



Qualification

Qualification	University / Board	Year	Specialization
Ph.D.	REC,Tiruchy(Bharathidasan University)	2000	Chemical Engineering
M.E. / M.Tech.	REC,Tiruchy (Bharathidasan University)	1988	Chemical Engineering
B.E. / B.Tech.	Annamalai University India	1985	Chemical Engineering

Experience

Organization	Designation	Period
REC, Tiruchy	Lecturer	14/10/1992 to 2/2/1998
REC/NIT, Tiruchy	Assistant Professor	3/2/1998 to 1/7/2007
NIT, Tiruchy	Professor	1/7/2007 to 29/4/2019
NIT, Tiruchy	Professor (HAG)	29/4/2019 to Till date

Professional / Research Interests

- 1) Process Engineering, Modeling and Control
- 2) Thermal Engineering and Fluid Technology
- 3) Biochemical and Bioprocess Technology
- 4) Environmental Engineering

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1. PUBLICATIONS

JOURNALS/INTERNATIONAL

Sl. No.	Title	Author(s)	Journal	Year Vol. (No), Page
1	Improvement in Performance of Heat Exchanger Fitted with Twisted Tape	Sivashanmugam. P, and Sundaram.S	American Society of Civil Engineers Journal	1999, Vol. 1, pp. 35
2	Hydrodynamics of Annular Circulating Fluidized Bed Drier	Sivashanmugam. P. and Sundaram.S	Journal of Powder Technology	1999, Vol. 103, pp. 165-169
3	RTD studies in Annular Circulating Fluidized Bed Drier	Sivashanmugam. P. and Sundaram.S	Journal of Powder Technology	2000, Vol. 107, pp. 256-258
4	Hydrodynamics of Annular Circulating Fluidized Bed Drier with Course Sand Particles	Sivashanmugam. P and Sundaram.S	Journal of Bioprocess Engineering	2001
5	Hydrodynamics of Annular Circulating Fluidized Bed Drier with Fine Sand Particles	Sivashanmugam P. and Sundaram.S	Journal of Powder Handling and Processing	2000, Vol. 12(2), pp. 157-160
6	Hydrodynamics of Annular Circulating Fluidized Bed Drier with Green gram Particles	Sivashanmugam. P. and Sundaram.S	Journal of Powder Handling and Processing	2000, Vol. 12(4), pp. 379-382
7	Experimental studies on Treatment of Distillery effluent by Emulsion Liquid Membrane Extraction	Kumaresan.T. Meera Sheriffa Begum, K.M. Sivashanmugam,P., Anantharaman, N. and Sundaram, S.	Chemical Engineering Journal	2003, Vol 95, pp. 199-204
8	Experimental studies on heat transfer and friction factor characteristics in laminar flow through a	Sivashanmugam, P and S Suresh	Journal of Applied Thermal Engineering	2006, Vol. 26, pp. 1990-1997

	circular tube fitted with helical screw-tape inserts			
9	Experimental studies on heat transfer and friction factor characteristics in laminar flow through a circular tube fitted with regularly spaced helical screw-tape inserts	Sivashanmugam, P and S Suresh	Journal of Experimental Thermal and Fluid Science	2007, Vol. 31(4), pp.301-308
10	Experimental studies on heat transfer and friction factor characteristics in turbulent flow through a circular tube fitted with helical screw-tape inserts	Sivashanmugam, P and S Suresh	Journal of Chemical Engineering and Processing	2007, Vol. 46(12), pp. 1292-1298
11	Experimental studies on heat transfer and friction factor characteristics in turbulent flow through a circular tube fitted with regularly spaced helical screw-tape inserts	Sivashanmugam, P and S Suresh	Journal of Applied Thermal Engineering	2007, Vol. 27, pp. 1311-1319
12	Experimental studies on heat transfer and friction factor characteristics in laminar flow through a circular tube fitted with right-left helical screw-tape inserts	Sivashanmugam, P, and Nagarajan P.K	Journal of Experimental Thermal and Fluid Science.	2007, Vol. 32(1), pp. 192-197
13	Experimental studies on heat transfer and friction factor characteristics in turbulent flow through a circular tube fitted with right-left helical screw-tape inserts	Sivashanmugam, P, and Nagarajan P.K	Journal of Chemical Engineering Communication	2008, Vol. 195, pp. 977-987
14	Studies on degradation of chlorinated aromatics by using	Manikandan R, Prabhu H.J, Sivashanmugam P	African Journal of Biotechnology	2007, Vol. 6(11),

	immobilized cell crude extract of <i>Pseudomonas aeruginosa</i>			pp. 1338-1342
15	Biodegradation of chlorobenzene using immobilized cell crude extract in packed column	Manikandan R, Prabhu H.J, Sivashanmugam P	African Journal of Biotechnology	2007, Vol. 6(19), pp. 2259-2266
16	Experimental studies on Parboiling of paddy by ohmic-heating	Sivashanmugam, P, and Arivazhagan M	International Journal of Food Engineering	2008, Vol. 4(1)
17	Simulation of an effect of a baffle length on the power consumption in an agitated vessel	Sivashanmugam, P, and Prabakar S	International Journal of Food Engineering	2008, Vol. 4(2)
18	Fuzzy Coordinated PI Controller: Application to the Real-Time Pressure Control Process	N. Kanagaraj, P. Sivashanmugam and S. Paramasivam	Advances in Fuzzy Systems	2008, Vol. (2008), doi:10.1155/2008/691808.
19	Experimental Studies on Pressure Control Using Intelligent PI Fuzzy Supervisory Approach	P. Sivashanmugam, N. Kanagaraj and R.Kumar	International Journal of Food Engineering	2008, Vol. 4(2)
20	Fuzzy Logic based Supervisory control scheme for Real Time Pressure Regulation	N. Kanagaraj, P. Sivashanmugam and S. Paramasivam	Journal of Control and intelligent systems	2009, Vol. 37, pp. 160-169
21	A Fuzzy Logic Based Supervisory Hierarchical Control Scheme for Real time Pressure Control	N. Kanagaraj, P.Sivashanmugam and S. Paramasivam,	International Journal of Automation and Computing	2009, Vol. 6(1), pp. 88-96
22	A Robust Intelligent PID type Fuzzy Control Structure for Pressure Control	P. Sivashanmugam, N. Kanagaraj and R.Kumar	Chemical Engineering Communications	2009, Vol. 196, pp. 291-304
23	Modeling of heat transfer augmentation in a circular tube fitted with right-left helical	P. Sivashanmugam	Chemical product and process Modeling	2008, Vol. 3(1)

	inserts in laminar flow using CFD			
24	Heat transfer and pressure drop studies in a circular tube fitted with straight full twist	Siva Rama Krishna , Govardhan Pathipaka and P.Sivashanmugam	Journal of Experimental Thermal and Fluid Science	2009, Vol. 33, pp. 431–438
25	CFD approaches for modeling of Energy saving turbine agitator; Comparison of Experimental data with simulated results	P.Sivashanmugam and D.Ankamma Rao	Journal of Scientific Research and Essays	2008, Vol. 3
26	CFD Modeling and simulation of heat transfer augmentation in a circular tube fitted regularly spaced twist inserts in laminar flow using CFD	P. Sivashanmugam and S.Suresh	Journal of advances in Engineering science	2008, Vol. 3(1)
27	CFD Modeling of Heat Transfer Augmentation in a Circular Tube Fitted with Right-Left Helical Inserts in Turbulent Flow	P. Sivashanmugam	<i>International Journal of Food Engineering</i>	2009, Vol. 5(1), Article 3
28	Experimental and CFD Modeling of effect of baffle cut on power consumption Volume	Sandeep Pullabotla and P.Sivashanmugam	Journal Chemical product and process Modeling	2009, Vol. 4(1)
29	A Simple Self-Tuning Scheme using Fuzzy Logic for a Non-Linear Pressure Regulating System	N. Kanagaraj, P. Sivashanmugam and S. Paramasivam	International Journal of Automation and Control	2010, Vol. 4(3), pp. 256-270
30	Experimental and CFD simulation studies on power consumption in mixing using energy saving turbine agitator	D.Ankamma Rao and P. Sivashanmugam	Journal Industrial and Engineering Chemistry	2010, Vol. 16, pp. 157-161
31	Biodegradation of chlorobenzene using immobilized cell crude extract in packed column	Manikandan R, Prabhu H.J, and Sivashanmugam P	African Journal of Biotechnology	2008, Vol. 7(12), pp. 2038-2042
32	Enhancement of Heat Exchanger Control	Gopalakrishna G., Sivakumaran N. and Sivashanmugam P	Sensors & Transducers Journal	2009, Vol. 107(8),

