



**THIAGARAJAR COLLEGE:: MADURAI – 625 009**  
**NATIONAL CENTRE OF EXCELLENCE IN STATISTICAL AND**  
**MATHEMATICAL MODELLING IN BIORESOURCES MANAGEMENT**  
**139 – 140, Kamarajar Salai, Teppakulam, Madurai , Tamilnadu**  
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About the Centre

The CoE has been established as a nodal centre to promote multidisciplinary research among the researchers, academicians and students through teaching, training and research with the following objectives

- To provide an integrated multidisciplinary inventorying and monitoring systems for sustainable utilization and conservation of bioresources
- To gain knowledge on bioresources at Regional, National and Global scales
- To develop skills for analysis, modelling, simulation and evaluation of bioresources management
- To draw attention to modern innovative ways of generating income through bioresources
- To establish a 'Regional Bioresources Monitoring Facility' for the benefit of students, researchers, stakeholders and policy makers

AREAS OF FUNCTIONING OF THE CoE (MHRD)  
AS GIVEN IN THE DETAILED PROJECT REPORT

- I. Research
- II. Training
- III. Teaching

**I. RESEARCH**

RECOGNIZED MULTI DISCIPLINARY RESEARCH CENTRE:

The Centre has been recognized as Full time Research Centre to carryout multidisciplinary Research leading to Ph.D., Degree by Madurai Kamaraj University

## RESEARCH SCHOLARS:

S.No	Name	Designation	Com.	Wef	Subject
01	Mr. P. Nirvin	Project Fellow	SC	25.01.16	Mathematics
02	Mr. S. Muralikrishnan	Project Fellow	OBC	25.01.16	Bioresource Management
03	Ms. R. Rohini	Project Fellow	OBC	25.01.16	Zoology
04	Mrs. S. Bhuvaneswari	Project Fellow	OBC	18.01.17	Zoology

\*Three more candidates will be enrolled in the last week of September, 2017.

## PUBLICATIONS IN JOURNALS/CONFERENCE PROCEEDINGS:

- Pandiaraja, D. Aditya, R.P. and Abirami, S. 2017. An algorithmic approach to cloud computing using graph theoretical modelling. *Advances in Computational Sciences and Technology*. 10(6): 1773 – 1784.
- Pandiaraja, D. Nagendran, N.A. Murugeswari, D. and Mishra, V.N. 2017. Spatial competition mathematical model analysis for the invasion, removal of *Kappaphycus* algae in Gulf of Mannar with propagation delays. *Communications in Mathematical biology and Neuroscience*, 2017.
- Muralikrishnan, S. Nagendran, N.A. Pandiaraja, D. Nair, A. Kubendran, T. 2017 Avifaunal diversity and water quality analysis of an inland pond, Kondagai Village, Sivaganga District, South India. 2017. *Int. J. Curr. Microbiol. App. Sci.* 6(7): 4437 – 4452.
- Kubendran, T. Selvakumar, C., Sidhu, A.K., Muralikrishnan, S. and Nair, A. 2017. Diversity and distribution of Baetidae (Insecta: Ephemeroptera) larvae of streams and rivers of southern Western Ghats, India. 5(3): 613 – 625
- Pandiaraja, D. Murugeswari, D. and Abirami, S. 2017. Stability analysis of mosquito life span model with delay. *Advanced dynamical systems and applications*. 12(2): 195 – 204.
- Kubendran, T., Selvakumar, C. Sidhu, A.K., Muralikrishnan, S. and Nair, A. 2017. Baetidae (Ephemeroptera: Insect) as Biological Indicators of Environmental degradation in Tamiraparani and Vaigai river basins of southern Western Ghats, India. *Int. J. Curr. Microbiol. App. Sci.* 6(6): 558 - 572
- Muralikrishnan, S., Arun Nagendran, N. and Pandiarajan, D. 2017. Survey of birds in Chitrangudi and Kanjirankulam village ponds in relation to vegetation: An avian paradise of South India. *Journal of Entomology and Zoological studies*, 5(1): 407 – 412.
- Muralikrishnan, S. and N. A. Nagendran. 2017. Diversity and distribution of birds in Vettangudi Birds Sanctuary in relation to vegetation in southern Western Ghats,

Sivaganga district, India. Fourth Indian Biodiversity Congress, Pondicherry University, Pudhucherry. 10 – 12 March, 2017.

