Dr. N. Meenakshisundaram
Assistant Professor of Physics
Vivekananda College (Residential & Autonomous)
DBT-Star College Scheme funded
College with Potential for Excellence
Tiruvedakam West, Madurai – 625234, TN, India

Mobile : 91-8667671349/9445536326
https://www.researchgate.net/profile/Meenakshisundaram-Natarajan-2

https://scholar.google.com/citations?pli=1&authuser=2&user=us7XkTQAAAAJ

E-mail: sundarm.phy@gmail.com
nmeenakshisundaram@vivekanandacollege.ac.in

My YouTube Channel: Physics for KIDS :
https://youtu.be/3OY8MoXfdBk

Education

Ph.D. in Physics, IIT Madras, Chennai (India) **2010**
Thesis title: Studies in Quantum Chaos: From an almost exactly solvable model to Hypersensitive operators
M.Sc. in **Physics**, The American College, Madurai, Tamilnadu (First class, 73 %) **2002**
B.Sc. in **Physics**, Vivekananda College, Madurai, Tamilnadu (First class with Distinction, 89.8 %) **2000**

Teaching Experience

Assistant Professor of Physics, Vivekananda College (Residential & Autonomous), College with Potential for Excellence, Tiruvedakam West, Madurai – 625234. Additional Responsibility - Postgraduate and Research Coordinator	Since Aug. 2016
SWAYAM and NPTEL SPOC – Local Chapter, Vivekananda College	Jan. 2019 – Oct. 2021
Assistant Professor (Research), School of Electrical and Electronics Engineering, SASTRA University, Thanjavur-613401, Tamilnadu	Dec. 2012 - June 2016
Assistant Professor (adhoc), Physics Section, Department of Education in Science and Mathematics, Regional Institute of Education (NCERT), Mysore - 570006, Karnataka	July 2010 – Nov. 2012
Teaching Assistant: Physics I and II (B.Tech.) IIT Madras	Even 2006 & Odd 2006 Even 2007 & Odd 2007
Instructor: B.Tech. General Physics Laboratory, IIT Madras	Even 2005 & Odd 2005
Instructor: M.Sc. Electronics Laboratory, IIT Madras	Odd 2003, Even 2004 & Odd 2004

Research Experience

Assistant Professor of Physics, Vivekananda College (Residential & Autonomous), College with Potential for Excellence, Tiruvedakam West, Madurai – 625234	Since Aug. 2016
Assistant Professor (Research), School of Electrical and Electronics Engineering, SASTRA University, Thanjavur-613401, Tamilnadu	Dec. 2012 - June 2016
Post-Doctoral Fellow, Computational Neuroscience Lab, IIT Madras, Chennai, Tamilnadu	Oct. 2009 - June 2010
CSIR- JRF	Sep. 2003 – Aug. 2005
CSIR-SRF	Sep. 2005 – Aug. 2009
System Administrator: Department Computing Facility, IIT Madras	Even 2005 & Odd 2006
Junior Research Fellow, Physical Research Laboratory, Ahmedabad, Gujarat	Aug. 2002 - July 2003

Research Specialization and Interests

- Nonlinear Dynamics and Quantum Chaos, Theoretical and Computational Physics, Photonics, Biophysics, Material Discovery and Science/Technology Education

Awards

Qualified in Joint CSIR-UGC Test for Junior Research Fellowship (JRF) and Eligibility for Lectureship (NET)	2002
Qualified in GATE (Physics) with a percentile of 90.50	2002
Qualified in All-India JEST for PhD with a percentile of 92.20	2002
Qualified in IISc Entrance Exam for PhD	2002

Grants

- Funding Agency: SASTRA University
- Project Title: Investigations on the physical properties of some full Heusler alloys and rare earth (R) - transition metal (TM) intermetallic compounds
- Amount: 1.00 Lakhs Rupees
- Status: **Completed**

- Funding Agency: SERB (Young Scientist Scheme)
- Project Title: Studies on the interplay between Multifractal Eigenstates of Quantum Chaos and Entanglement Spectrum
- Amount: 17.75 Lakhs Rupees
- Status: **Completed** (Nov. 2016 - Nov. 2019)

- Funding Agency: ISRO- RESPOND
- Project Title: Investigation of X-ray polarimetric properties of selected nano-materials for space applications
- Role : Co-Principal Investigator (Principal Investigator – Dr. K.V.P. Lata, Dept. of Physics, Pondicherry University)
- Status: **Under Review** (Submitted in January 2022)