	Using Improved PID Controller			pp. 144-156
33	Neuro and Fuzzy Computing Approach for the Flow Sensorless Measurement	R. Kumar, and P.Sivashanmugam	Sensors & Transducers Journal	2009, Vol. 109(10), pp. 21-28
34	CFD simulation of heat transfer augmentation in a circular tube fitted with varying width right-left helical inserts with	P.K.Nagarajan and P.Sivashanmugam,	spacer International Journal of Chemical Engineering research	2009, Vol. 1(1), pp. 1-11
35	Heat transfer and pressure drop studies in a circular tube fitted with straight half twist	Siva Rama Krishna , Govardhan Pathipaka and P.Sivashanmugam	International Journal of Chemical Reactor Engineering	2009, Vol. 7, Article 666
36	CFD simulation of heat transfer behavior of nanofluids in a uniformly heated circular tube fitted with helical inserts in laminar flow	Govarthan Pathipakka and P.Sivashanmugam	Superlattices and Microstructures	2010, Vol. 47(2), pp. 349-360
37	Studies on heat transfer and friction factor characteristics of turbulent flow through a micro finned tube fitted with Left-right inserts	P.K.Nagarajan , Yagna Mukkamala and P.Sivashanmugam	Applied Thermal Engineering	2010, Vol. 30(13), pp.1666-1672
38	Optimisation of 2,4 Dichlorophenol degradable crude extracts produced by Pseudomonas Aeriginosa using Box behnken	Manikandan R, Prabhu H.J, Sivashanmugam P,CN.Pradeepa, Pankaj Shah	Design, Nature and Science	2009, Vol. 7(7), pp. 117-128
39	Degradation studies textile reactive dye by combined electrochemical, microbial and photo catalytic methods	C. Ahmed Basha,K.V.Selvakumar, H.J.Prabhu , P.Sivashanmugam and Chang woo Lee	Journal of separation and purification Technology	2011, Vol. 79, pp. 303–309

40	Heat transfer studies in coiled agitated vessel with varying heat input	V.T.Perarasu , M.Arivazhagan , and P.Sivashanmugam	International Journal of Food Engineering	2011, Vol. 7(4), Article3
41	Heat transfer enhancement studies in a circular tube fitted with right-left helical inserts with spacer	P.K.Nagaraja , and P.Sivashanmugam	World Academy of Science, Engineering and Technology	2011, Vol. 58, pp. 840-844
42	Influence of stack geometry and resonator length on the performance of thermoacoustic engine	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan	Applied Acoustics	2012, Vol. 73, pp. 1052–1058
43	Optimization of thermoacoustic primemover using response surface Methodology	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan,	Journal of HVAC&R Research	2012, Vol. 18(5), pp. 890-903
44	Experimental and theoretical investigation of thermoacoustic prime mover	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan,	Journal of HVAC&R Research	2012, Vol. 18(6), pp.1112-1121
45	Heat transfer of TiO ₂ /water nanofluid in a coiled agitated vessel with propeller	V.T.Perarasu, M.Arivazhagan., P.Sivashanmugam	Journal of Hydrodynamics	2012, Vol. 24(6), pp. 942-950
46	Heat transfer Characteristics of TiO ₂ /water nanofluid in a coiled agitated vessel with Disk turbine agitator	V.T.Perarasu, M. Arivazhagan., P.Sivashanmugam,	Chemical Engineering Communications	2013, Vol. 200(6), pp. 783-797
47	Effect of resonator length and working fluid on the performance of twin thermoacoustic heat engine – Experimental and simulation studies	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan	Computers & Fluids	2013, Vol. 75, pp. 51–55
48	Optimization of thermoacoustic refrigerator using response surface methodology	N. M. Hariharan P.Sivashanmugam and S. Kasthuriengan	Journal of Hdrodynamics	2013, Vol. 25(1), pp. 72-82

49	CFD Simulation of thermoacoustic heat engine	H.Muralidharan, N. M. Hariharan, V.T.Perarasu, P.Sivashanmugam and S. Kasthuriengan,	Progress in Computational Fluid Dynamics	2014, Vol.14(2) , pp. 131–137
50	Influence of operational and geometrical parameters on the performance of twin thermoacoustic prime mover	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan	International Journal of Heat and Mass transfer	2013, Vol. 64, pp. 1183–1188
51	Experimental investigation of a thermoacoustic refrigerator driven by a standing wave twin thermoacoustic prime mover	N. M. Hariharan, P.Sivashanmugam and S. Kasthuriengan	International Journal of Refrigeration	2013, Vol. 36, pp. 2420–2425
52	Treatment of Oil tanning effluent by electrocoagulation: Influence of ultrasound and hybrid electrode on COD removal	P.Maha Lakshmi and P.Sivashanmugam	journal of Separation and Purification Technology	2013, Vol. 116, pp. 378–384
53	Experimental and CFD Heat Transfer Studies of Al ₂ O ₃ -Water Nanofluid in a Coiled Agitated Vessel Equipped with Propeller	V.T.Perarasu, M. Arivazhagan., P.Sivashanmugam	Chinese Journal of Chemical Engineering	2013, Vol. 21(11), pp. 1232–1243
54	Extraction of Peroxidase from waste <i>brassica oleracea</i> used for the treatment of aqueous phenol in synthetic waste water	Ashutosh Nath Deva, C. Arun , G. Arthanareeswarana, and P. Sivashanmugam	Journal of Environmental Chemical Engineering	2014, Vol. 2, pp. 1148–1154
55	Studies on Performance of Thermoacoustic Prime Mover	N. M. Hariharan P. Sivashanmugam and S. Kasthuriengan,	Experimental Heat Transfer	2015, Vol. 28, pp. 267–281
56	CFD modeling study of heat transfer in a coiled agitated vessel	V.T.Perarasu, M. Arivazhagan., P.Sivashanmugam ,	Progress in Computational Fluid Dynamics	2014, Vol. 14(3), pp. 177–188
57	Investigation of biocatalytic potential of	C.Arun, and P.Sivashanmugam ,	Process Safety and	2015, Vol. 9(4),

	garbage enzyme and its influence on stabilization of industrial waste activated sludge		Environmental Protection	pp.471–478
58	Solubilization of waste activated sludge using a garbage enzyme produced from different preconsumer organic waste,	C.Arun and P.Sivashanmugam	RSC Adv.	2015, Vol. 5, pp. 51421-27
59	Identification and optimization of parameters for the semi-continuous production of garbage enzyme from pre-consumer organic waste by green RP-HPLC method	C.Arun and P.Sivashanmugam	Waste management	2015, Vol. (44), pp. 28-33
60	Formation of polycyclic aromatic hydrocarbons in Claus process from contaminants in H ₂ S feed gas	Shabin Mohammed, Abhijeet Raj, Ahmed Al Shoaibi , and P Sivashanmugam	Chemical Engineering Science	2015, Vol. 137, pp. 91–105
61	Impact of acoustic cavitation on food emulsions	Olga Krasulya, Vladimir Bogush, Victoria Trishina, Irina Potoroko, Sergey Khmelev, Palani Sivashanmugam , Sambandam Anandan	Ultrasonics Sonochemistry	2016, Vol. (30), pp. 98–102
62	Influence of operational parameters on performance of twin thermoacoustic prime mover:CFD Studies	<u>P. Jabbar</u> , <u>N.M. Hariharan</u> , <u>P. Sivashanmugam</u> , <u>S. Kasthuriengan</u>	Engineering Computations	Vol. 33 (3), (2016), pp.759-766, https://doi.org/10.1108/EC-01-2015-0018
63	Study on optimization of process parameters for enhancing the multi-hydrolytic	C. Arun and P. Sivashanmugam	Bioresource Technology	Vol. 226, (2017), pp 200–210

	enzyme activity in garbage enzyme produced from preconsumer organic waste			
64	Grindability studies on blended coals of high ash Indian coals with low ash imported coals	K. Ananda Babu, A. Lawrence, P.Sivashanmugam	International Journal Coal Preparation and Utilization	http://dx.doi.org/10.1080/19392699.2017.1281254
65	Thermo-chemo-sonic pre-digestion of waste activated sludge for yeast cultivation to extract lipids for biodiesel production	P. Selvakumar, and P. Sivashanmugam	Journal of Environmental Management	Vol. 198 (2017), pp 90-98
66	Optimization of lipase production from organic solid waste by anaerobic digestion and its application in biodiesel production	P. Selvakumar, and P. Sivashanmugam	Fuel Processing Technology,	Vol. 165 (2017), pp 1-8,
67	The Sonochemical Impact on Food Emulsions. <i>Bulletin of the South Ural State University. Ser.</i>	Krasulya O.N., Bogush V.I., Khmelev S.S., Potoroko I.Yu., Tsirulnichenko L.A., Kanina K.A., Yushchina E.A., Anandan S., Sivashanmugam P.	<i>Food and Biotechnology,</i>	2017, vol. 5, no. 2, pp. 38–48. (in Russ.) http://dx.doi.org/10.14529/food170206 .
68	Economical synthesis of silver nanoparticles using leaf extract of <i>Acalypha hispida</i> and its application in the detection of Mn (II) ions	Sithara R, Selvakumar P, Arun C, Anandan Samandam, and Sivashanmugam P	Journal of Advanced research	Vol. 8, (2017), pp 561-568,
69	Studies on Performance of Thermoacoustic Prime Mover	N. M. Hariharan P. Sivashanmugam and S. Kasthuriengan	Experimental Heat Transfer	, Vol. pp 28, 267–281, 2015
70	Experimental heat transfer behaviour of graphite - water microfluid in a coiled agitated vessel	N. M. Hariharan and P. Sivashanmugam	Heat Transfer—Asian Research	1-15, 2017

