Dr Noufal A (Kattunkal Veedu)

Contact Information	Kattunkal Veedu Edathala North P.O Near Maleppally, Aluva. Kerala.	*Cell:* 9447327154 *E-mail:* noufal@cusat.ac.in
Present Address	Associate Professor (Level 13A) Department Of Mathematics CUSAT, Cochin - 682 022	

Passport Details	Indian Passport No: V9514314
Date of Birth	31-05-1983
Objective	Quality Teaching and Dedicated Research
Administrative Responsibilities	Regional Co-ordinator (Kerala) for International Mathematical Olympiad, Department level Placement Co-ordinator, Department Council secretary (2016 - 2021), Assistant Warden of Hostels.
Research Interests	Multiwavelets, Framelets, Numerical Solution of PDEs, Functional Analysis, Representation Theory, Differential Geometry, Signal Processing.
Publications	**Anusree Sreedharan, Noufal Asharaf, Frame Structure Derived from a non-Blaschke sequence on the unit disc** published in Journal of analysis, 2023.
	V.B. Kiran Kumar, Lexy Alexander, M N N Namboodiri, Noufal

Asharaf, Spectral Analysis of Singular Matrices in SIMO Channel is published in Applied mathematics and computation 2022.

Athira Babu and Noufal Asharaf, Numerical Solution of Partial Differential Equations Using Daubechies Filter With Accuracy Order Six is published in Surveys in Mathematics and its applications 2022.

Athira Babu and Noufal Asharaf, Numerical Solution of Nonlinear Sine-Gordon Equation Using Modified Cubic B-Spline-Based Differential Quadrature Method is published in Computational methods for Differential Equations 2022.

Athira Babu, Bin Han and Noufal Asharaf, Numerical solution of the hyperbolic telegraph equation using cubic B-spline-based differential quadrature of high accuracy is published in Computational methods for Differential Equations 2022.

K. Pallavi, M.C Lineesh, Noufal Asharaf, A Review on Minimally Supported Frequency Wavelets is published in Australian Journal of Mathematical Analysis and Applications, ISSN: 1449-5910, vol(18) 2021, No.2, Art. 17, 21pp.

Athira Babu, Bin Han and Noufal Asharaf, Numerical solution of the viscous Burgers' equation using Localized Differential Quadrature Method is published in Partial Differential Equations in Applied Mathematics, Elsevier, ISSN: 2666-8181, Volume 4, December 2021.

A. Noufal, Study of Multiplication operator on $\mathcal{H}_{\frac{1}{2}} \oplus \mathcal{H}_{-\frac{1}{2}}$ is published in International Journal of Applied and Computational Mathematics, Springer, ISSN: 2349-5103, Volume 4, Issue 6, December 2018.

A. Noufal, Korovkin Thoerem is published in the procedings of the UGC sponsored National Seminar on Recent Trends in Analysis, Topology and Its Applications organized by the Department of Mathematics, Sanathana Dharma College Alappuzha in 2015.

C. Jayasri and A. Noufal, Functions Analytic on the upperhalf plane published in the December 2010 issue of the Bulletin of Kerala Mathematical Association.

C. Jayasri and A. Noufal, Study on Heisenberg group is published in the proceedings of the International Conference on Groupoids, Semigroups and Automata in the Department of Mathematics University of Kerala.

Conference Presentations

Numerical solution of one-dimensional hyperbolic telegraph equation using Collocation of cubic B-splines (accepted to publish in the proceedings of International Conference on Semigroups, Algebras and Operator Theory).

Representation of affine group with Heisenberg operators as generators in International Conference on Analysis and its Applications in the Department of Mathematics, Aligarh Muslim University.

Study on Heisenberg group in International Conference on Groupoids, Semigroups and Automata in the Department of Mathematics University of Kerala.

The Concept of Empirical Mode Decomposition in National Seminar on fuzzy and its applications to real world problems at SN College Kollam.

The Research on Intrinsic Mode Function in National Seminar on Recent trends in Analysis and Discrete Mathematics at Mahathma Gandhi College Thiruvananthapuram.

Reviewer of Journals

Mathematical Reviews, American Mathematical Society.
Palestine Journal of Mathematics, ISSN 2219-5688.

Doctoral committees

Digital University of Kerala.
APJ Abdul Kalam Technological University.