Computer Proficiency

Programming	Fortran 77/90, Julia, C/C++, R and Python (Anaconda & Enthought Canopy-Python modules)
Operating Systems	Linux, Macintosh and Windows Virtual Learning Environment : Moodle & Bodhi Tree
Algorithms	Artificial Neural Networks and Machine Learning
DFT Codes/Packages	Quantum ESPRESSO, VASP, QuantumATK, WIEN2K, ORCA, GAMESS-US and MOPAC
MD Codes	LAMMPS, AMBER, GROMACS, NAMD and DL-POLY
Simulation Packages	COMSOL, ANSYS Fluent and Coventor Ware
Plotting Softwares	Gnuplot, Xmgrace, Xfig and Origin
Others	MATLAB, MATHEMATICA, MEEP, LaTeX, Tecplot360, VMD and Bioinformatics

Research Profile

Area of research Ph.D.	Nonlinear Dynamics and Quantum Chaos
Ph.D. Thesis Advisor	Prof. Arul Lakshminarayan, IIT Madras
Fields for Ph.D. qualifying exam	Dynamical Systems, Advanced Mathematical Physics, Condensed Matter Physics and Methods of Computational Physics (MCP) - Special focus on Molecular Dynamics and Monte-Carlo methods.
Mini-project for the course MCP	Solving large symmetric eigenvalue problems using Lanczos algorithm.

Research Summary (Ph.D.)

The understanding of classical chaos has been facilitated by the study of very simple models, many of them being exactly solvable. The classical baker's map is a simple and paradigmatic model of a fully chaotic system. It has been a very important model due to the fact that its classical mechanics is completely solvable. Its quantization has been studied for many years now as a simple model of quantum chaos. We have studied the nature of eigenfunctions of the quantum baker's map when the Hilbert space dimension is power of 2, mimicking multiple qubits space.

Publications from Ph.D. work

1. **N. Meenakshisundaram** and Arul Lakshminarayan, Multifractal eigenstates of quantum chaos and the Thue-Morse sequence, **Phys. Rev. E** 71, 065303(R), 2005.
2. **N. Meenakshisundaram** and Arul Lakshminarayan, The Fourier transform of the Hadamard transform: Multifractals, Sequences and Quantum Chaos, Allied Publishers, Ed. M. Lakshmanan and Rajasekar, pp-69, Chennai, India, February, 2006.
3. Arul Lakshminarayan and **N. Meenakshisundaram**, Using the Hadamard and related transforms for simplifying the spectrum of the quantum baker's map, ***J. Phys. A***, 39, 11205, 2006.

Significant Research Contribution

During my tenure as Post-Doc in the Department of Biotechnology of IIT Madras, I explored the possibility of applying deterministic randomness into a neural network based model for Parkinson's disease's reaching movement (**Neural Computation, 2011**). During my service in SASTRA University as Asst. Prof. of Research, I expanded my horizon by applying my knowledge in binary automatic sequences into designing of Photonic devices (Quasi-Phase Matched Devices) for Multi-wavelength conversion (**JOPT, 2014** & **OQEL 2015**). I have also published couple of papers on bio based synthesis of Nanomaterials for sensing application (**Desalination, 2019 & RSC Adv. 2017**) apart from working on the fundamental aspects on the nature of eigenstates of crucial operators relevant to Quantum Computation and their sensitivity to perturbation using Quantum Information theoretic approach (**IJBC, 2016 & Phys. Scri. 2015**). I had also worked on the theoretical understanding on the role of viscosity, pH and denaturant in altering the confirmations of certain proteins using energetic calculation by various computational methods such as Molecular Dynamics, Monte Carlo and bioinformatics (**Res. J. Biotech, 2015, AIP Adv. 2016, Spec. Spec. Ana. 2016 & RSC Adv. 2016**).