- Muralikrishnan, S., Keerthiga Devi, P., Rohini, R. and Arun Nagendran, N. 2016. Isolation and characterization of amylase producers and optimization of enzyme production. In.: Recent trends in microbiology organized by the Department of Microbiology, Algappa University, Karaikudi. 20 & 21<sup>st</sup> December 2016.
- Rohini, R., Muralikrishnan, S. Kulandaivel, S. and Nagendran, N.A. 2016. Isolation and characterization of L – asparaginase producing marine bacteria and process optimization. In.: Recent trends in microbiology organized by the Department of Microbiology, Algappa University, Karaikudi. 20 & 21<sup>st</sup> December 2016.
- Vigneswaran, K. 2016. Efficacy of aqueous extract of *Tinospora cordifolia* stem as immunostimulant in *Oreochromis mosambicus*. In: National Seminar on Conservation methods and biopotential assessment of biodiversity, Sourashtra College, Madurai. 16<sup>th</sup> March 2016.
- Madhan, P. 2016. Isolation of multidrug resistant *K. pneumonia* from currencies collected in Madurai region. National Conference on Trends in Healthcare and Biotechnology: Opportunities & Challenges sponsored by Science and Engineering Research Board (SERB), New Delhi organized by AVVM Sri Pushpam College, Tanjavur, 22 & 23<sup>rd</sup> January.
- N. Saranya, 2015. A review about causes, effects & Controlling measures of pollution on Biodiversity., International Conference on Biodiversity and Evaluation – Perspective & Paradigm shift organized by Sree Sankara College, Kalady, 2 & 3<sup>rd</sup> December.
- Pandiaraja, D and Murugeswari, D. 2015. Stability analysis for an HIV/AIDS epidemic model with an additional delay. (In.) Proceedings of National Conference on Recent Developments on Emerging fields in Pure and Applied Mathematics. Organized by Department of Mathematics and NcoE, MHRD. 12 & 13 March 2015.
- Pandiaraja, D. and Adithya, R.P. 2015. Generalized Eulerianess in Non-linear Eulerian graphs. (In.) Proceedings of National Conference on Recent Developments on Emerging fields in Pure and Applied Mathematics. Organized by Department of Mathematics and NcoE, MHRD. 12 & 13 March
- Pandiaraja, D. and Murugeswari, D. 2015. Computational Analysis of He's method and Homotopy Analysis method to non-linear Damped driven Pendulam, Jamal special Journal
- Pandiaraja, D., Nagendran, N.A., Chandrasekaran, S. and Aditya, R.P. 2014. Graph theoretical modeling and analysis of fragile honey bee pollination network. Curr.Sci., 107(12): 1988 – 1996.

- Chandrasekaran, S., Saravanan, S., Kamaladhasan, N., Saraswathi, K. and Nagendran, N.A. 2014. Impact of *Prosopis juliflora* on reproductive success of migratory birds at Vettangudi Birds sanctuary of South India. *Curr.Sci.* 106(5): 676 – 678
- Kamalakannan, B., Jeevamani, J.J.J., Nagendran, N.A., Pandiaraja, D. and Chandrasekaran, S. 2014. Impact of removal of invasive species *Kappaphycus alvarezii* from coral reef ecosystem in Gulf of Mannar, India, *Curr.Sci.* 106(10): 1401 – 1408.

#### PAPERS ACCEPTED FOR PUBLICATION / PRESENTATION

- Kubendran, T. Selvakumar, C. Sidhu, A.K., Nair, A. and Muralikrishnan, S. 2017. Phylogenetic relationships of the genera and species of Baetidae of the hill streams of southern Western Ghats, India. *The Journal of Zoology studies.*
- Muralikrishnan, S., Arun Nagendran, N. and Pandiaraja. D. 2017. Estimated impact of climate and land use change on the south India diversity of Birds community. In: 3<sup>rd</sup> World Congress on Climatic and Global warming Dubai, UAE., 16 – 17<sup>th</sup> October 2017
- Pandiaraja D, Aditya R P and Abirami S. 2016. An Algorithmic Approach to Cloud Computing Using Graph theoretical Modelling, Springer Verlag lecture notes in Computer Science (2016)
- Pandiaraja D, Arun Nagendran N and Murugeswari D, Computational Analysis of He's methods and Homotopy Analysis Method to non-linear biological Problems – International Conference on Discrete and Computational Mathematics to be held Feb. 16 -17 2017 (accepted)

#### SEMINARS CONDUCTED

- National Conference on Mathematical modelling and Bioresource management (MMBRM – 2017), 06 & 07<sup>th</sup> April 2017
- National Conference on Recent Developments on Emerging fields in Pure and Applied Mathematics. Organized by Department of Mathematics and NCoE, MHRD 12 & 13 March 2015.