71	'Extraction of consortium of hydrolytic enzymes from waste activated sludge using ultrasonication and stirring with surfactants'	Sethupathy Anbazhagan, Sivashanmugam Palani	Ultrasonics – Sonochemistry,	Vol. 40PA, (2018), pp. 874-880,
72	Dispersion induced ozone pretreatment of waste activated biosolids: Arriving biomethanation modelling parameters, energetic and cost assessment	R. Yukesh Kannah, S. Kavitha, J. Rajesh Banu, Obulisamy Parthiba Karthikeyan, P. Sivashanmugam	Bioresource Technology	Vol. 244, (2017), pp 679–687
73	Computational fluid dynamics simulation of open ended thermoacoustic prime mover with straight and tapered.	H.Muralidharan, N. M. Hariharan, V.T.Perarasu, P. Sivashanmugam and S. Kasthuriengan	HVAC&R Research	Vol. 19, (2013), pp 208–212
74	Simulation Study of IMC and Fuzzy Controller for HVAC System	Umamaheshwari and P.Sivashanmugam ,	Sensors & Transducers Journal	Vol. 105(6), 2009, pp 66-72
75	CFD Simulation of twin thermoacoustic prime mover for binary gas mixtures,	N. M. Hariharan and P. Sivashanmugam	High Temperature Journal	(DOI: 10.1134/S0018151X18020232)
76	Optimization of Process Parameters for Efficient Bioconversion of Thermo-chemo Pretreated <i>Manihot esculenta</i> Crantz YTP1 Stem to Ethanol	P. Selvakumar S. Kavitha and P. Sivashanmugam	Waste and Biomass Valorization	doi.org/10.1007/s12649-018-0244-7
77	CFD simulation on the performance of twin thermoacoustic prime mover for various resonator lengths and operating pressures	N. M. Hariharan, S.Arun, P. Sivashanmugam and S. Kasthuriengan	<i>Heat Transfer—Asian Res.</i>	DOI: 10.1002/hjt.21306

78	Enhanced production of biohydrogen from dairy waste activated sludge pre-treated using multi hydrolytic garbage enzyme complex and ultrasound – optimization	C. Arun and P. Sivashanmugam	Energy Conversion and Management	164 (2018) 277–287
79	Simple and low-cost synthesis of CuO nanosheets for visible-light-driven photocatalytic degradation of textile dyes	Martha Purnachander Rao, Pannerselvam Sathishkumar, Ramalinga Viswanathan Mangalaraja, Abdullah M. Asiri, Palani Sivashanmugam , and Sambandam Anandan	Journal of Environmental Chemical Engineering	6 (2018) 2003–2010
80	Green synthesis of silver nanoparticles using leaf extract of <i>Acalypha hispida</i> and its application in blood compatibility	Selvakumar. P, Sithara. R, Viveka. K, Sivashanmugam. P	Journal of Photochemistry & Photobiology, B: Biology	182 (2018) 52–61.
81	Multi-hydrolytic biocatalyst from organic solid waste and its application in municipal waste activated sludge pre-treatment towards energy recovery	Selvakumar. P, and Sivashanmugam. P	<i>Process Safety and Environmental Protection</i>	117 (2018) 1–10
82	Study on Lipid Accumulation in Novel Oleaginous Yeast <i>Naganishia liquefaciens</i> NITTS2 Utilizing Pre-digested Municipal Waste Activated Sludge: A Low-Cost Feedstock for Biodiesel Production	Selvakumar. P, and Sivashanmugam. P	Applied Biochemistry and Biotechnology	DOI: 10.1007/s12010-018-2777-
83	Effect of Surfactant assisted sonic pretreatment on liquefaction of Fruits and Vegetable residue:	M. Shanthi, J. Rajesh Banu, and P. Sivashanmugam	journal of Bioresource Technology	264 (2018) 35–41

	Characterization, Acidogenesis, Biomethane yield and Energy ratio			
84	Investigation on ultrasonication mediated biosurfactant disintegration method in sludge flocs for enhancing hydrolytic enzymes activity and polyhydroxyalkanoates	Sethupathy Anbazhagan, and Sivashanmugam Palani	Journal of Environmental Technology.	https://doi.org/10.1080/09593330.2018.1481887
85	Study on optimization of co-digestion process parameters for enhancing biohydrogen production using response surface methodology	A. Sethupathy, G. Ravi Teja, C. Arun, and P. Sivashanmugam	Journal of Energy Sources, Part A: Recovery, Utilization, and Environmental Effects	2018, VOL. 40, NO. 14, 1753–1764
86	Numerical studies on heat transfer characteristics of graphite - water microfluid in a coiled agitated vessel,	Sivashanmugam P	<i>Heat Transfer Asian Res.</i>	2018;47:824–834
87	Enhancing biomethane potential of pulp and paper sludge through disperser mediated polyhydroxyalkanoates ,	A. Sethupathy, A, Sivashanmugam P	Energy Conversion and Management	173 (2018) 179-186
88	Ultrasound Assisted Oleaginous Yeast Lipid Extraction and Garbage Lipase Catalyzed Transesterification for Enhanced Biodiesel Production	Selvakumar. P, and Sivashanmugam.P	Energy Conversion and Management	179 (2019) 141–151.
89	Biohydrogen production from rice straw: Effect of combinative pretreatment, modelling assessment	R. Yukesh Kannah , S. Kavitha , P. Sivashanmugam ,Gopalakrishnan Kumar , Dinh Duc Nguyen , Soon Woong Chang , and J. Rajesh Banu	International Journal of Hydrogen energy	44 (2019) 2203–2215.

	and energy balance consideration,			
90	Enhancing hydrogen production through anaerobic co-digestion of fruit waste with biosolids,	A. Sethupathy, G. Ravi Teja, C. Arun, and P. Sivashanmugam	Journal of Environmental Science and Health, Part A	https://doi.org/10.1080/10934529.2019.1571320
91	Thermo-sonic assisted enzymatic pre-treatment of sludge biomass as potential feedstock for oleaginous yeast cultivation to produce Biodiesel	Selvakumar. P, A.Arunagiri and Sivashanmugam.P	Renewable Energy	139 (2019) 1400-1411
92	Synergistic effect of combined pre-treatment in solubilizing fruits and vegetable residue for biogas production: Hydrolysis, energy assessment	M. Shanthi , J. Rajesh Banu, and P. Sivashanmugam	Fuel	250 (2019) 194–202
93	Solubilisation of fruits and vegetable dregs through surfactant mediated sonic disintegration: impact on biomethane potential and energy ratio, Environmental Technology	M. Shanthi , J. Rajesh Banu, and P. Sivashanmugam	Environmental Technology	https://doi.org/10.1080/09593330.2019.1677784
94	Disperser coupled rhamnolipid disintegration of pulp and paper mill waste biosolid: Characterisation, methane production, energy assessment and cost analysis	A. Sethupathy, A. Arunagiri, P. Sivashanmugam , J. Rajesh Banu, Muthupandian Ashokkumar	Bioresource Technology	297 (2020) 122545
94	Advances and challenges for sustainable ecosystems	A. Arunagiri, M. Perumalsamy,T. Sivasankar, P. Sivashanmugam , Suranani Srinath	Environmental Science and Pollution Research	(2020) 27:20573–20575
96	Enrichment of biomethane production from paper industry	A. Sethupathy, C. Arun, P. Sivashanmugam , R. Ranjith kumar	Fuel	279 (2020) 118522

	biosolid using ozonation combined with hydrolytic enzymes,			
97	Enhancement of ultrasound assisted aqueous extraction of polyphenols from waste fruit peel using dimethyl sulfoxide as surfactant: Assessment of kinetic models,	P. Selvakumara, V. Karthikb, P. Senthil Kumarc., P. Asaithambid, S. Kavithae, P. Sivashanmugam	Chemosphere	263 (2021) 128071 https://doi.org/10.1016/j.chemosphere.2020.128071
98	Amelioration of methane production efficiency of paper industry waste sludge through hydrolytic enzymes assisted with poly 3 hydroxybutyrate	A. Sethupathy, P. Sivashanmugam	Energy	214(2021) 119083 https://doi.org/10.1016/j.energy.2020.119083
99	Trends in Biological Nutrient Removal for the Treatment of Low Strength Organic Wastewaters	J Rajesh Banu, J Merrylin, S Kavitha, R Yukesh Kannah, P Selvakumar, S Gopikumar, P Sivashanmugam , Khac-Uan, Do	Current Pollution Reports, Springer publication	https://doi.org/10.1007/s40726-020-00169-x
100	Evaluation of biohydrogen production potential of fragmented sugar industry biosludge using ultrasonication coupled with egtazic acid	A. Sethupathy, Patturi Syam kumar, P. Sivashanmugam , C.Arun, J. Rajesh Banu, Muthupandian Ashokkumar	International Journal of Hydrogen Energy	Accepted for publication and Article in press
101	Mercury removal from aqueous solution using petal-like MoS ₂ nanosheets	Ragini Pirarath, P Sivashanmugam , Asad Syed, Abdallah M. Elgorban, Sambandam Anandan, Muthupandian Ashokkumar	Front. Environ. Sci. Eng.	2021, 15(1): 15 https://doi.org/10.1007/s11783-020-1307-0

