

# Iswarya Sitiraju

## Personal Details

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## Education

2018-2024(Expected) **PhD Mathematics**, Louisiana State University, Baton Rouge, GPA -4/4  
**Title:-** Analytic Wavefront Sets of Spherical Distributions on De Sitter Space.  
Jan 2021 **MS Mathematics**, Louisiana State University, Baton Rouge  
2013-2018 **BS-MS Dual Degree, Mathematics**, Indian Institute of Science Education and Research, Mohali, CPI 8.3/10

## Research Experience

### PhD Thesis

Aug 2018- **LSU**  
**Topic:-** Harmonic Analysis, Analysis on Symmetric Spaces, Wavefront Sets  
**Title:-** Analytic Wavefront Sets of Spherical Distributions on De Sitter Space;  
**Supervisor:-** Prof. Gestur Olafsson

### MS Thesis

Aug 2017-May 2018 **IISER Mohali**  
**Topic:-** Fourier Analysis  
**Title :-** Quasi-crystals and Poisson Summation Formula;  
**Supervisor:-** Prof. Shobha Madan  
**Abstract :-** The aim of my thesis is to understand and analyse whether there are uniformly discrete sets other than lattices which are generated by standard basis of  $\mathbb{R}^n$  (i.e.  $\mathbb{Z}^n$ ) for which the poisson summation formula holds in the sense of tempered distribution.

## Research papers

- G. Ólafsson, I. Sitiraju: "Analytic Wavefront Sets of Spherical Distributions on the De Sitter Space". arXiv:2309.10685.

**Abstract:-** In this work we determine the wavefront set of certain eigendistributions of the Laplace-Beltrami operator on the de Sitter space. Let  $G = SO_{1,n}(\mathbb{R})_e$  be the connected component of identity of Lorentz group and let  $H = SO_{1,n-1}(\mathbb{R})_e \subset G$ . The de Sitter space  $dS^n$ , is the one-sheeted hyperboloid in  $\mathbb{R}^{1,n}$  isomorphic to  $G/H$ . A spherical distribution, is an  $H$ -invariant, eigendistribution of the Laplace-Beltrami operator on  $dS^n$ . The space of spherical distributions with eigenvalue  $\lambda$ , denoted by  $\mathcal{D}'_\lambda(dS^n)$ , has dimension 2. In this article we construct a basis for the space of positive-definite spherical distributions as boundary value of sesquiholomorphic kernels on the crown domains, an open  $G$ -invariant domain in  $dS^n_{\mathbb{C}}$ . It contains  $dS^n$  as a  $G$ -orbit on the boundary. We characterize the analytic wavefront set for such distributions. Moreover, if a spherical distribution  $\Theta \in \mathcal{D}'_\lambda(dS^n)$  has the wavefront set same as one of the basis element, then it must be a constant multiple of that basis element. Using the analytic wavefront sets we show that the basis elements of  $\mathcal{D}'_\lambda(dS^n)$  can not vanish in any open region.

## Internship

- May–Aug,2023 **LSU**, (<https://github.com/ishulsu/Deep-Learning-for-Frog-Eggs-Quantification>)  
**Topic:-** Deep learning for frog eggs quantification, **Supervisor:-** Dr. Peter Wolenski
- May–July, 2017 **IISER, Mohali**  
**Topic :-** Poisson summation formula, it's applications and Introduction to Harmonic analysis, **Supervisor :-**Prof. Shobha Madan
- May–July, 2015 **IISER, Mohali**  
**Topic :-** Theory and experiments on Polarization of Light, **Supervisor :-** Dr. K P Singh

## Awards and Fellowships

- Awarded with Pasquale Porcelli Best Graduate Student in 2019,LSU Mathematics.
- Recipient of *Innovation in Science Pursuit for Inspired Research* (INSPIRE) scholarship funded by the Department of Science and Technology (DST), Govt. of India, for studying in IISER Mohali.

## Presentations in Conferences/Seminars

- (Upcoming) JMM-AWM Special Session on Recent Developments in Harmonic Analysis; Jan 4, 2024
- Prairie Analysis Seminar Poster Session; Nov 3-4, 2023
- AMS Southeastern Sectional meet, Special Session on Topics in Harmonic Analysis and Partial Differential Equations; Oct 15, 2023
- AMS Fall Central Sectional meet, Contributed Paper Session, II; Oct 8,2023
- Analysis Seminar, Clemson University; September 2023
- Harmonic Analysis Seminar, LSU; March 2023

- Noncommutative Geometry and Analysis on Homogeneous Spaces, William & Mary, Virginia; Jan 2023  
<https://sites.google.com/view/ncgahs20/home?authuser=0>

## Teaching

- Fall 2023:- Plane Trigonometry 1022
- Summer 2023:- Analysis Qualifying Exam preparation
- Fall 2022:- Calculus 1550
- Summer 2022:- Analysis Qualifying Exam preparation
- Fall 2021:- College Algebra 1021
- Fall 2020:- College algebra 1021
- Spring 2020:- Plane Trigonometry 1022
- Fall 2019:- College Algebra 1021

## Technical Skills

- Python; Latex; HTML-CSS.

## Extra curricular

- Co-organized Harmonic Analysis Seminar at LSU; Jan 2020-May 2023
- Volunteered for research talks in Geaux Program for incoming students, Aug 2022
- President of Indian Students' Association at LSU, May 2021- April 2022
- Cultural Chair of Indian Students' Association at LSU, May 2020 - April 2021
- Volunteered for Organizing Student Colloquium at LSU, 2019-2020
- Demonstrated Pigeon-Hole Principle on Girls Scout Event at LSU, Sep 2019
- Volunteered for Geaux Science for Girls: Our Earth, Our Laboratory, March 2019