Joel Sleeba

joelsleeba1@gmail.com JoelSleeba joelsleeba joelsleeba.github.io

Education

PhD in Mathematics **August 2024 – Present**
University of Houston *Houston, TX*

- Relevant coursework: measure Theory, functional analysis

Master of Science in Mathematics **October 2021 – May 2023**
Indian Institute of Science Education and Research — GPA: 8.38/10 *Thiruvananthapuram, Kerala*

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

Bachelor of Science in Mathematics **June 2018 – May 2021**
Madras Christian College — GPA: 8.04/10.0 *Chennai, Tamil Nadu*

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

Research Experience

Peaking Qubit Channels **October 2023 – April 2024**
Research Project *Dr. P Shankar, Cochin University of Science and Technology (CUSAT)*

- Exploring the possibility to introduce the notion of classical peak points to unital qubit channels.
- Tried to employ the characterisation of unital qubit channels from *On unital qubit channels*, Li and Choi
- 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, 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 – February 2024**

- Reading group of graduate students interested in operator algebras and related topics.
- Access the website here

Computability **Jananuary 2022 – March 2022**
Student Reading Project *Ashish Kujur, IISER Thiruvananthapuram*

- Learned about computable functions in unlimitied 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 **June 2020 – August 2020**
Student Reading Group *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 **July 2020 – Dec. 2020**
Grade: A+ *MOOCs Course, IITBombayX*

CS101.1x: Programming Basics **July 2020 – Dec. 2020**
Grade: A+ *MOOCs Course, IITBombayX*

Extracurricular

TEX- Click **Dec. 2023**
Firefox Addon

- Currently developing a Firefox addon to easily extract TEX from the equations on websites including arXiv, Wikipedia, and StackExchange. Access the addon

Introduction to C* algebras **October 9, 2023**
Student Seminar Presentation *IISER Thiruvananthapuram*

- Access the presentation slides

Math Modelling **Sept. 2022 – Nov. 2022**
Volunteer *The International Genetically Engineered Machine competition (iGEM), IISER Thiruvananthapuram*

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

Web Development **Sept. 2022 – Nov. 2022**
Volunteer *The International Genetically Engineered Machine competition (iGEM), IISER Thiruvananthapuram*

- Access the webpage

Peer Discussion: Real Analysis **March 31, 2022**
Host *Club of Mathematics, IISER Thiruvananthapuram*

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

Online Foundation Course in Mathematics **September 2021 – October 2021**
Mentor *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

CSIR National Eligibility test for Junior Research Fellowship **June 2024**
Rank 58, (out of 29118 applicants), Mathematics *National Testing Agency, India*

M.Sc Entrance Examination **2021**
Rank 1, Mathematics *Pondicherry University*

M.Sc Entrance Examination **2021**
Rank 3, Mathematics *Hyderabad Central University*

Technical Skills

Programming: Python, C, C++, Java, Bash, SQL
Markup: LATEX, MarkDown, HTML, CSS
CAS: MATLAB, GNU Octave, Maxima, SageMath