In collaboration with Device Modeling Group at SASTRA University, during my current position in Vivekananda College, Madurai, examined the prospect of phosphorene antidot nanoribbons (PANRs) using the density functional based tight binding (DFTB) method for electronic device applications. From the simulation results we found that the bandgap of Arm chair PANRs cannot be scaled down with nanoribbon width, whereas bandgap of Zig-zag PANRs can be scaled easily. Bandgap scaling in terms of topographic parameters namely ribbon width, length and number of antidots were thoroughly analyzed for ZPANRs. In the end, a two-terminal device is constructed and transmission analysis is using the nonequilibrium Green's function (NEGF) methodology. A negative differential (NDR) region appeared in the current–voltage characteristics of the ZPANRs, which paved a pathway for nano-device application. (**PCCP, 2018**)

In my SERB-YSS project, I worked on a theoretical and computational approach that enables a systematic approach for understanding the role of multifractality of wavefunctions on the entanglement spectrum. Entanglement finds a natural place in the study of disordered systems where the concepts of entanglement and delocalization go hand in hand. Since entanglement in position-space captures information about long-range correlations it is natural that it should reveal information about localized and delocalized states. Entanglement is a unique feature of a quantum system and entanglement entropy, defined through the von Neumann entropy measure, is a useful measure to characterize a quantum phase transition. The nonanalyticity of this entropy at disorder-dominated quantum phase transitions in

noninteracting electronic systems, at critical points, is determined by the single particle wavefunction intensity, that exhibits complex scale invariant fluctuations. It is found that the concept of multifractality is naturally suited for studying von Neumann entropy of the critical wavefunctions. Hence, an understanding of the multifractal nature of critical wavefunctions is important to understand the localization transition. Now I am extending the results obtained from the above mentioned project to understand the quantum fluctuations arising from the electrical, thermal and magnetic properties of the devices constructed using DFT, DFPT methods with 2D materials such as Phosphorene, TMDs and topological insulators. The quantum fluctuations will be characterized using various multifractal measures and different entanglement quantifiers developed using the funding obtained from SERB-YSS project. Apart from this I am also presently working on the thermal, mechanical and optical properties of PANRs.

Monolayer (ML) transition metal dichalcogenides (TMDCs) have been rigorously studied to comprehend their rich spin and valley physics, exceptional optical properties, and ability to open new avenues in fundamental research and technology. However, intricate analysis of twisted homobilayer (t-BL) systems is highly required due to the intriguing twist angle (t-angle)-dependent interlayer effects on optical and electrical properties. Density functional theory (DFT) is employed to understand the band-gap variations with t-angle. Exciton radiative lifetime has been estimated theoretically using temperature-dependent PL measurements, which shows an increase with tangle that agrees with our experimental observations. This study presents the groundwork for further investigation of the evolution of various interlayer excitons and their dynamics with t-angle in homobilayer systems, critical for optoelectronic applications. This work is done in collaboration with the 2D Materials Research and Innovation Group at IIT Madras. (**ACS Omega, 2022**)

List of Publications (post Ph.D.)

S.No.	Publication Details	Year
1.	Prahalad Kanti Barman, Pranshoo Upadhyay, Ramesh Rajarapu, Sharad Kumar Yadav, Latha K. V. P., **Meenakshisundaram N**., and Pramoda K. Nayak Twist-Dependent Tuning of Excitonic Emissions in Bilayer WSe_2, ***ACS Omega***, 7, 7, 6412–6418.	2022
2.	K. Roja, Priya Mehta, M. Premalatha, K. Jeyadheepan, C. Gopalakrishnan, **N. Meenakshisundaram**, Kamatchi Sankaranarayanan, Biosynthesized silver nanoparticles as antimicrobial agents and photocatalytic degradation of methylene blue, ***Desalination and Water Treatment*** 156, 292.	2019
3.	Santhia Carmel, Adhithan Pon, **N Meenakshisundaram**, R. Ramesh and Arkaprava Bhattacharyya, Bandgap Scaling and Negative Differential Resistance behavior of Zigzag Phosphorene Antidot Nanoribbons (ZPANRs), ***Phys. Chem. Chem. Phys.*** 20, 14855.	2018
4.	S M Ramachandran, K V P Latha and **N Meenakshisundaram**, Calculation of the atomic electric dipole moment of Pb2+ induced by nuclear Schiff moment, ***J. Phys. B: At. Mol. Opt. Phys.,*** 50, 145003.	2017
5.	M.S.Sameeha, Soumya Joy, **N. Meenakshisundaram**, R.K. Karn, C. Gopalakrishnan, P. Karthick, K. Jeyadheepan, K. Sankaranarayanan, Phase Tuned Synthesis of Titanium Di-Oxide Nanoparticles for Room Temperature Enhanced Ammonia Detection. ***RSC Advances*** Vol.7,37720.	2017
6.	K. Sankaranarayanan, **N. Meenakshisundaram**, Micro-viscosity induced conformational transitions in Poly-L-Lysine. ***RSC Advances***, Vol.6, 74009.	2016
7.	**N. Meenakshisundaram**, K. Sankaranarayanan, Role of Interfacial viscosity and pH in L-Phe, L-Trp molecular rotors. ***Spectroscopy & Spectral Analysis*** Vol. 5, 35.	2016
8.	Kamatchi Sankaranarayanan, **N. Meenakshisundaram**, Influence of Ficoll on urea induced denaturation of Fibrinogen. ***AIP Advances*** Vol. 6, 035150.	2016
9.	**N. Meenakshisundaram**, Design and Analysis of Dual Periodic Optical Superlattices using Walsh-Hadamard Transform Matrix, ***Optical and Quantum Electronics***, 48, 176.	2016
10.	**N. Meenakshisundaram**, The Analysis of Eigenstates of a Few Generalized Quantum Baker's Maps Using Hadamard and Related Transforms, ***International Journal of Bifurcation and Chaos***, 26, 1650057.	2016
11.	Gargi Rastogi, **N. Meenakshisundaram** and Kamatchi Sankaranarayanan, Propensities to ATP binding sites in Myosin II domains, ***Research Journal of Biotechnology***, 10, 78.	2015
12.	**N. Meenakshisundaram**, Hypersensitivity to perturbation of some crucial operators relevant to	2015

