Science and Technology (CUSAT)

- Learned the basics of Banach and C* algebras, Gelfand transforms, functional calculus, sesquilinear forms, GNS constructions.
- References: *C* Algebras and Operator Theory* by Gerard Murphy and *An Invitation to C* Algebras* by William Arveson.

A Study in Fourier Analysis

January 2023 – May 2023

Masters Thesis

Dr. P Devaraj, IISER Thiruvananthapuram

- Learned about Fourier transforms in the circle and line, ℓ^p convergence of Fourier series, Fourier Inversion, and classical Paley Wiener theorems
- References: *Early Fourier Analysis* by Hugh L Montgomery and *Real and Complex Analysis* by Walter Rudin.
- [Read my report on GitHub](#)

Workshops

Mathematics Training and Talent Search (MTTS) | Level 1 Summer Camp

April 2021 – May 2021

- Participated in the online summer camp hosted by MTTS trust, funded by the National Board of Higher Mathematics.
- Helped revise concepts in group theory, real analysis and linear algebra.

Mathematics Training and Talent Search (MTTS) | Level 0 Summer Camp

May 2020 – June 2020

- Gained a deeper understanding of topics including logic, sequence and series, vector spaces.
- The programme promoted active discussions in mathematics and gave a platform to connect with people passionate about mathematics.

Reading Groups

Community for Linear Algebra Pursuits

November 2023 – December 2023

Reading Group

Dr. Neeldhara Misra, IIT Gandhinagar

- Reading group for the book *Thirty-three Miniatures: Mathematical and Algorithmic Applications of Linear Algebra*
- [Access the community website here](#)

Operator Algebra Reading Group

October 2023 – Present

- Reading group of graduate students interested in operator algebras and related topics.
- [Access the website here](#)

Computability

Student Reading Project

January 2022 – March 2022

Ashish Kujur, IISER Thiruvananthapuram

- Learned about computable functions in unlimited register machines(URM).
- Reference: *Computability: An Introduction to Recursive Function Theory*, Nigel Cutland.
- An article we authored as part of the project was published in the quarterly newsletter of Club of Mathematics. [Access it here](#)

Students' Recreational MTTS

Student Reading Group

June 2020 – August 2020

MTTS 2020 Summer Camp Alumni

- Reading group aimed to self learn and discuss topics from *Linear Algebra* by Friedberg, Incel, Spence.
- [Access the website here](#)

Additional Courses

CS101.2x: Object-Oriented Programming

Grade: A+

July 2020 – Dec. 2020

MOOCs Course, IITBombayX

CS101.1x: Programming Basics

Grade: A+

July 2020 – Dec. 2020

MOOCs Course, IITBombayX

Extracurricular

T_EX- Click

Firefox Addon

Dec. 2023 – Present

- Currently developing a Firefox addon to easily extract T_EX from the equations on websites including arXiv, Wikipedia, and StackExchange. [Access the addon](#)

Introduction to C* algebras

Student Seminar Presentation

October 9, 2023

IISER Thiruvananthapuram

- [Access the presentation slides](#)

Math Modelling

Volunteer

The International Genetically Engineered Machine competition (iGEM), IISER Thiruvananthapuram

Sept. 2022 – Nov. 2022

- Modelled the partial differential equations for the internalization of vesicles through cell membrane. [\[Link\]](#)

Web Development

Volunteer

The International Genetically Engineered Machine competition (iGEM), IISER Thiruvananthapuram

Sept. 2022 – Nov. 2022

- [Access the webpage](#)

Peer Discussion: Real Analysis

Host

March 31, 2022

Club of Mathematics, IISER Thiruvananthapuram

- Co-hosted the peer discussion session for first year integrated BS-MS students.

Online Foundation Course in Mathematics

Mentor

September 2021 – October 2021

MTTS Trust

- Guided first and second year undergraduate students in the post lecture discussion sessions of the course.
- The course aimed at helping students develop mathematical thinking by focusing on logic, sequence and limits and linear algebra.

Achievements

M.Sc Entrance Examination

Rank 1, Mathematics

2021

Pondicherry University

M.Sc Entrance Examination

Rank 3, Mathematics

2021

Hyderabad Central University

Technical Skills

Programming: Python, C, C++, Java, Bash, SQL

Markup: L^AT_EX, Markdown, HTML, CSS

CAS: MATLAB, GNU Octave, Maxima, SageMath