Lakshmi Jayalal | Curriculum Vitae

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Education

Communications and Signal Processing
Indian Institute of Technology, Madras–Electrical Department   *2019-Present*
Doctor of Philosophy, PMRF Scholar
CGPA-8.86/10

Communications and Signal Processing
Indian Institute of Technology (ISM), Dhanbad – Electronics and Communications Engineering   *2017–2019*
Post Graduation
OGPA - 9/10

Bachelor of Technology
College of Engineering, Trivandrum – Electronics and Communications Engineering   *2013–2017*
OGPA - 7.98/10

Technical Skills

Programming Languages: Python, R, IDL, MATLAB

Frameworks & **Libraries**: PyTorch

Mathematical & **Computational Tools**: Mathematica, Mathematical Optimization, Applied Mathematics, Mathematical Analysis

Machine Learning & **Data Science**: Machine Learning, Estimation Theory, Compressed Sensing

Projects

Effect of introduction of IRS in communication channel
IIT Madras   *Present*
We successfully approximated the channel system with intelligent reflecting surface to a Log-normal random variable making the analysis of such channels more tractable.

Study of implicit regularization and derive an algorithm to estimate the group sparse signals
IIT Madras   *Present*
In this work, we study the convergence behavior of various algorithms that promote implicit regularization within gradient descent, significantly reducing computational costs. We also demonstrate their applicability in background extraction from video sequences.

Impact-Based Weather Forecasting
India Meteorological Department   *2021*
Developed an impact-based weather forecasting system for the India Meteorological Department, enabling timely warnings for heavy rain in Kerala (2024).

Digital signal processing of satellite radio signals
IIT(ISM) Dhanbad   *2019*
Derived Venusian atmospheric properties with an accuracy of 0.01 Hz and achieved a resolution of 1 mHz

Quick Look Display
ISRO *Space Physics Lab*   *2019*
The application was used to monitor the atmospheric parameters of moon during initial phase of the Chandrayaan-II

Collision warning system using Vehicle to Vehicle communication
Undergraduate Project   *2016-2017*
A model to demonstrate the efficacy of radio frequency system to avoid vehicle collision was developed and demonstrated.

Achievements

Prime Ministers Research Fellowship	**IIT Madras**
Fellowship	*2021-2024*

Recipient of the prestigious Prime MinisterâĂŹs Research Fellowship (PMRF) for 2021-2023.

IEEE College of Engineering Trivandrum	**Student Branch**
Best Student Volunteer	*2017*

Awarded Best Student Volunteer (2017) for leading a membership drive that significantly increased student participation.

Grace Hopper Celebrations India	**AnitaB.org**
GHCI Student Scholar	*2016*

Was selected as one of the 14 GHCI scholars selected from all around the country. And was provided with a once in a lifetime opportunity to attend the GHCI Conference. (2016)

Experience

Teaching and Graduate Research Assistant	**IIT Madras**
Ph.D.	*2019-Present*

Have been a teaching and research assistant at IIT Madras. The courses assisted are
1. Applied programming lab
2. Introduction to probability
3. Estimation theory
4. Digital modulation and coding
5. Introduction to machine learning

Core Executive Member	**IIT Madras**
Research Connect	*2021-2022*
Coordinator	**IIT Madras**
Research Connect	*2020-2021*
Coordinator (Website Design Team)	**IIT Madras**
Research Scholars Day 2021	*2021*
ISRO Space Physics Lab	**VSSC**
Intern	*2018-2019*

Certifications

Issued Jul 2021	**Credential ID b2a4fdb25ade47d0ae85f194b191ef4f**
NVIDIA	*Fundamentals of Deep LearningFundamentals of Deep Learning*
Issued Jul 2021	**Credential ID 6RPNMLN3DD8U**
Coursera	*Getting Started with AWS Machine Learning*

Publications

Tuning-Free Online Robust Principal Component Analysis through Implicit Regularization	
arxiv, Lakshmi Jayalal, Gokularam Muthukrishnan, Sheetal Kalyani	*2024*
SINR Analysis of an IRS Assisted MU-MISO System	
arxiv, Lakshmi Jayalal, Shashank Shekhar, Athira Subhash, Sheetal Kalyani	*2022*
On the estimation of frequency residuals in a radio occultation experiment	
Monthly Notices of the Royal Astronomical Society, Keshav R Tripathi, R K Choudhary, Lakshmi Jayalal	*2022*
A novel methodology for impact-based forecast	
Weather and climate science for service partnership (WCSSP) India, VK et al.	*2022*
Exploring Power Signatures for Location Forensics of Media Recordings	**SigPort**
ICASSP, Unnikrishnan et al.	*2016*