quantum computation, ***Physica Scripta***, 90, 035102.

13. **N. Meenakshisundaram**, L. Vignesh and P. Sabareesan, Tailoring of Bandgaps in Magnonic Antidot Waveguides by Varying Bias Field, ***Asian Journal of Applied Sciences***, 7, 814. 2014
14. **N. Meenakshisundaram**, Krishnamoorthy Pandiyan and Raman Kashyap, A Systematic Approach for Designing Quasi-Periodic Optical Superlattice using Hadamard Matrix, ***Journal of Optics*** (IOP), 16, 015204. 2014
15. K.N. Magdoom, D. Subramanian, V.S. Chakravarthy, B. Ravindran, Shun-ichi Amari and **N. Meenakshisundaram**, Modeling Basal Ganglia for understanding Parkinsonian Reaching Movements, ***Neural computation***, 23, 477. 2011
16. **N. Meenakshisundaram** and Arul Lakshminarayan Super-random states of the Maximal Shift Operator and Entanglement entropy. (To be submitted) 2023

Career Advancement Courses (MOOC) Audited/Credited/ Pilot Projects conducted

1. Summer Faculty Research Fellowship - 2022 – IIT Delhi – June 7 - July 26, 2022
2. Two Days Inservice Teacher Training Program Sponsored by TNSCHE and Organized by Sri Meenakshi Government College for Women(A), Madurai – May 5 - May 6, 2022
3. Refresher Course in Physics (Online) Organized by UGC-HRDC, Sambalpur University, Odisha during September 16 - September, 29, 2021
4. Passed the Rigaku School for Advanced Topics in Practical Crystallography test with Honors, June 24, 2021
5. Rigaku School for Advanced Topics in Practical Crystallography - June 7 - June 18, 2021
6. Summer Faculty Research Fellowship - 2020 (Online) – IIT Delhi – June 8 - July 24, 2020
7. 127th Orientation Course, HRDC- Pondicherry University, Pondicherry. - Feb. 1 - Feb.28, 2019
8. Canopy – Advanced Python training courses (6 Self-Paced Courses) – Jan. 2015 – Dec. 2017
9. Computational Materials Physics (Self-Paced Course), Ghent University, Belgium - Sep. 2016 - Dec. 2016 & Sep. 2017 - Dec. 2017
   Project: Discovery of new stable Quaternary Crystals
10. NME-ICT- **Introduction to Research Methodology** – IITB (Subscribed it as Research Methodology Course for Research Scholars/Part-time Ph.D./M.Sc./M.Tech.12 students as contact course – **Pilot project**) – Jan. 2014 - May 2016
11. Educational Technology for Engineering Teachers (IITBX-ET601X) – Jan. 2016 - May 2016
12. Signals and Systems (IITBX- ES210X) – Jan. 2016 -Apr. 2016
13. **Technical Communication for Science and Engineering** (IITBX-HS791X) – (**Graded 6 students**) - Jan. 2016 - May. 2016
14. Statistics and R for Life Sciences- Self Paced Courses (HarvardX- PH525.1X, PH525.2X and PH525.3X) – Jan. 2015 - Sep. 2015
15. Solar Energy-Fundamentals, Technology and Systems (TU-Delft, Netherlands, ET.3034TU) – Sep. 2014 - Dec. 2014
16. Introduction to Computer Science and Programming in Python (MITX-6.001X) - Feb. 2014 to Apr. 2014 & Jan. 2016 - May. 2016
17. Classical Mechanics (MITX-8.001X) – Sep. 2013 - Nov. 2013
18. 2-Day ISTE Workshop on Research Methods in Educational Technology (Using **Virtual Learning Environment – Moodle**) – 02 Feb. 2013 and 09 Feb. 2013
19. Quantum Mechanics and Quantum Computation (BerklyX-CS191X) - Feb. 2013 - Apr. 2013
20. MOOC Course Offered: GATE-Physics – Video lectures on Mathematical Physics (SASTRA University, May 2016) (https://youtu.be/3OY8MoXfdBk)

