Joel Sleeba

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

Education

Indian Institute of Science Eductaion and Research **Oct. 2021 – May 2023**
Master of Science in Mathematics, GPA: 8.38 *Thiruvananthapuram, Kerala*

Madras Christian College **June 2018 – May 2021**
Bachelor of Science in Mathematics, GPA: 8.03 *Chennai, Tamil Nadu*

Relevant Coursework

- Functional Analysis
- Measure Theory
- Representation Theory
- Finite Frames
- Topology
- Real Analysis
- Analysis of Manifolds
- Machine Learning

Experience

Unitary Invariants for Representations of Operator Algebras **Sept. 2023 – Present**
Reading Project *Dr. Soumyashant Nayak, ISI Bangalore*

- Plans to read the paper by Richard Kadison of the same name.
- Currently reviewing the representations of finite groups and C* algebras as a first step to the reading project.

Introduction to C* Algebras **June 2023 – Sept. 2023**
Summer Reading Project *Dr. P Shankar, Cochin University of Science and Technology*

- Understood the basics of Banach algebras including spectrum, Gelfand representations of abelian algebras, compact and Fredholm operators in Hilbert spaces.
- Learned C* algebra theory including spectral Gelfand transforms, functional calculus, sesquilinear forms, positive linear functionals, and GNS construction.
- Covered chapters 1-3 from *C* Algebras and Operator Theory* by *Gerald Murphy* and parts of chapter 1 from *An Invitation to C* Algebras* by *Willian Arveson*.

Fourier Analysis: From Circle, through the line, to the complex **Jan. 2023 – April 2023**
Masters Thesis, Grade:A+ (Maximum possible Grade) *Dr. P Devaraj, IISER Thiruvananthapuram*

- Explored Fourier transforms in the circle and line, ℓ^p convergence of Fourier series, Fourier Inversion, and classical Paley Wiener theorems
- Covered chapters 3, parts of chapter 4 and 10 from *Early Fourier Analysis* by *Hugh L Montgomery* and parts of chapter 19 from *Real and Complex Analysis* by *Walter Rudin*.

Summer Schools

Mathematics Training and Talent Search | *Level 1 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 | *Level 0 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.

Leadership / Extracurricular

Operator Algebra Reading Group **Sept. 2023 – Present**

- Reading group of friends who are interested in discussions on the basics of C* algebra and related topics.
- Hosts weekly meetups and presentations on selected topics.

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

- Understood the notion of computable functions in unlimitied register machines(URM).
- Read upto Church-Turing thesis from *Computability: An Introduction to Recursive Function Theory* by *Nigel Cutland*.

Pi Quiz 3.0 **March 14, 2022**
Host *Club of Mathematics, IISER Thiruvananthapuram*

- Co-hosted the annual π day quiz organized by the maths club of IISER Thiruvananthapuram.
- Framed questions and hosted rounds in the online quiz competition.

Online Foundation Course in Mathematics **Sept. 2021 – Oct. 2021**
Mentor *MTTS Trust*

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

Achievements

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

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

Additional Courses

CS101.2x: Object-Oriented Programming **July 2020 – Dec. 2020**
Grade: A+ (Maximum Possible Grade) *MOOCs Course, IITBombayX*

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

Volunteering and Other Projects

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*

- Helped in the development of the team webpage. Link

XOR Encryptor **Jan. 2022**
Developer

- Developed a simple programme to encrypt text and files alike using a symmetric key or password. Link

CSSart **May. 2020**
Developer

- Created a handful of webpages as a part of learning CSS. Link

Search for Extra Terrestrial Intelligence **Sept. 2015 –**
Volunteer *SETI Institute*

- Contributed to the SETI@Home initiative which uses idle time in computational device for data crunching throught the BOINC platform.

Technical Skills

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