102	Corrosive nature of the wetting behaviour modified AISI 304 stainless steel with a surface microgroove	P Sivashanmugam , K. Sureshvarr, R. Kannan, Abhilash Kumar Nair, R. Sairam Krishna, Yaswanth Varikuti and Abhishek Gollapalli	Int. J. Materials Engineering Innovation	Vol. X, No. Y, xxxx in press
103	Study on the Ethanol Production from Hydrolysate Derived by Ultrasonic Pretreated Defatted Biomass of Chlorella sorokiniana NITTS3	K. Dhandayuthapani, V. Sarumathi, P. Selvakumar, Tatek Temesgen, P. Asaithambi and P. Sivashanmugam	Chemical Data Collections	31 (2021) 100641
104	An intensified approach for transesterification of biodiesel from Annona squamosa seed oil using ultrasound-assisted homogeneous catalysis reaction and its process optimization	Sundaramahalingam M.A.,Karthikumar S., Shyam Kumar R., Karl J. Samuel; Shajahan S., Sivasubramanian V., Sivashanmugam P. , Varalakshmi P., Asad Syed ., Najat Marraiki ., Abdallah M. Elgorban R., Vinoth Kumar and I. Ganesh Moorthy	Fuel	291(2021) 120195
105	Enrichment of hydrogen production from fruit waste biomass using ozonation assisted with citric acid Waste Management & Research, Sage publication	A. Sethupathy, Pathak Pushkar Kumar, P. Sivashanmugam , C. Arun, J Rajeshbanu, and Ashokkumar Muthupandian,	Waste Management & Research, Sage publication	DOI:10.1177/0734242X211010364
106	Study on removal of silver and polyethylene terephthalate from exposed radiography films using enzyme protease	C Arun, P.Maha Lakshmi, A Sethupathy, Karthikeyan S, P.Sivashanmugam and J Rajesh Banu	Journal of Journal of Material Cycles and Waste Management	https://doi.org/10.1007/s10163-021-01267-8
107	An encapsulated report on enzyme-assisted transesterification with an allusion to lipase 3 Biotech	M. A. Sundaramahalingam, C. Amrutha, P. Sivashanmugam, J. Rajeshbanu	3 Biotech	2021) 11:481; https://doi.org/10.1007/s13205-021-03003-3

108	Bioethanol from hydrolysate of ultrasonic processed robust microalgal biomass cultivated in dairy wastewater under optimal strategy	K. Dhandayuthapani, P. Senthil Kumar, Wen Yi Chia, Kit Wayne Chew, V. Karthik, H. Selvarangaraj, P. Selvakumar, P. Sivashanmugam, Pau Loke Show	Energy,	2021,122 604, https://doi.org/10.1016/j.energy.2021.122604
109	In silico approach for enhancing innate lipid content of <i>Yarrowia lipolytica</i> , by blocking the acyl-CoA oxidase-1 enzyme, using various analogous compounds of lipids	Sundaramahalingam, M.A., Amrutha, C., Rajeshbanu, J., Thirukumaran, K., Manibalan, S., Ashokkumar Muthupandian,, Sivashanmugam, P	Journal of Biomolecular Structure and Dynamics	,1,14,2021,0739-11 https://doi.org/10.1080/07391102.2021.2008498
110	Studies on evaluation of surfactant coupled sonication pretreatment on <i>Ulva fasciata</i> (marine macroalgae) for enhanced biohydrogen production,	A.V. Snehya, M.A. Sundaramahalingam, J. Rajeshbanu, S. Anandan, P. Sivashanmugam	Ultrasonics Sonochemistry	
111	A review on contemporary approaches in enhancing the innate lipid content of yeast cell,	M.A. Sundaramahalingam, P. Sivashanmugam, J. Rajesh banu, Muthupandian Ashokkumar,A	Chemosphere	,Volume 293,2022, 133616,ht tps://doi.org/10.1016/j.chemosphere.2022.133616
112	Optimization of Process Parameters for Efficient Bioconversion of Thermo-chemo Pretreated Manihot esculenta Crantz YTP1 Stem to Ethanol	P. Selvakumar, S. Kavitha, P. Sivashanmugam		https://doi.org/10.1007/s12649-018-0244-7
113	Nor Saadah M. Yusof, Sambandam Anandan, Palani Sivashanmugam, Erico M.M. Flores, Muthupandian Ashokkumar,A correlation between cavitation bubble temperature, sonoluminescence and		Ultrasonics Sonochemistry,	85,2022,1 05988

	interfacial chemistry – A minireview,			
114	Studies on evaluation of pretreatment efficiency of surfactant mediated ultrasonic pretreatment of Sargassum tennerimum (marine macroalgae) for achieving profitable biohydrogen production, International	A.V. Snehya, M.A. Sundaramahalingam, J. Rajesh banu, P. Sivashanmugam ,	Journal of Hydrogen Energy,	2022,47, 17184-17193. https://doi.org/10.1016/j.ijhydene.2022.03.216
115	Studies on evaluation of surfactant coupled sonication pretreatment on Ulva fasciata (marine macroalgae) for enhanced biohydrogen production	A.V. Snehya, M.A. Sundaramahalingam, J. Rajeshbanu, S. Anandan, P. Sivashanmugam	Ultrasonics Sonochemistry	81,2021,1 05853 https://doi.org/10.1016/j.ultsonch.2021.105853
116	A review on contemporary approaches in enhancing the innate lipid content of yeast cell,	M.A. Sundaramahalingam, P. Sivashanmugam , J. Rajesh banu, Muthupandian Ashokkumar	Chemosphere	293,2022, 133616, https://doi.org/10.1016/j.chemosphere.2022.133616 .
117	Optimization of Process Parameters for Efficient Bioconversion of Thermo-chemo Pretreated Manihot esculenta Crantz YTP1 Stem to Ethanol	P. Selvakumar, S. Kavitha, P. Sivashanmugam	Waste and Biomass Valorization,	10 , 2177–2191 (2019) https://doi.org/10.1007/s12649-018-0244-7
118	A correlation between cavitation bubble temperature, sonoluminescence and interfacial chemistry – A minireview,	Nor Saadah M. Yusof, Sambandam Anandan, Palani Sivashanmugam , Erico M.M. Flores, Muthupandian Ashokkumar	Ultrasonics Sonochemistry	85,2022,1 05988, https://doi.org/10.1016/j.ultson

				ch.2022.1 05988
119	Studies on evaluation of pretreatment efficiency of surfactant mediated ultrasonic pretreatment of Sargassum tennerimum (marine macroalgae) for achieving profitable biohydrogen production	A.V. Snehya, M.A. Sundaramahalingam, J. Rajeshbanu, P. Sivashanmugam	International Journal of Hydrogen Energy	,2022, 47, 17184-17193. https://doi.org/10.1016/j.ijhydene.2022.03.216
120	Phase separated pretreatment strategies for enhanced waste activated sludge disintegration in anaerobic digestion: An outlook and recent trends,	V. Godvin Sharmila, Gopalakrishnan Kumar, P. Sivashanmugam , Grzegorz Piechota, Jeong-Hoon Park, S. Adish Kumar, J. Rajesh Banu	Bioresource Technology	363,2022, 127985. https://doi.org/10.1016/j.biortech.2022.127985
121	Nanostructured zinc orthotitanates for photocatalytic removal of dye pollutants,	Ragini Pirarath, Ujwala O. Bhagwat, Sivashanmugam Palani , Belqasem Aljafari, Anandan Sambandam	Materials Science and Engineering: B,	287,2023, 116107, https://doi.org/10.1016/j.mseb.2022.116107
122	Recent advances in consolidated bioprocessing for conversion of lignocellulosic biomass into bioethanol – A review	Selvakumar Periyasamy, J. Beula Isabel, S. Kavitha, V. Karthik, Badr A. Mohamed, Desta Getachew Gizaw, P. Sivashanmugam , Tejraj M. Aminabhavi,	Chemical Engineering Journal	453, 2023,139783, https://doi.org/10.1016/j.cej.2022.139783
123	Surfactant-assisted ultrasonic fragmentation of mixed fruit and vegetable biomass: Its impact on biomethane yield and energy analysis	M. Shanthi, M.A. Sundaramahalingam, J. Rajeshbanu, P.Sivashanmugam	Fuel	334, 2023,126617, https://doi.org/10.1016/j.fuel.2022.126617 .
124	Production of lipase from <i>Priestia endophytica</i> SSP strain and its potential application in deinking of printed paper,	M.A.Sundaramahalingam Pavithra Vijayachandran , J.Rajeshbanu , and P.Sivashanmugam	Biomass Conversion and Biorefinery	https://doi.org/10.1007/s13399-022-03556-0