Curriculum Development

1. Revision of M.Sc. Ed., (Physics) Syllabus, RIE Mysore
2. Development of General Physics, Advanced Physics Labs, Electronics (Analog and Digital) Lab and Computational Physics Lab for M.Sc. Ed (Physics), RIE Mysore
3. Introduced 10 experiments based on Experimental Physics Kit developed by Prof. R. Srinivasan for the M.Sc. Ed (Physics), RIE Mysore
4. Curriculum development for core courses and laboratory courses of M.Sc. Physics following choice-based credit system with Outcome based Education, SASTRA University and revising it subsequently.
5. Introduced 5 experiments based on Experimental Physics Kit developed by Prof. R. Srinivasan for M.Sc. Physics, SASTRA University

6. Question paper Setter for Ph.D. and M.Sc. Physics entrance exams, SASTRA University for 3 years
7. Training UG students for JAM/University entrance exams for pursuing M.Sc. and PG students for GATE/NET/University entrance exams for pursuing Ph.D. and training them for facing Ph.D. interviews at IITs/NITs/Universities etc., since June 2002.
8. Syllabus framing for M.Sc. Physics course as Postgraduate and Research Coordinator of Physics, Vivekananda College, Madurai.

Innovative teaching Practices

- ✓ Active learning
- ✓ Reinforcement learning
- ✓ Reward based learning
- ✓ Flipped learning
- ✓ Mini projects and Concept Centered Experiments
- ✓ Outcome based Education
- ✓ Activity based learning
- ✓ Cooperative learning
- ✓ Peer learning
- ✓ Problem solving

Courses Taught

Undergraduate Level

RIE Mysore

Quantum Mechanics and Statistical Mechanics
Quantum Mechanics and Relativity
Electricity and Magnetism

Vivekananda College, Madurai
Core/Elective
Classical Mechanics, Quantum Mechanics and Relativity
Allied Physics I & II
Mechanics
Electricity and Magnetism
Thermodynamics and Statistical Mechanics
Solid State Physics
Nuclear Physics
Numerical Methods
Modern Physics
Astrophysics
Spectroscopy
SBS/NME
Physics for Competitive Examinations
Solar Energy
Space Science
Fibre Optic Communication

Postgraduate Level

RIE Mysore

Science of Renewable Energy Sources
Liquid Crystals
Mathematical Physics – I
Optics

SASTRA University, Thanjavur

Thermodynamics and Statistical Physics

Solid State Physics

E-Contents Developed

(Encl. – Annexure -I)

Ph.D./Project Guidance

Ph.D. (Ongoing)	Design and Development of Metal Oxide Nanoparticles Decorated Carbon Nanomaterials for Boosting the Photocatalytic Activity (M. Aravindh, Since **May 2019**)
M.Tech.	Tailoring of Bandgaps in Magnonic Antidot Waveguides by Varying Bias Field (L.Vignesh (114051023), SASTRA University - 2014)
M.Sc.	Design and analysis on Aperiodic Optical Superlattice using Walsh-Hadamard matrix (G. Saravanapriya (115124006), SASTRA University - 2015)

B.Sc. 13 projects – By 35 Students (180601- 180639) Academic Year - 2020-2021 (Encl. Annexure -II - List of projects)