Title of the Doctoral Thesis awarded

1. **Multiframelet Expansion for the Numerical Solution of PDEs**, Athira Babu (Reg No. 5775) (2023).

Number of PhD/Mphil Students

PhD : 4 (Pursuing), 1(Degree Awarded) Mphil : 6 (Completed).

Mphil Projects Supervised

2015-21

1. Approximate Solution of Fredholm Integral Equations With Green's Type Kernel. (2021)

2. Estimation of Spectral Radius of Refinement and Subdivision Operators. (2019)
3. Refinable Vector Functions. (2018)
4. Canonical Dual of a Wavelet Frame. (2017)
5. The Optimal Coefficients in Daubechies Wavelets. (2017)
6. Refinable Splines. (2015)

MSc Projects **2016-2023**
Supervised

1. On the spectral inclusion regions of Centro-symmetric Matrices(2023).
2. Moving mesh Partial Differential Equations(2023).
3. Finite-element methods for numerical PDEs(2023).
4. B-splines to extract the intrinsic modes from a data(2023).
5. Finite difference method to solve the Schrondinger equation(2023).
6. Code based Cryptography(2023).
7. Numerical solution of PDEs using Galerkin Methods (2022).
8. Matrix Polynomials (2022).
9. Singular value thresholding algorithm for matrix completion (2022).
10. Harmonic Analysis on Topological groups (2022).
11. Computational Methods in Applied Mathematics (2022).
12. Support Vector Machine for Data Classification (2021).
13. Detection of Sleep Spindles using Hilbert Huang Transform (2021).
14. Weierstrass Approximation Theorem (2016).

Current MSc **2023-24**
Projects

1. Cryptography using Sagemath.
2. Elliptic Partial Differential Equations

Courses Taught

M.Sc. Discrete Framelets (2023), Integral Transforms (2022), Differential Geometry (2021, 2022), Measure Theory (2016, 2021, 2023), Topics in Applied Mathematics (2016), Harmonic Analysis (2018), Wavelet Analysis (2013, 2015, 2019), Functional Analysis I (2015, 2019, 2021), Computational Mathematical Laboratory (2016, 2017, 2018, 2019, 2020), Functional Analysis II (2016), Partial Differential Equations (2021, 2015, 2017, 2019), Real Analysis I (2019), Ordinary Differential Equations (2020), Complex Analysis I (2013, 2022), Complex Analysis II (2014), Probability Theory (2013,2023), Abstract Algebra (2013), Topology (2012), Algebraic Topology (2011), Analytic Number Theory (2011).

Mphil/PhD. course work: Theory of Frames in Hilbert space (2017, 2019, 2020, 2021), Framelets and Wavelets (2021).

B.Sc. - Ordinary and Partial Differential Equations (2023), Groups and Rings (2022), Real Analysis (2013), Complex Analysis (2013), Vector Calculus (2014), Probability Theory (2014), Mathematical Economics (2011)

Conferences/Workshops Organized

1. International Conference on Spectral and Approximation Theory (Co-Convenor), November 27-30, 2023.
2. Research Workshop on Wavelets & Frames (March 24-26, 2018).
3. Residential Training Camp for the Regional Mathematical Olympiad Awardees in Kerala Region (2017, 2018, 2019).
4. Research Workshop on Analysis (July 25-28, 2016).
5. National Seminar on Analysis and Geometry (2014).

Education

University of Kerala, Thiruvananthapuram, Kerala, INDIA.

Awarded Ph.D Degree for the thesis entitled A Study of Wavelet Analysis and its Applications by University of Kerala in November 2014.

- Candidacy Exam: *PhD Entrance exam conducted by University of Kerala*
- Adviser: Dr. C. Jayasri
- Area of Study: Wavelet Analysis and its Applications.

NET, Mathematical Sciences, December 2009.

CSIR/UGC JRF, Mathematical Sciences, June 2010.

CSIR/UGC JRF, Mathematical Sciences, June 2011.

M.Phil, Mathematics, March 2008(Annamalai University)

- With a Second Class
- Thesis Topic: *Zero Divisor Graph with respect to an Ideal in a Ring*
- Adviser: Dr. K.P. Naveena Chandran
- Area of Study: Algebra

M.Sc, Mathematics, May 2005

- *Mathematics* with an aggregate of 84%
- Thesis Topic: *An Introduction to Algebraic Coding Theory*
- Adviser: Prof. M.V Sudarsanan
- Area of Study: Coding Theory

B.Sc, Mathematics, April 2003

- *Mathematics* with an aggregate of 93.6%
- Participated in Mathematics Talent Search Programme at RIE Mysore.