125	Surfactant combined ultrasonic pre-treatment for the disintegration of <i>Sargassum tennerimum</i> (Marine macroalgae) and evaluation of its efficiency for the generation of biohydrogen	A.V. Snehya, M.A. Sundaramahalingam, J. Rajeshbanu, P. Sivashanmugam	Bioenergy research -Springer	DOI: 10.1007/s12155-023-10582-x
127	Concomitant strategy of wastewater treatment and biodiesel production using innate yeast cell (<i>Rhodotorula mucilaginosa</i>) from food industry sewerage and its energy system analysis,	M.A. Sundaramahalingam, and P. Sivashanmugam	Renewable Energy	208 (2023) 52–62
128	Corrosive nature of the wetting behaviour modified AISI 304 stainless steel with a surface microgroove,	Sureshvarr, K, R. Kannan, Abhilash Kumar Nair, R. Sairam Krishna, Yaswanth Varikuti, Abhishek Gollapalli and P. Sivashanmugam ,	Inter-science Journal	12 , (2021) 68-82.
129	Biodiesel production from a novel renewable source through the ultrasound-assisted transesterification process, using energy efficient nano catalyst developed from waste material,	M.A. Sundaramahalingam, and P. Sivashanmugam ,	Fuel	346,2023, 128397, https://doi.org/10.1016/j.fuel.2023.128397
130	Production of microbial carotenoid using innate inherent of the food industry wastewater,	M.A. Sundaramahalingam, and P. Sivashanmugam ,	Journal of Molecular Liquids	,388,2023, 122772, https://doi.org/10.1016/j.molliq.2023.122772
131	Biohydrogen recovery by biosurfactant-induced ultrasonic fractionation of macroalgae,	M. A. Sundaramahalingam, A. V. Snehya, P. Sivashanmugam , J. Rajeshbanu and S. Anandan	Biomass Conversion and Biorefinery	https://doi.org/10.1007/s13399-023-05197-

	Sargassum tennerimum,			
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PUBLICATIONS- NATIONAL JOURNAL

Sl. No.	Title	Author(s)	Journal	Year Vol. (No), Page
1	Hydrodynamics of Annular Circulating Fluidized Bed Drier using Millet and Ragi Particles	Sivashanmugam. P. Sree Lakshmi and Sundaram.S.	Journal of Scientific and Industrial Research	2002, Vol. 61, pp. 275-279
2	Seperation of L-Glutamic Acid by Emulsion Liquid Membrane Extraction,	Bhuvaneshwari.S, Meera Sheriffa Begum K.M, Sivashanmugam P , Anantharaman N, Sundaram S	Journal of Scientific and Industrial Research	2003, Vol. 62, pp. 329-333
3	Studies on Hydrodynamics of Annular Circulating Fluidized Bed Drier using Millet and Ragi Particles	Sivashanmugam. P. Sree Lakshmi and Sundaram.S.	Journal of Food Technology	2003, Vol. 46(6)
4	Drying studies in Annular Circulating Fluidised Bed Drier	Sivashanmugam. P	Journal of Scientific and Industrial Research	2003, Vol. 62, pp. 1067-1070
5	Studies on Hydrodynamics of Annular Circulating Fluidised Bed Drier with Millet-Ragi Particle Mixture	Sivashanmugam. P , and Sree Lakshmi	Journal of Indian Chemical Society	2004, Vol. 80, pp. 1-4
6	Extraction of L-Glutamic Acid by Emulsion Liquid Membrane Extraction	Venkatesan S, Meera Begum K.M, Sivashanmugam. P , and Anantharaman N	Journal of Indian Chemical Society	2004, Vol. 81, pp. 264-266
7	Real Time of change of Pressure Measurement and Control	N.Kanagraj, P.Sivashanmugam and R.Kumar	Journal of Scientific and Industrial Research	2007, Vol. 66, pp.1 20-123
8	Recurrent Neuro Computing Approach for the Flow Sensorless Measurement and Control	Kumar R , Sivashanmugam P and Palani ,	Journal Instrument Society of India	2006, Vol. 36(4), pp. 267-275

9	Flow Sensorless Measurement and Control using soft computing	Kumar R , Sivashanmugam P	Journal Instrument Society of India	2007, Vol. 37(2), pp. 112-121
10	Decolorisation of Crystal violet dye and Congo red dye using Electrocoagulation	Amaresh Reddy Y, Arivazhagan M and Sivashanmugam, P	Indian Journal of Environmental Protection	2007, Vol. 27(6), pp. 516-526.
11	Removal of Chromium VI from Industrial waste using Electrocoagulation	Mahesh G, Vivek Narayanan N, Arivazhagan M and Sivashanmugam, P	Indian Journal of Environmental Protection	2007, Vol. 27(4) pp. 303-312
12	Heat transfer and pressure drop studies in a circular tube fitted with straight half twist	Siva Rama Krishna , Govardhan Pathipaka and P.Sivashanmugam,	Journal of Environmental Research and Development	2008, Vol. 3(2), pp.437-440
13	Studies on effect of cut in baffle and Turbine blade on power consumption	Pullabatala Sandeep and P.Sivashanmugam	Journal of Environmental Research and Development	2009, Vol. 4(2) pp.549-551
14	Heat transfer behavior of nanofluids in a uniformly heated circular tube fitted with helical inserts in laminar flow	Siva Rama Krishna and P.Sivashanmugham	IUP Journal of Chemical Engineering	2010, Vol. II(2)
15	CFD Simulation of Subcooled Vertical Nucleate Boiling	K.Nawaz Mohamed and P.Sivashanmugham	IUP Journal of Chemical Engineering	2010, Vol. II(4)
16	CFD Simulation of Heat Transfer Characteristic in Pilot plant scale bubble column	Lutukurthy D.N.V.V.Konda and P.Sivashanmugham	IUP Journal of Chemical Engineering	2011, Vol. III(2)
17	A comparative study on biodegradation of chlorobenzene using Pseudomonas aeruginosa, Nicordia hydrocarbonoxidase	Manikandan R, Prabhu H.J and Sivashanmugam P;	Journal of Environment and Pollution Technology	2007, Vol. 6(3), pp. 399-406

18	Studies on degradation of chlorobenzene using immobilized cell crude extract of Nicardia hydrocarbonoxidase	Manikandan R, Prabhu H.J and Sivashanmugam P ;	Journal of Environment and Pollution Technology	2008, Vol. 7(1), pp. 1-6
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INTERNATIONAL CONFERENCES

Sl. No.	Author(s)	Title	Name of the Conference, Place, Date
1	Sivashanmugam.P	Studies on Dispersion of Newtonian Fluid in a tube Fitted with Twisted Tape and Kenics Mixer	International conference on Mixing and Crystallisation, Malaysia, 1998
2	Prabhu.H.J. and Sivashanmugam.P.	Fluidised Bed Biomethanation of waste water	International workshop on Energy and Environment, Periyar Maniammai College of Engineering, Nov-2001
3	Sivashanmugam.P , Anantharaman. N, Meera Sheriffa Begum K.M, and Sridar.S.	Process Integration study of Ammonia Plant	International symposium on Recent trends in Heat and Mass Transfer, I.I.T Guwahatti, Jan-2002
4	Kumar R, Sivashanmugam P and Kaliyugavarathan S	Intelligent Fuzzy and Conventional Control Implementation Using RTOS and TCP/IP	International Conference on Digital Aided Modeling and Simulation, CIT Coimbatore, Jan-2003
5	.Kanagraj, P.Sivashanmugam and R. Kumar	N An Embedded Fuzzy Controller for Real time Pressure Control accepted	IEEE Conference, IIT, Mumbai, from 15-17 Dec 2006
6	N.Kanagraj, P.Sivashanmugam and R.Kumar	Feed Forward Integral Fuzzy approach for Pressure Control	International Conference on System Cybernetics, Pentagon Research Center, Hyderabad, from 03-07 Jan 2007
7	N.Kanagraj, P.Sivashanmugam and R.Kumar	Real Time Pressure Control Using three inputs Integral Fuzzy approach	TIMA(International Conference), NIT, Tiruchirappalli
8	R.Maheswari, N.Kanagaraj, R.Kumar and P.Sivashanmugam	High Accuracy Direct Digital Read out of Relative Humidity and Temperature Uisng Embedded System	TIMA (International Conference), NIT, Tiruchirappalli
9	S.Suresh, P.Sivashanmugam ,	CFD Modeling of Heat Augmentation in a circular	ISMC, IIT, Guwhatti, from 08-10 Dec 2006