Conferences /Schools /Refresher Courses/Workshops Participated

- Atomistic Modelling Workshop on Amsterdam Modelling Suite, organised by Nyro Research India, Kochi and SCM, Netherlands from June 07 to June 11, 2021
- Worskshop and Symposium on Advanced Simulation Methods: DFT, MD and Beyond Basic Principles and Modern Insights" (ASM2019), IIT Delhi, Mar. 6 to Mar.10, 2019
- Science Acadmies' Lecture Workshop on Emerging trends in Material Science, Jan. 03 and Jan. 04, 2017, P.G. and Research Department of Physics, Raja Doraisingam Govt. Arts College, Sivagangai, India.
- National Level Workshop on Genomic Analysis and Protein Designing using Internet Tools, Oct. 6, 2016, Post Graduate and Research Department of Zoology, Vivekananda College, Madurai, India.
- One-day Workshop on Verilog Programming, Dec. 15, 2015, SASTRA University, Thanjavur, India.
- Science Acadmies' Lecture Workshop on Nonlinear Physics, Jan. 23-35, 2014, Post Graduate and Research Department of Physics, Bishop Heber College, Trichy, India.
- International Conference on Multidisciplinary Frontiers of Medicinal Chemistry: Synthesis, Molecular Biology & Technology, Jan. 18 and Jan. 19, 2013, Department of Chemistry, SASTRA University, Thanjavur, India.
- 7th National Conference on Nonlinear Systems and Dynamics (NCNSD-2012), July 12 - 15, 2012, IISER PUNE, India.
- 30th Refresher Course in Experimental Physics, Sponsored by various Academy of Sciences, July 11 – July 27, 2011, Department of Physics, IIT Madras, Chennai, India.
- Special course on Analytical Methods, July. 7 – July 19, 2010, National Centre for Catalysis Research, IIT Madras, Chennai, India.
- 3rd National Conference on Nonlinear Systems and Dynamics (NCNSD-2006), Feb. 6-8, 2006, Ramanujan Institute for Advanced study in Mathematics, University of Madras, Chennai, India.
- SERC School on Nonlinear Dynamics, Nov. 28 – Dec. 18, 2004, Physical Research Laboratory, Ahmedabad, India.
- National School on Nonlinear Dynamics, Dec. 21-27, 2003, Indian Statistical Institute, Kolkatta, India.
- National Conference on Nonlinear Systems and Dynamics (NCNSD-2003), Dec. 28-30, 2003, IIT Kharagpur, India

Conferences/ Workshops Organized/Served as Resource Person for Refresher Courses

- Coordinator, Science Academies' Lecture Workshop on Recent Trends in Applied Physics for Technology, Dec. 29 and Dec. 30, 2017, Vivekananda College, Madurai, India.
- Coordinator, One day Hands on Workshop on LaTeX for Faculties, Research Scholars and M.Tech. (2014 & 2015), SASTRA University, Thanjavur, India.
- Organizing Committee Member, 1st International Conference on Opto-Electronics and Photonic Materials (ICOPMA 2015), SASTRA University, Thanjavur, India.
- Organizing Committee Member, International Conference on Thin Films & Applications (ICTFA 2013), SASTRA University, Thanjavur, India.
- Resource Person, 46th Refresher Course in Experimental Physics, Sponsored by various Academy of Sciences, Mar. 5 - 20 Mar. 2013, Indian Academy of Sciences, Jalahalli, Bangalore, India.
- Resource Person, 38th Refresher Course in Experimental Physics, Sponsored by various Academy of Sciences, June 5 –June 20, 2012, Department of Physics, B.S. Abdur Rehman University, Vandalur, Chennai, India.

Academic Research Collaboration

IIT Madras	JNCASR, Bengaluru
IIT Delhi	IASST, Guwahati
IIT Bombay	BARC, Mumbai
Pondicherry University	BSIP, Lucknow
Banaras Hindu University	Jain University

Academic Research Visits

- IIT Madras – May 2014, November 2016, June 2018, January 2019, February 2020
- Pondicherry University – May 2017 to June 2017, November 2017, April 2019, February 2020
- IIT Delhi – July 2018, March 2019, May 2019
- Physical Research Laboratory, Ahmedabad – May 2018
- JNCASR – June 2019
- IASST Guwahati – November 2019 and December 2019
- NIT Trichy – January 2019
- SASTRA University – February 2017, February 2018
- IIT Bombay – September 2012