Plus Two, Science, May 2000

- With an aggregate of 72.2%

SSLC, Kerala State Board, March 1998

- With an aggregate of 69.8%

Academic Experience

Cochin University of Science and Technology, Ernakulam

Associate Professor (Level 13A) **19-08-2023 to present**

Assistant Professor (Level 12) **19-08-2020 to 18-08-2023**

Assistant Professor (Level 11) **19-08-2015 to 19-08-2020**

Govt. Brennen College Dharmadam, Thalassery

Assistant Professor (Level 10) **10-06-2014 to 18-08-2015**

Govt. Polytechnic College Kannur

Assistant Professor (Level 10) **24-09-2013 to 09-06-2014**

PSMO College Tirurangadi

Assistant Professor (Level 10) **05-03-2012 to 23-09-2013**

H.H Maharaja Govt. College for women

Assistant Professor (FIP sub) **03-09-2010 to 03-03-2012**

Govt. College Kattappana

Assistant Professor (FIP sub) **21-07-2010 to 02-09-2010**

Department of Mathematics, University of Kerala.

Research Scholar **November 2007 to July 2010**

Institute of Distance Education, University of Kerala

External Teaching Faculty **December 2007 to July 2010**

Mar Ivanios College Thiruvananthapuram.

Resource Person for the UGC Sponsored Programme for NET/JRF Coaching **July 2009 to July 2010**

Catholicate College Pathanamthitta.

Resource Person for the UGC Sponsored Programme for NET/JRF Coaching **July 2010 to December 2011**

MES College of Engineering, Kuttippuram, Kerala, India.

Lecturer in Mathematics **Jan 2006 to October 2007**

TECHNICAL SKILLS

Extensive Hardware and Software skill

MATLAB experience: Linear algebra, Fourier transforms, Numerical methods, Polynomials, Statistics.

MATLAB toolboxes: Signal processing, Wavelet toolbox, Image processing.

Programming: Python, Sagemath, Maple, C, C++.

Computer Applications: LaTeX, Scilab, Geogebra and the most common productivity packages (for Mac OS, Linux and Windows platforms),

Operating Systems: Mac OS, Linux, Microsoft Windows.

MATHEMATICAL EXPERTISE

Functional Analysis, Framelet Analysis, Integral Transforms, PDE, Real Analysis, Complex Analysis, and Representation Theory.

ENGINEERING EXPERTISE

Signals and Systems, Transform Theory.

CONFERENCE SESSION CHAIR

International Conference on Semigroups and Applications (ICSAA 2019), 09-12, December 2019.

INVITED TALKS ***Interesting Mathematical models in Nature,*** Regional Seminar in connection with Mathematics Association inuguration at the Department of Mathematics, Bharata Mata College Thrikkakara on 06-11-2023.

Group Representations in Mathematical Physics. Refresher Course in Mathematics at UGC-Human Resource Development Centre, University of Kerala, 27-02-2023.

Discrete Fourier Transform. One Day seminar at the Department of Mathematics, Pavanathma College, Murickassery, Idukki, 31-01-2023.

Partial Differential Equations I Refresher Course in Mathematics at UGC-Human Resource Development Centre, University of Kerala, 14-02-2022.

Partial Differential Equations I Refresher Course on Mathematics, Statistics and Computer Science at UGC-Human Resource Development Centre Kannur University, 09-12-2021.

Partial Differential Equations II Refresher Course on Mathematics, Statistics and Computer Science at UGC-Human Resource Development Centre Kannur University, 15-12-2021.

International Lecture series on Wavelet Transforms and Image Processing Department of Mathematics Al-Ameen College, Edathala 09-08-2021.

Calculus on Vector Fields , Department of Mathematics, Fatima Mata National College (Autonomous), Kollam, 27-10-2020.

Introduction to Hilbertspaces, National Seminar on recent Trends & Careers in Mathematics, Department of Mathematics, P S M O College Tirurangadi, 25-02-2019.

Introduction to Wavelet Analysis National Seminar on Functional Analysis and Its Applications, Department of Mathematics Govt. Brennen College Dharmadam, 28-09-2018.