	and S.Prabhakaran	tube fitted with helical twist inserts in a laminar flow under constant flux	
10	Sivashanmugam, P and S Suresh, Prabakaran S and Ankamma Rao D	Modeling Heat transfer Augmentation in a circular tube fitted with helical twist insert in turbulent	International conference on Modeling and simulation, CIT, Coimbatore, from 27-29 Aug 2007
11	Sivashanmugam, P and Prabakaran S and Rathod Kailash Nayak	Simulation of an effect of a baffle length on the power consumption in an agitated vessel,	International conference on Modeling and simulation, CIT, Coimbatore from 27-29 Aug 2007
12	R.Manikandan, H.J.Prabhu, P.Sivashanmugam , C.N.Pradeeba, and L.S.Dina Livya	“Optimisation of Chlrobenzene biodegradable Extracts Production by Pseudomonas Auruginosa Using Experimental methods	International conference on Modeling and simulation, CIT, Coimbatore from 27-29 Aug 2007
13	N.Kanagraj, and P.Sivashanmugam	Intelligent Fuzzy Coordinated Control Scheme for Pressure Control ProcessReal Time Pressure Control Using three inputs Integral Fuzzy approach	International Conference on Computational Intelligence and Multimedia Applications 2007, Mepco Schelenk Engineering College, Sivakasi, 2007
14	P.Sivashanmugam , , Prabakaran S and Ankamma Rao D	Modeling of Heat Augmentation in a circular tube fitted with twisted tape inserts in a laminar flow using CFD	International conference on Resource Utilization and Intelligent system, Kongu Engineering College, Erode, from 03-5 Jan 2008
15	Pullabatala Sandeep and P.Sivashanmugam	Studies on effect of cut in baffle and Turbine blade on power consumption	paper presented in International Congress on Environmental Research, BIT-Pilani Goa campus from 20-22 Dec 2008
16	Siva Rama Krishna, Govardhan Pathipaka and P.Sivashanmugam	Studies on heat transfer augmentation in a circular tube fitted with straight half twist left-right inserts in laminar flow	International Congress on Environmental Research, BIT-Pilani, Goa campus, from 17-19 Dec 2008
17	Pullabatala Sandeep and P.Sivashanmugam	Studies on effect of V cut in baffle and Turbine blade on power consumption	International Conference on Emerging Trends in Engineering, Pravera College of Engineering, from 20-22 Dec 2008
18	Krishnama Raju Inavolu and P.Sivashanmugam	Heat transfer and pressure drop studies in a circular tube fitted with V cut twisted tape	Emerging Research and Advances in Mechanical Engineering, Vellammal College of Engineering, from 19-21 March 2009

19	N. Kanagaraj,M .Y .Sanavullah, P. Sivashanmugam , S. Paramasivam	Fuzzy based online tuning of PI controller for pressure regulation' paper presented in the international conference on Electrical energy system and power electronics in emerging economics	SRM university, Chennai, 16-17 April 2009
20	S. Kasthuriangan, U. Behera, V.Krishnamoorthy , B. V. Kamble, B.T. Kuzhiveli , N.M.Hariharan,and P.Sivashanmugam	Experimental studies of a thermoacoustic prime mover for the development of a pulse tube cryocooler	Cryogenic Engineering Conference and International Cryogenic Materials Conference, 2011
21	A.Farjana Begum, N.Muthu Remena, S.Chittibabu, K.Thirumalavan, and P .Sivashanmugam	Optimization of media components for pullulan production	International conference on Green Technology for pollution prevention and control NIT, Tiruchirapalli, 27-29 th Sep 2014
22	R. Madhu Nisha, V. T .Perarasu and P. Sivashanmugam	CFD Studies on heat transfer studies of Aluminium oxide ethylene glycol Nano fluids in a coiled agitated vessel	International conference on Green Technology for pollution prevention and control NIT, Tiruchirapalli, 27-29 th Sep 2014
23	S. Arun, R. Madhu Nisha, V .T. Perarasu and P. Sivashanmugam	CFD Simulation heat transfer studies of Nano fluids in a coiled agitated vessel using turbine agitator	International conference on Green Technology for pollution prevention and control, NIT, Tiruchirapalli, 27-29 th Sep 2014
24	S. Arun, R. Madhu Nisha, V .T. Perarasu and P. Sivashanmugam	CFD Simulation heat transfer studies of Nano fluids in a coiled agitated vessel	International conference on Advances in chemical engineering and technology, TKM College of Engineering Kollam, Kerala 23-26 th October 2014
25	S. Arun, R. Madhu Nisha, V .T. Perarasu and P. Sivashanmugam	CFD Simulation heat transfer studies of Nano fluids in a coiled agitated vessel	International conference on Advances in chemical engineering and technology, TKM College of Engineering, Kollam, Kerala, 23-26 th Oct 2014

NATIONAL CONFERENCE

Sl. No.	Author(s)	Title	Name of the Conference, Place, Date
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1	Sivashanmugam P	Treatment of Heavy Metals in Metal Finishing Industries	National Seminar on Advanced Wastewater Treatment, Annamalai University, 1997
2	Sivashanmugam P	Computer Aided Design of Heat Exchanger presented	National symposium on Computer Application in Chemical Engineering, CIT Coimbatore, 1998
3	Sivashanmugam P and Prabhu H.J.	Production of Citric from Commercial Sugar by Aspergillus Niger	CHEMCON, Visakapattinam, 1998
4	Sivashanmugam P and Prabhu H.J.	Production of Citric Acid using mixed Culture of Yeast and Aspergillus Niger	CHEMCON, Jalandhar Punjab, 1999
5	Kumar P , Sivashanmugam P and Palani S	Intelligent Control of Boiler using Fuzzy logic	National Symposium on Intelligent Measurement and Control conducted, MIT Chennai, Feb 2000
6	Sivashanmugam P and Prabhu H.J	Production of Alpha Amylase	CHEMCON, Calcutta, 2000
7	Sivashanmugam P Baskar and Abarna	Computer Aided Design and Performance Analysis of Cyclone Dust Collector	CHEMCON, Calcutta, 2000
8	Sivashanmugam P and Mohan Rao	Computer Aided Design of Evaporator	CHEMCON, Calcutta, 2000
9	Sivashanmugam P and Arivazhagan M	Energy Audit and Design Strategies for the Efficient Design of Incinerator for Solid Waste Disposal	RAWM-2001, BHU, Varanasi, 2001
10	Anantharaman N, Sivashanmugam P and Meera Sheriffa Begum K.M	Studies on Treatment of Dairy Wastewater using Three phase Fluidization	CHEMCON-2001, Chennai, 2001
11	Sivashanmugam. P , Jameer Hasan M and Rajagopal B	Computer Aided Design of Skirt Support	CHEMCON-2001, Chennai, 2001

12	Sivashanmugam P , Senthil Prabhu J.M and Vijaya Kumar	Computer Aided Design of Horizontal Cylindrical Storage Tank	CHEMCON-2001, Chennai, 2001
13	Sivashanmugam P , Chittibabu S.,	Denitrification study in a Biological Fluidised Bed Reactor using Brick particles	Environics-2002, Thiagarajar College of Engineering, 2002
14	Kumar.R, Umapathi.M, Sivashanmugam.P , Kaliyugavarathan.S	Embedded Image Processing Using Invariant Moments and RTOS	First National Conference on Modern Trends in Electrical and Instrumentation Systems, GCT Coimbatore, March 2002
15	Kumar R, Sivashanmugam P and Kaliyugavarathan	Embedded Co- processor Scheduling for Fuzzy and Conventional Control using RTOS and TCP/IP	National Symposium on Instrumentation, Bhrathiar University, Nov 2002
16	Kumar R, Sivashanmugam P and Kaliyugavarathan	Embedded low cost Hospital data communication using Device drivers	National Symposium on Instrumentation, Bhrathiar University, Nov 2002
17	Sivashanmugam P and K.Selvam	Removal of Mercury (II) by adsorption	CHEMCON-2002, Hyderabad, 2002
18	Kumar.R, Sivashanmugam.P , Kaliyugavarathan.S	Embedded Humidity control and Monitoring using RTOS Device Drivers	National Conference on Intelligent System Automation, and Signal Processing (NCIASP'03), RMD Engineering College, Chennai, 25-02- 2003
19	Kumar.R, Sivashanmugam.P , Kaliyugavarathan.S	Embedded Multi Channel Humidity control and Interrupt based Scheduling using RTOS Device KERNEL	National Conference on Process Identification, Control and Diagnosis, Annamalai University, Annamalai Nagar, 8 and 9 th Aug 2003
20	Saravanan S, Deepak S ,Velappan K.C, and Sivashanmugam P	Optimal Design of Plate Heat Exchanger	CHEMCON-2003 RRL, Orissa, Bhubaneshwar, 2003