Invited Talks and Academic Outreach Activities

- 13.07.2023 - Invited lecture on the Student Induction Programme for the 1st Year Integrated M. Sc. Physics students on the topic "An Invitation to Physics – The Halliday and Resnick Way", Manonmanium Sundaranaar University, Tirunelveli.
- 10.03.2022 – 12.03.2022 - PG Level Entrance Exams – Training Program (CSIR-NET/GATE/JEST) for M.Sc., Physics Students of Sacred Heart College, Tirupattur.
- 19.07.2021 – 31.07.2021 - PG Level Entrance Exams – Training Program (CSIR-NET/GATE/JEST) for M.Sc., Physics Students of Sacred Heart College, Tirupattur through **online** mode.
- 08.06.2020 - Resource person for the CSIR- NET & UGC-NET Online Coaching Class Organized by IQAC & TARGET CE, AVC College, Mayiladuthurai.
- 22/23.02.20 - CSIR-NET – Physical Sciences – Special Lecture Program – Department of Physics, Alagappa University, Karaikudi.
- 27.01.20 - CSIR-NET Coaching – Physical Sciences – Cluster of Colleges Program, Department of Physics, SFR College for Women, Sivakasi.
- 15.11.19 - Phosphorene antidot nanoribbons - a novel 2D material for nanoscale applications, IASST, Guwahati.
- 06.06.19 - Novel 2D materials for nanoscale applications, JNCASR, Bangalore.
- 20.03.19 - Valedictory Address – UG and PG Association of Physics titled "So you want to be a Physicist?" at Fatima College, Madurai.
- 10.03.19 - Investigation on the electrical and transport properties of phosphorene antidot nanoribbons for nanoscale applications, ASM 2019, IIT Delhi.
- 16.01.19 - 2D materials for nanoscale applications, Department of Physics, IIT Madras.
- 11.01.19 - One-day workshop on "Physics for Competitive Exams (GATE/NET/SET/JEST etc.,)" – Department of Physics, The American College, Madurai.
- 07.01.19 - Invited Lecture titled "What, Who, When, Where, How, Why of a Career and You" – Lakshmi College of Education, Gandhigram.
- 16.05.14 - The Walsh-Hadamard transform: From Sequences to phase reversal quasi-phase matched grating structures, Department of Physics, IIT Madras.

Membership in bodies

- Life Member, Indian Association of Physics Teachers (10392, L6627)

Other Information

Date of birth: May 29,1980.
Known Languages: English, Tamil and Hindi.
Nationality: Indian
Marital status: Married

Permanent address
Dr. N. Meenakshisundaram,
5-4-3, Balaji Street, Shanti Nagar
4th Street,
Vilangudi, Madurai District,
Tamilnadu – 625018 India

I, hereby declare that all the information found in my resume is true to the best of my knowledge and belief.

Place: Madurai
Date: August 17, 2023

Sincerely,
N. Meenakshisundaram

Annexure -I

ICT e -contents prepared by Dr. N. Meenakshi Sundaram, Assistant Professor of Physics, Vivekananda College, Madurai

S.No.	Course Code/Course Name	Topic	ICT tools used PPT/youtube/Slide share	Link
1.	06CT51-Solid State Physics	Crystal Structure-Part 1	PPT	https://tinyurl.com/2fccyen9
2.	06CT51-Solid State Physics	Crystal Structure - Part 2	PPT	https://tinyurl.com/2hsho8db
3.	06CT51-Solid State Physics	Crystal Structure - Part 3	PPT	https://tinyurl.com/2e2ufa5a
4.	06CT51-Solid State Physics	Crystal Structure – Atomic Packing Fraction	PPT	https://tinyurl.com/2pmau4de
5.	06CT51-Solid State Physics	Crystal Structure – Crystal Planes and X-ray Diffraction	PPT	https://tinyurl.com/2z6fd7yq
6.	06CT51-Solid State Physics	Defects in Crystals	PPT	https://tinyurl.com/2hrtwfr3
7.	06CT51-Solid State Physics	Dielectric Properties	PPT	https://tinyurl.com/2jhbjdlz
8.	06CT51-Solid State Physics	Magnetic Properties	PPT	https://tinyurl.com/2mhc4nog
9.	06CT51-Solid State Physics	Superconductivity	PPT	https://tinyurl.com/2nn63jnl
10.	06SB51- Fibre Optic Communication	Refractive Index and Velocity of Light	PPT	https://tinyurl.com/2hvmcxu6
11.	06SB51- Fibre Optic Communication	Classification of Optical Fibres	PPT	https://tinyurl.com/2elon5fg
12.	06SB51- Fibre Optic Communication	Fibre Fabrication	PPT	https://tinyurl.com/2lx3tty3
13.	06SB51- Fibre Optic Communication	LED and Laser		https://tinyurl.com/2ojt24au