Introduction to Wavelets and Frames Two day National seminar on Analysis and applications, Department of Mathematics, K.K.T.M Govt. College Pullut, 11-10-2018.

Sagemath Two day workshop on sagemath, Department of Mathematics, St.Joseph's College Alappuzha 5^{th} and 6^{th} February 2018.

Diagonalisation of Matrices One day seminar on Recent trends in Algebra, Department of Mathematics, Maharajas College Ernakulam, 13-10-2017.

Python Programming National Workshop on Math Computing, Department of Mathematics and Computer Science, Panampilly Memorial Govt. College, Chalakkudy, Sponsored by Directorate of Collegiate Education,Govt.of Kerala, 26 October 2018.

Introduction to Wavelet Analysis Lecture series, Department of Mathematics, St.Joseph's College Devagiri, 23-01-2017.

Wavelets on $\ell^2(\mathbb{Z}_N)$ Ramanujan Day celebration, Department of Mathematics, St.Mary's College Thrissur, 30-01-2017.

Wavelet Analysis International conference on Applied Mathematics and Computer Science, Department of Mathematics St.Thomas College (Autonomous) Thrissur, 14-12-2016.

Geogebra Faculty Enrichment Programme on Mathematical Softwares, Department of Mathematics statistics and Computer science St.Theresas College (Autonomous) Ernakulam, 20-10-2015.

The Introduction to Real Analysis for the Students of Govt. Arts and Science College Tirur.

Introduction to Geogebra 5.0 in the Faculty Enrichment Programme on Mathematical Softwares Organized by the Department of Mathematics, Statistics and Computer Applications at St.Theresas College (Autonomous) Ernakulam, 20.10.2015.

The Finite Dimensional Spectral Theorem in the Two day Workshop on Functional analysis Organized by the Department of Mathematics, P.M.Govt.College Chalakkudy, 11.12.2015.

Korovkin Theorem in The National Seminar on Recent Trends in Analysis, Topology and its Applications organized by the Department of Mathematics, Sanatana Dharma College, Alappuzha, during December 02-04, 2015.

LaTeX in the One day Seminar organized by the Department of Mathematics, St. Mary's College, Thrissur on 19-03-2016.

An Invitation to Function spaces in the One day Seminar organized by the Department of Mathematics, Mahathma Gandhi College, Iritty on

24-02-2015.

The Introduction to Wavelet Analysis for the Students of Majlis Arts and Science College Puramannur.

Hilbert Huang Transform for the Research group in the Department of Bioinformatics, University of Kerala, Thiruvananthapuram.

Presentations of PhD students

Search of Fine Accuracy Order in B-spline Collocation International Conference on Functional Analysis at Indian Institute of Technology Bombay (October-2019).

Numerical solution of Burgers' equation using compactly supported wavelets International lecture series on Wavelet Transforms and Image Processing at Al Ameen Collge Edathala (August 2021).

Differential Quadrature method to numerically approximate the solution of two-dimensional Telegraph equation in the 34th Kerala Science Congress at Mar Ivanios College Thiruvananthapuram (February 2022).

Numerical solution of one-dimensional hyperbolic telegraph equation using collocation of cubic B-splines in International Conference on Semigroups, Algebras and Operator Theory at Cochin University of science and Technology (March 2022).

Numerical Solution of Fredholm Integral Equation with Green's type Kernel using B-spline Collocation in International Conference on Analysis, Inverse Problems and Applications at Indian Institute of Technology Madras (July 2022).

Workshops Attended

Instructional Shools for Teachers on Ordinary Differential Equations and Dynamical Systems Organized at the Department of Mathematics, IIT Mandi, from 26-06-2023 to 08-07-2023.

Instructional Shools for Teachers on Partial Differential Equations Organized at the Department of Applied sciences, Tezpur University, Assam from 21-11-2022 to 03-12-2022.

Refresher course in Mathematical Science Organized at the UGC-

Human Resource Development centre, Punjab University, Chandigarh from 23-11-2021 to 06-12-2021.

Refresher course in Mathematical Science Organized at the UGC-Human Resource Development centre, Punjab University, Chandigarh from 23-11-2021 to 06-12-2021.