#### PUBLICATIONS BY THE CENTRE:

- Pandiaraja, D., 2015. Proceedings of National Conference on Recent Developments on Emerging fields in Pure and Applied Mathematics.
- Nagendran, N.A., Kulandaivel and Saranya, N. 2016. Manual on UV Spectrophotometric Techniques, NCoE, MHRD, New Delhi.
- Nagendran, N.A., Kulandaivel, S., Muralikrishnan, S and Rohini, R. 2016. Manual on Kinetics of marine microbial products. NCoE, MHRD, New Delhi.

## PROJECTS CARRIED OUT BY POST GRADUATE STUDENTS

S.No	REG. No.	NAME	GUIDE	TITLE
01	15SPBT01	MADHAN, P	VS	Study of heavy metal accumulation in plants cultivated with waste water at Vellakal collection site
02	15SPBT03	ABIRAMI, P	NAN	Isolation and characterization of heavy metal degrading biosurfactant produced by <i>Alcaligenes faecalis</i>
03	15SPBT05	ASIFA NASREEN, S	CB	Larvicidal activity of synthesized silver nanoparticles using Lactobacillus against vector mosquitoes
04	15SPBT06	BALACHANDRIKA, D	AS	Studies on the synthesis and activity of beta galactosidase produced from <i>Candida tropicalis</i>
05	15SPBT07	HELEN PRIYANKA, P	NAN	Optimization of acetic acid production using microbes isolated from decayed fruits
06	15SPBT08	KEERTHATHANA, B	VS	Extraction and characterization of pigment produced from bacteria and its application in industries
07	15SPBT09	KRISHNA VENI, P	TSR	Standardization of microbial alginate production and its application in bioremediation
08	15SPBT10	KRITHIKA, S.K.	AS	Characterization of amino acid production by microbes isolated from soil
09	15SPBT11	MAHESHWARI, M	Rm.M	A facile green synthesis of silver nanoparticles using <i>Piper betle</i> and its therapeutic applications
10	15SPBT13	PAVITHRA, S	DPR	Optimization of cellulase enzyme production by microbes isolated from termite and grasshopper
11	15SPBT14	POOJA ABARNA, P	AS	Optimization of protease producing bacteria isolated from soil
12	15SPBT15	POORNIMA AISHWARYA, S	KS	Effect of secondary metabolites of <i>Notonia grandiflora</i> on selected microorganisms
13	15SPBT17	RISWANA THASWIN, S	VS	Synthesis, optimization and application of marine bacterial calcite
14	15SPBT18	SANGEETHA, A	CB	Plant extract mediated synthesis of silver nanoparticles and its antimicrobial activity against human pathogenic bacteria
15	15SPBT20	SINDHUJA, R	VS	Screening and characterization of phosphate solubilizing bacteria from rhizosphere soil
16	15SPBT21	SOUNDARYA, S	CB	Molecular docking studies of natural alkaloids against acetyl choline esterase in vector mosquito
17	15SPBT22	SRILALITHA, S	VS	Synthesis of silver nanoparticles using banana peel extract and its antibacterial efficiency
18	15SPBT23	SURUTHI, M	CR	Biochemical profile and heavy metal analysis in the tissue of choosen marine crabs
19	15SPBT25	YAAMINI, R	AS	Characterization of liposomes synthesized from the lipids of oleaginous yeast isolated from soil

## OTHER STAFF:

The following staff have been appointed to carryout activities of the centre

S.No	Name	Designation	Community	Wef
01	Mr. G.B. Manikandan	Field Assistant	OBC	27.01.16
02	Mr. V. Prem Kumar	Office Assistant	OBC	17.02.16

The above staff were relived on their request and new staff will be appointed in the last week of September, 2017

## **II. TRAINING**

### TRAINING PROGRAMMES ORGANIZED

Training Programmes organized by the Centre participated by students of various institutions of Southern Tamilnadu		
Programme	Dates	Participants
Two day workshop on Multiplex ligation dependent probe amplification and its application in collaboration with Department of Zoology & BITS, Hyderabad Campus	21.12.15 & 22.12.15	PG Microbiology & Biotechnology
Two day Workshop on UV-Vis Spectrophotometric techniques along with Department of Zoology	09.01.16 & 10.01.16	Selected undergraduate students from various institutions
Winter school on Statistics for biologists	21.11.16 to 26.11.16	PG biology students
Winter schools on Mathematical modelling on Bioresource management	21.11.16 to 26.11.16	PG Mathematics & Biology students
Winter school on Kinetics of marine microbial products	21.11.16 to 26.11.16	UG & PG biology students