14.	06SB51- Fibre Optic Communication	Fibre Optic Communication	PPT	https://tinyurl.com/2p67zdrm
15.	06CT11 – Mechanics	Mechanics - Introduction	PPT	https://tinyurl.com/2plx58tu
16.	06CT42 -Numerical Methods	Numerical Differentiation and Integration	Slide Share	https://tinyurl.com/2fqjc482
17.	06CT42 -Numerical Methods	Numerical Solution of Ordinary Differential Equations	Slide Share	https://tinyurl.com/2plo6z6z
18.	General	Academic Career Opportunities for Physics Students in India	Slide Share	https://tinyurl.com/2h59s6ot
19.	General	CSIR-UGC-NET-TIPS and Tricks to prepare Part A Aptitude and Reasoning	Slide Share	https://tinyurl.com/2jyd9zz8
20.	General	Tips and Tricks to Clear - CSIR-UGC NET- Physical Sciences	Slide Share	https://tinyurl.com/2l4f2mrr
21.	06EP61-Modern Physics	Wave Properties of Particles	Slide Share	https://tinyurl.com/2z87lpqd
22.	06EP61-Modern Physics	Particle Properties of Waves	Slide Share	https://tinyurl.com/2ly734d5
23.	General – 5 Modules (Videos in 18 parts)	GATE/NET/JEST/ TIFR PHYSICS Training Program	Youtube	https://tinyurl.com/2o3sjfl8

Annexure -II

Vivekananda College, Tiruvedakam West, Madurai

Student Projects

Department: **Physics** Academic Year : **2020-2021**

S.No.	Register No.	Name of the Student	Name of the Guide Teacher	Title of the Project
1.	180602	Alagesan R	Dr. N. Meenakshi Sundaram	Driver sleep detection and alarming system using ARDUINO NANO and IR sensor
	180624	Saimukeshkumar G		
2.	180616	Marcus R	Dr. N. Meenakshi Sundaram	Ultrasonic radar
	180604	Dinakara Balaji K		
	180631	Suresh Gopi O		
3.	180617	Maruthu Pandiyan M	Dr. N. Meenakshi Sundaram	Obstacle avoiding car using ARDUINO UNO
	180611	Karthick Raja R		
	180606	Gowtham B		
4.	180639	Yogesh Kannan K	Dr. N. Meenakshi Sundaram	Bidirectional visitor counter and automatic room light controller using 8051 Microcontroller
	180627	Sivanesh Pandi S		
	180608	Jayasurya K		
5.	180614	Lakshmi Narayanan V	Dr. N. Meenakshi Sundaram	Temperature based fan speed control by using ARDUINO
	180626	Sidharthanan M		
	180635	Vijay K		
6.	180613	Keasavaraj J	Dr. N. Meenakshi Sundaram	Object counter using ARDUINO UNO
	180609	Kalidass K		
7.	180634	Sanjai Kumar J	Dr. N. Meenakshi Sundaram	Home appliance remote control using ARDUINO UNO R3
	180638	Ragul P		
	180619	Prathap Singh S		
8.	180634	Vignesh Kumar R	Dr. N. Meenakshi Sundaram	Touchless electric appliances control system for covid safety
	180619	Nagendran G		
	180638	Vishwa S		
9.	180623	Sabaribala B	Dr. N. Meenakshi Sundaram	Study of ultrasonic velocity in different concentration of polyethylene glycol.
	180632	Thanga Pandi M		
10.	180628	Siva Prakash.P	Dr. N. Meenakshi Sundaram	LED light ON and OFF using wifi
	180629	Sundhara Cholan P		
	180637	Vishwa R		
11.	180605	Dinakaran K	Dr. N. Meenakshi Sundaram	Laser transmitter and receiver
	180612	Karuna Moorthi K		
12.	180603	Balkannan A	Dr. N. Meenakshi Sundaram	Automated headlight intensity control
	180615	Manikandan C		
	180630	Surendar V		
13.	180601	Aadhiabinesh A	Dr. N. Meenakshi Sundaram	Vehicle movement based street light automation