21	Saravanan S, Anantharaman.N, Velappan K.C, Sivashanmugam P , K.M.Meera Sheriffa Begum	Removal of Cr (IV) ions from aqueous solutions by Emulsion Liquid Membrane	CHEMCON-2003, RRL. Orissa Bhubaneshwar, 2003
22	P.Sivashanmugam and C.Chittibabu	Denirtification study in a Fluidised Bed Reactor using spent activated alumina	one day conference on Safety Environment and Energy Management (SEEM 2004), NIT, Tiruchirappalli, 2004
23	P.Sivashanmugam	Environmental Management System.	one day conference on Environmental Impacts and Pollution Awareness conducted at CEESAT, NIT, Tiruchirappalli, 2004
24	Manikandan R, Sivashanmugam P and Prabhu H.J.	Biodegradation of Monochlorobenze ne by Pseudomonous Alragenosa Nicardia Hydrocarboxydan se and Mycoplana dimorpha and fitting biomass data to the logistic equation,	National Symposium on Recent trends in Biotechnology, Bishop Heper College, Tiruchy, 24 -02-2005 to 25-02- 2005
25	S.Suresh, P.Sivashanmugam , and P.K.Nagarajan	CFD Simulation of Heat Augmentation in a circular tube fitted with regularly spaced helical twist inserts in a laminar flow under constant flux	AER 2006, IIT, Bombay from 4-5 Dec 2006
26	S.Suresh, P.Sivashanmugam , and P.K.Nagarajan	CFD Simulation of Heat Augmentation in a circular tube fitted with regularly spaced helical twist inserts in a turbulent flow under constant flux	CHEMCON-2006, Ankeleshawar, Gujarat, from 27-30 Dec 2006
27	P.Sivashanmugam and S.PrabHakaran	Investigation of Heat Transfer and	Arunai Engineering college, Thruvannamalai, 2007

		Pressure drop Augmentation for laminar flow using CFD Analysis	
28	Siva Rama Krishna , Govardhan Pathipakka and P.Sivashanmugam	CFD Simulation of Heat Transfer Augmentation in a Circular Tube Fitted with Right-left Helical Inserts in Laminar Flow	CHEMCON -2008, Chandigarh, 2008
29	Siva Rama Krishna , Govardhan Pathipakka and P.Sivashanmugam	Experimental studies on heat transfer augmentation in a circular tube fitted with straight half type twist in laminar flow	CHEMCON-2008, Chandigarh, 2008
30	Pullabatala Sandeep and P. Sivashanmugam	Experimental studies on power consumption in an agitated vessel fitted with cut baffle	CHEMCON-2008, Chandigarh, 2008
31	Sivashanmugam, P, and Nagarajan P.K	Studies on heat transfer and friction factor characteristics in laminar flow through a circular tube fitted with right-left helical screw-tape inserts with 100 mm spacer	National conference on Impact of Chemical Engineering and Biotechnology on Process Industries in the New Millennium, St Joseph College of Engineering, Chennai, 11 th March 2009
32	Sivashanmugam, P, and Nagarajan P.K	Studies on heat transfer and friction factor characteristics in turbulent flow through a circular tube fitted with right-left helical screw-tape inserts with 100 mm spacer	National conference on Rural and renewable energy conducted in Gandhigram rural University, Dindukal, 26 th March 2009
33	Sivashanmugam, P, and Nagarajan P.K	Studies on heat transfer and	3 rd National conference on Emerging Trends and Innovations in Chemical

		friction factor characteristics in laminar flow through a circular tube fitted with right-left helical screw-tape inserts with 300 mm spacer	Engineering, St. Peter College of Engineering, Chennai, 27-28th March 2009
34	Sivashanmugam, P, and Nagarajan P.K	CFD Simulation of Heat Transfer Augmentation in a Circular tube fitted with right-left helical Inserts with spacer in laminar flow	3 rd National conference on Emerging Trends and Innovations in Chemical Engineering, St. Peter College of Engineering, Chennai, 27-28th March 2009
35	Siva Rama Krishna V, Govardhan Pathipaka , Krishnama Raju I and Sivashanmugam P	CFD simulation of heat transfer augmentation in a circular tube fitted with straight full twist inserts in laminar flow	3 rd National conference on Emerging Trends and Innovations in Chemical Engineering, St. Peter College of Engineering, Chennai, 27-28th March 2009
36	Sivashanmugam, P, and Govradan Pathipakka and Nagarajan P.K;	CFD Simulation of Heat Transfer Augmentation in a Circular tube fitted with right-left helical Inserts with 300 mm spacer in laminar flow	National conference on Challenges in Biotechnology, M.V.J. College of Engineering, Bangalore, 16 – 17th April 2009
37	Rajish C.S., Nawas Mohammad K, Sivashanmugam, P	CFD Simulation on effect tape width in twist inserts on Heat Transfer Augmentation in a Circular tube in laminar flow	Twenty fifth in National convention of Chemical Engineer, Cochin, 8 – 10 Oct 2010
38	Rajish C.S., Sivashanmugam, P	RTD studies in a circular tube fitted with twisted tape	CHENCON-2010, Annamalai University, Tamilnadu, 27-29 Dec 2010

1. AWARDS

Sl.No	Name of the Award	Year
1	Best teacher award	2008

2	Golden Jubilee Distinguished Alumni award	2014
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2. INVITED LECTURES

Sl.No	Name of the topic	Programme	Date	Organization
1	Environment of Non-convectional Energy	conference on Trends and Developments in Renewable Energy Sources	27/02/2009	Anna University Tiruchirappalli-620 024
2	Key note speaker	international conference on Smart technologies for materials, communications, controls, computing and energy	5-7 Jan2010	

3. SHORT TERM COURSES

Sl. No.	Title	Duration	No. of Participants	Sponsored by
1	Safety, Environment Management Emerging trends	13 days	40	AICTE-ISTE
2	Energy Management and Non-conventional Energy	13 days	40	AICTE-ISTE
3	Emerging Technologies for Biotechnology and Chemical Processes	2days	30	self-financing category
4	RESEARCH Avenues in mult-interdisciplinary area of Chemical Engineering	2 days	30	self-financing category
5	Methodology of preparation of technical interview for campus placement for prefinal year students	2 days	30	self-financing category

4. WORKSHOPS

Sl. No.	Title	Duration	No. of Participants	Sponsored by
1.	Safety in Chemical Process industry	1	30	TEQIP

2.	Recent Advances and Challenges of Biotechnology Processes	2	30	TEQIP
3.	Recent trends in wastewater treatment	1	30	TEQIP
4.	Two weeks ISTE Workshop on Engineering Thermodynamics conducted by IIT,Mumbai under the National Mission on Education through ICT	10 days	40	MHRD
5.	R and D Proposals to National and International funding for Researchers-Approach and Preparation	2 days	60	TEQIP
6.	Energy conservation: Scope and options Jan 2014	1 day	50	TEQIP
7.	Recent Initiatives on Energy and Environmental Research 16.02.2016	1 day	50	TEQIP
8.	An Insight into solar Energy & Bio Energy application" on 23.07.2016	1 day	50	TEQIP
9.	Current Research Scenarios in Energy, Environmental and Chemical Engineering, Jan 2017	2 days	50	TEQIP

5. MEMBERSHIP IN PROFESSIONAL SOCIETIES

Sl.No.	Type of membership	Organization	Membership Number
1	Life member	Indian society for Technical Education	LM13223
2	Life member	Institution of Engineers	M120536-0
3	Life member	Indian Institute of Chemical Engineers	LM 26927

Technical Paper Reviewer

Reviewer of Heat transfer Engineering, Experimental thermal and fluid science, International journal of heat and mass transfer, International communication of heat and mass transfer, Chemical Engineering science, Computers and Fluids, Chemical Process intensification, Journal of separation and purification Technology, Chemical Engineering Taylor and Francis etc

6. SPONSORED & CONSULTANCY PROJECTS

Completed

Sl. No.	Name of the Project	Sponsoring Agency	Amount (Rs. in Lakhs)	Year of Completion
1	MODROB project	MHRD	10.00 lakhs	2006
2	R and D Project -Studies on Emulsion Liquid Membrane Extraction	MHRD	10.00 lakhs	2006
3	R and D Project- Design and Development of Embedded System for Rate change of Pressure Measurement	MHRD	8.00 lakhs	2006
4	R and D Project- Heat transfer Augmentation studies in Heat Exchanger	CSIR	7.82 lakhs	2010
5	Experimental and Theoretical aspects of Ultrasound in Food Emulsion	Indo-Russia joint research project	20.50lakhs	June 2015
6	An Alternative Green Sonochemical Process Optimization and Pathway Studies	DST-WTI	31.49 lakhs	21/02/2017
7	SPARK	MHRD	64.5 lakhs	Feb 2019