### TRAINING PROGRAMMES ATTENDED BY STAFF, SCHOLARS & STUDENTS IN OTHER INSTITUTIONS:

Programme	Date	Participant(s)
Operation and maintenance training – Shimadzu UV-1800 and AAS – 7000 conducted by Toshvin Analytical Pvt. Ltd.,	11.02.15	S. Muralikrishnan Research Scholar
State level workshop on Latex, Department of Mathematics, Saiva Banu Kshatriya College	07.03.15	P. Nirvin, Research Scholar

Pasteurization and milk products manufacturing – Aavin Milk Processing unit, Madurai	20.07.15	I M.Sc., Biotechnology students of the Centre
Plant Tissue Culture – GrowMore Biotech Ltd., Hosur	23.09.15	I M.Sc., Biotechnology students of the Centre
Five Day National Workshop on Modelling, stimulation and optimization of bioprocess organized by Department of Biotechnology, NIT, Warangal	02.11.15 – 06.11.15	P. Nirvin, Project Fellow
International Workshop on Scholarly research publications: Writing, citations and Plagiarism, Periyar University	01.02.16	P. Nirvin, Project Fellow
Visit to Networking Resource Centre in Biological Sciences, Madurai Kamaraj University – DNA sequencing	17.02.16	I M.Sc., Biotechnology students of the Centre
*UGC & DBT Sponsored National Seminar cum Workshop on Microbial Omics: From Genome to Proteome, Bioinformatics Infrastructural Facility, Department of Biotechnology, Alagappa University, Karaikudi	24.02.16 – 26.02.16	N. Saranya Faculty M.Sc., Biotechnology
Mathematica training program – GT Enterprises, Bangalore	25.02.16 & 26.02.16	Dr. D. Pandiaraja Director
NAAC sponsored Benchmarks for excellence in teaching and evaluation, IQAC, Thiagarajar College,	01.04.16 & 02.04.16	S. Muralikrishnan, R.Rohini & P.Nirvin Research Scholars
TEQIP-II sponsored Short term training programme on Nonlinear analysis, computations using MATLAB, Mathematica, Maple, LINGO and Cplex with applications in engineering and sciences organized by Sardar Vallabhbhai National Institute of Technology, Surat	30.09.16 – 04.10.16	P. Nirvin Research Scholar
National level workshop on genomic analysis and Protein designing using internet tools organized by Vivekananda College sponsored by Tamilnadu Science and Technology Centre, Chennai, Tamilnadu State Council for Science and Technology	06.10.16	Dr. C. Balachandran Faculty M.Sc., Biotechnology & 10 Students
DBT sponsored National Workshop on Recent trends in Molecular biology and bioinformatics, Lady Doak College, Madurai	05.01.17 & 07.01.17	G.B. Manikandan Technical assistance

National Workshop on Networking on Ecohistoric and cultural heritage of India, UBCHEA , Lady Doak College, Madurai	24.01.17 & 25.01.17	Dr. C. Balachandran & Dr. A. Surendran Faculty M.Sc., Biotechnology
Wildlife Conservation monitoring training at Tamilnadu Forest Training College,	11.07.17 & 14.07.17	Mr. S. Muralikrishnan (as resource persosn)

### III. TEACHING

#### M.Sc., BIOTECHNOLOGY COURSE

- The Centre is offering M.Sc., Biotechnology Course from the academic year 2015 affiliated to Madurai Kamaraj University

#### STUDENTS / STAFF PARTICIPATION IN VARIOUS ACTIVITIES

Programme	Date	Participant(s)
Inauguration of Science Club in the Centre – Presentation of lectures by students of Biotechnology	31.08.17	M.Sc., Biotechnology students
One day Science Workshop – National Science Day, Yadhava College, IISER, Thiruvananthapuram, Kerela	28.02.17	05 I M.Sc., Biotechnology Students
Intercollegiate Competition on fauna, VV Vanniaperumal College for Women, Virudhunagar	10.02.17	04 I M.Sc., Biotechnology students
Visit to Department of Biotechnology, Bharathidasan University, Trichirappalli	03.01.17	I M.Sc, Biotechnology students
National Level Workshop on genomic analysis and Protein designing, Vivekananda College, Madurai supported by TN Science and Technology Centre, TNSCST, TN Science Forum	06.10.16	10 students of I and II M.Sc., Biotechnology participated
State level intercollegiate meet – Microbes 2016, organized by Ayya Nadar Janaki Ammal College, Sivakasi	08.09.16	10 students of I MSc., Biotechnology students
Colloquium – 2	19.12.15	Mrs. N. Saranya, Faculty and students of I M.Sc., Biotechnology students
Visit to Networking Resource Centre in Biological Sciences, Madurai Kamaraj University – DNA sequencing	17.02.16	I M.Sc., Biotechnology students of the Centre
Multiplex liagation dependent probe amplification, Thiagarajar College, Madurai	21.12.15 – 22.12.15	12 students have participated
	23.09.15	I M.Sc., Biotechnology students of