International workshop on Leavitt Path Algebras and K-theory Organized at the Department of Mathematics, Cochin University of Science and Technology, 01-03, July 2017.

International Conference on Functional Analysis Organized at the Indian Statistical Institute, Bangalore. 22-24, 2016.

Talk on Wavelets and Framelets by Prof. Bin Han Organized at the Department of Mathematics, University of Kerala, 02-11-2018.

International Conference on Fourier Analysis and Wavelets (ICFAWL) Organized at the Ramanujan Institute for Advanced study in Mathematics, University of Madras, 21-25, March 2017.

National Seminar on Functional and Harmonic Analysis sponsored by the Directorate of Collegiate Education, Govt. of Kerala, organized by the post graduate department of Mathematics, Govt.College Mokeri, 09-12-2016.

FLAIR Induction Training Programme Organized by the Directorate of Collegiate Education, Govt. of Kerala, at Ashir Bhavan Ernakulam, from 14-09-2015 to 16-09-2015.

Refresher course for college Teachers in Kerala State-V Organized by the Kerala School of Mathematics, 21-02-2019 to 24-02-2019.

21 days Inter-disciplinary Refresher course on Basic Sciences Organized by the Human Resource Development Centre, at Ranchi University Ranchi, Jharkhand, from 11-01-2016 to 31-01-2015.

2-day Induction programme for newly recruited teachers Organized by CUSAT, at Ranchi University Ranchi, Jharkhand, from 15-02-2016 to 16-02-2016.

95th Orientation Course Organized by the Academic Staff College, Jawaharlal Nehru University during 06-04-2015 to 01-05-2015.

Mathematics Training and Talent Search Programme Funded by

the National Board of Higher Mathematics at RIE Mysore in 2003.

Fourth Annual Foundation School-Part II Funded by National Board of Higher Mathematics at University of Hyderabad in 2008.

Workshop on Harmonic Analysis Funded by National Board of Higher Mathematics at Amritha Vishwa Vidyapeetham in 2009.

Workshop on Functional Analysis and Harmonic Analysis at Kerala School of Mathematics Calicut in 2010.

Refresher Course for College Teachers in Kerala State at Kerala School of Mathematics Calicut in 2014.

Research oriented Workshop on Image Processing Organized by the Department of Computer Science and MCA MES College of Engineering Kuttippuram.

Approach to Advanced Soft Computing Concepts Organized by the Department of Electrical and Electronics Engineering and ISTE chapter MES College of Engineering Kuttippuram in 2007.

Workshop on Several Complex Variables and Complex Dynamics(Advanced Training in Mathematics Schools) Funded by National Board of Higher Mathematics at Indian Institute of Sciences in 2010.

Facutly Development Course on Free Software System Administration Organized by the Department of Information Technology MES College of Engineering Kuttippuram in 2006.

Conferences Attended

International conference on Semigroup algebras and Applications ICSAA-2015 organised by the Department of Mathematics, CUSAT during September 17-19, 2015.

International Congress of Mathematicians(ICM) organised by International Mathematical Union and Department of Mathematics University of Hyderabad in August 2010.

International Conference on Groupoids Semigroups and Automata Funded by the National Board of Higher Mathematics,DST, KSCSTE, UGC organized by the Department of Mathematics University of Kerala in August 2010.

Differential Geometry and Chaos Organized by St.Josephs College

for Women Alappuzha and Kerala Mathematical association in 2004.

Limits and Fractal Geometry Organized by SD College Alappuzha and Kerala Mathematical association in 2004.

Algebra and Discrete Mathematics Organized by the Department of Mathematics, University of Kerala in 2007.

Functional Analysis and Applications Organized by the Department of Mathematics, Scott Christian College Nagercoil in 2007.

Algebra and Discrete Mathematics Organized by the Govt. College Kattappana in 2008.

Number Theory, PDE and Geometry Organized by the Department of Mathematics University of Calicut in 2009.

Digital Signal Processing in Computational Biology sponsored by DBT(Govt. of India) at the Centre For Bioinformatics, University of Kerala in 2009.

Mathematics Education and Computing Organized by BJM Govt. College Chavara in 2013.

Automata and Fuzzy Theory Organized by SN College Punalur in 2009.

Indian Science Congress Organized by University of Kerala and ISRO in 2010.

Lecture series in Commutative Algebra Organized by the Department of Mathematics, University of Kerala in 2010.