Plant Tissue Culture – GrowMore Biotech Ltd., Hosur		the Centre
State level students' Seminar, Thiagarajar College, Madurai	11.09.15	S. Pavithra & R. Sindhuja
Live healthy and live young – Guest lecture by Dr. K. Kanchana, MD., DGO.,	28.08.15	I M.Sc., Biotechnology students
Colloquium – 01	22.08.15	Capt. Dr. N. Arun Nagendran, Joint Director, Dr.T.S. Ramya –Lakshmi, Mrs. N. Saranya, Faculty and students of I M.Sc., Biotechnology students
Pasteurization and milk products manufacturing – Aavin Milk Processing unit, Madurai	20.07.15	I M.Sc., Biotechnology students of the Centre

#### IV. PHYSICAL PROGRESS

- Established a wet lab and bioresource collection centre with seed bank, algal reference collection, microbial culture stock and mushroom collection
- Established a dry lab with Mathematical software

#### V. FUTURE PLAN

##### Research:

Promoting interdisciplinary research

Increasing the strength of research scholars

Organizing seminars/conferences

Signing MoUs

#### LIST OF SOFTWARE PURCHASED BY CoE, UNDER THIS SCHEME

S.No.	Description	Qty.
01	Matlab 8.01 with 9 tool boxes	06 users
02	SPSS 22.0 with 15 modules	10 users
03	Wolfram Mathematica V.9.0 – single user ESD	01 user

#### LIST OF SELECTED INSTRUMENTS PROCURED BY CoE, UNDER THIS SCHEME

S.No	Date of Purchase	Description
01	24.10.2013	PRINTER HP LASERJET M1005
02	24.10.2013	PRINTER CANON MP 287
03	24.10.2013	HI POWER 12 V WITH TUBULAS BATTERIES – 20 Nos
04	26.10.2013	LENOVO THINK CENTRE SILT, W 7,27,16,36,18,30,07,13,21,23
05	08.11.2013	APPLE MAC BOOK PRO
06	16.12.2013	AA 7000 ATOMIC ABSORPTION SPECTROPHOTOMETER
07	16.12.2013	UV SPECTROPHOTOMETER
08	29.01.2014	S.A 3*2 COMPUTER TABLES – 10 Nos
09	04.02.2014	1200 INFINITY DAD HPLC
10	13.02.2014	SINGLE PENTO REVOLVING CHAIR – 10 Nos
11	31.03.2014	15 KW ONLINE UPS, 26 AH SMF BATTERY – 10 Nos
12	24.03.2015	ALUMINIUM PARTITION 4 DOORS
13	03.07.2015	DAIKIN 1.5 TR; V GUARD STABILIZER and ACCESSORIES
14	22.12.2015	DAIKIN 1.5 TR – 2 Nos, V GUARD STABILIZER – 2 No
15	12.02.2016	PH ELECTRODE – 2 Nos.
16	19.02.2016	WATER BATH 6 HOLES – 2 Nos
17	29.02.2016	APPLE ADAPTOR
18	02.03.2016	WEB CAMERA AND SPEAKER
19	17.03.2016	ULTRASONIC BATH 3.5 LTR
20	17.03.2016	MICRO CENTRIFUGE 1000 RPM – 10000
20	28.03.2016	UPS WITH DC POWER PACK 1 No (NUMERIC)
21	29.03.2016	PH METER DIGITAL WITH COMBINED ELECTRODE – 2 Nos
22	19.03.2016	WHIRLPOOL DC 200L FRIDGE – 4 Nos. with STABILIZER
23	24.05.2016	LENOVO CPU WITH MONITOR – 10 Nos
24	27.05.2016	BOX FOR EFFONDORF TUBES – 20
25	27.05.2016	SYRINGE FILTER – 10;
26	27.05.2016	MEMBRANE FILTER-3
27	27.05.2016	MINI COOLER – 5
28	27.05.2016	INCUBATOR ORDINARY- 2
29	27.05.2016	AUTOCLOAVE VERTICAL 550*760
30	30.05.2016	ELECTROPHORESIS UNIT – 2 Nos WITH POWER SUPPLY

PRINCIPAL & DIRECTOR