Ongoing

Sl. No.	Name of the Project	Sponsoring Agency	Amount (Rs. in Lakhs)	Year
1	FIST 2017	DST	95 lakhs	1.04.2018

7. PROJECTS GUIDED

Ph.D. Guided

Sl. No	Name of the Thesis	Year
1	Heat transfer Augmentation studies in a circular tube fitted with helical screw inserts	Dec 2006
2	Real time studies of flow sensor less measurement and control	Mar 2007
3	Studies on intelligent pressure control	Sep 2008
4	Studies on Heat transfer Augmentation in a circular tube fitted with Right-Left helical twist insert	Mar 2009
5	Studies on Thermoacoustically Driven Thermoacoustic Refrigerator	May 2013
6	Investigation on production of garbage enzyme from pre-consumer organic waste and its influence on dairy waste activated sludge to enhance biohydrogen production	July 2017
7	Bioconversion of pre-treated municipal waste activated sludge for biodiesel production under optimal strategy	June 2019
8	Extraction of value added byproducts from waste sludge and its influence on biomethane production of pulp and paper industry sludge	December 2020
9	Studies on Biohydrogen production from Marine macro algae	July 2022
10	Effect of surfactant mediated ultrasonic pre-treatment on fruits and vegetable waste for energy efficient biomethane production	13.12.2022

Ph.D. Co. Guided

Sl. No	Name of the Thesis	Year
1	Studies on Biodegradation of Chlorinated Aromatic Hydrocarbon	Dec 2008
2	Heat transfer characteristics of Nano fluids in a coiled agitated vessel	Jan 2013

M.S Guided

Sl. No	Name of the Thesis	Year
1	Experimental and CFD studies on effect of cut in baffle and turbine agitator on power consumption	May 2009

M.Tech.

Sl. No	Name of the Thesis	Year
[1]	Fermentation of Citric acid from Commercial Sugar by <i>Aspergillus Niger</i>	1994

[2]	Studies on Flow Pattern and Pressure drop for the tube fitted with twisted tape and Kenics Element	1995
[3]	Studies on Circulating Fluidized Bed Drier	1996
[4]	Studies on Energy Audit in Combined Cycle Power Plant	1996
[5]	Studies on Fouling of Heat Exchangers and its Mitigation Technique	1997
[6]	Studies on Energy Audit in Large Utility Boiler	1997
[7]	Studies on Hydrodynamics of Circulating Fluidized Bed Drier	1998
[8]	Process Integration study of Ammonia plant	1999
[9]	Studies on Denitrification using Fluidized Bed	2000
[10]	Studies on Removal of Mercury –II by adsorption	2001
[11]	Studies on optimization of batch digester in Kraft pulp mill	2002
[12]	Experimental studies on Agitation	2003
[13]	Experimental studies on Etherification of Acetic acid with N-Butyl Alcohol	2004
[14]	Multi-phase flow Simulation of Liquid-Solid Fluidized Bed by using CFD-CFX	2004
[15]	Studies on Hydrodynamics of Annular Circulating Fluidized Bed with Dhal particles	Jan 2005
[16]	CFD Simulation of Heat transfer in Laminar Flow through a circular tube with and without twisted tape internals	Jan 2005
[17]	Studies on Hydrodynamics of Annular Circulating Fluidized Bed with Dhal particles	June 2006
[18]	CFD Simulation of Heat transfer in Laminar Flow through a circular tube with and without twisted tape internals	June 2006
[19]	Ohmic heating in Parboiling of Paddy and Energy Audit	June 2006
[20]	Design of maximum Power point tracker for Photovoltaic Powered Water Pumping System	
[21]	CFD Simulation of Heat transfer Augmentation using varying width of twisted tape in laminar flow with power law fluid	
[22]	Fuzzy based control of Pressure	
[23]	Enhancement of heat exchanger control using optimized PID controller	
[24]	Analog implementation of and controller design of MIMO system	
[25]	Experimental and Simulation studies on power consumption in mixing using energy saving turbine agitator using water	
[26]	Pressure drop studies in helical coil fitted with inserts	
[27]	Experimental and Simulation studies on power consumption in mixing using energy saving turbine agitator using glycerol	
[28]	CFD simulation of heat transfer augmentation using helical screw inserts	
[29]	Studies on heat transfer augmentation in a circular tube fitted with straight half twist inserts	
[30]	Studies on heat transfer augmentation in a circular tube fitted with straight full twist inserts	
[31]	Studies on heat transfer augmentation in a circular tube fitted with straight full twist inserts with V cuts and varying twisted tape width	
[32]	CFD simulation of Thermoacoustic Prime mover	

[33]	Treatment of Tanning Effluent by Electrocoagulation and sonication	Dec 2012
[34]	Catalytic wet air oxidation studies of Phenol in tricked bed red reactors	Dec 2012
[35]	Enzyme based recovery of silver from exposed x-ray films	May 2013
[36]	REMOVAL OF PHENOL FROM SYNTHETIC WASTEWATER USING CAULIFLOWER (<i>Brassica oleraceae</i>) PEROXIDASE	May 2013
[37]	Effects of Different Resonator Lengths on the performance of twin prime mover –CFD studies	Dec 2014
[38]	CFD Simulation of twin thermoacoustic prime mover by varying composition of gas mixture	Dec 2014
[39]	Effects of temperature gradient on twin thermoacoustic prime mover-CFD studies	May 2014
[40]	CFD Heat transfer studies of Carbon nano tube –water nano fluids in coiled agitated vessel	May 2014
[41]	Formation of aromatics in Claus furnace	Dec 2014
[42]	CFD studies on heat transfer characteristic of Al_2O_3 –Ethylene glycol nano fluids in a coiled agitated vessel	Dec 2014
[43]	Formation of aromatics inside Claus furnace	May 2015
[44]	Experimental and Numerical studies on heat transfer characteristics of graphite-water micro fluids in a coiled agitated vessel	May 2015
[45]	Experimental and Numerical studies on effect of coil fluid flow rate on heat transfer	Dec 2015
[46]	Hydrogen production using Claus process	Dec 2015
[47]	Studies on green synthesis of silver nanoparticles towards medicinal applications (June 2016)	June 2016
[48]	Hydrogen production using Claus process using improved process (June 2016)	June 2016
[49]	Studies on Green synthesis of Silver Nano particles and its application in detection of pollutants	December 2016
[50]	Dye separation from textile waste water using CMC/ZnO Nanocomposite Membranes	December 2016
[51]	Study on Blood compatibility of Biosynthesized Silver Nanoparticles	May 2017
[52]	Application of Rankine cycle for waste heat recovery in automotive engines	May 2017
[53]	Study on surfactant assisted extraction and characterization of phenolic compounds from pomegranate peel	Dec 2017
[54]	Enhancing the anaerobic digestion of dairy waste activated sludge for bio-hydrogen production under optimized condition	Dec 2017
[55]	Optimization of ultrasound-assisted surfactant aided extraction of polyphenolic compounds from pomegranate peel	May 2018
[56]	Optimization of bio hydrogen production from anaerobic co-digestion of municipal and industrial waste activated sludge with fruit peel waste	May 2018
[57]	Control of Bioreactor Using Artificial Intelligence Techniques	Dec 2019
[58]	Extraction of Polyphenolic compounds from Mango seed Kernel	Dec 2019

[59]	Production of Biohydrogen from Fruit Waste using Disperser combined with Rumen Fluid	May 2019
[60]	Optimal design and control of tame production using genetic algorithm	May 2019
[61]	Enhancing Hydrogen production through solubilization of Sugar industry waste sludge using Sonication mediated with EGTA	Dec 2019
[62]	Solubilisation of Fruit waste to enhance Hydrogen production through ozone PRE-treatment with Citric acid	Dec 2019
[63]	Sodium thiosulphate coupled ozone pretreatment for enhanced hydrogen production from sugar industry waste sludge	May 2020
[64]	Liquefaction of fruit waste by using thermal-disperser-bio-surfactant method to enhance hydrogen production	May 2020
[65]	Computational approach in enhancing the lipase production in lipid accumulating yeast cell, <i>Yarrowia lipolytica</i>	Dec 2020
[66]	An Algorithmic Approach in Identifying Lipid Accumulating Yeast Cell Using, Genomic Data And Its Transcriptome	Dec 2020
[67]	Comparative analysis various optimization approach in enhancing the recovery of oil from plant source	May 2021
[68]	An Algorithmic Approach in Identifying Lipid Accumulating Yeast Cell Using, Genomic Data And Its Transcriptome with ANN	May 2021
[69]	Production and characterization of microbial lipase and its potential use in deinking of printed and photocopied paper	Dec 2021
[70]	An Algorithmic Approach in Identifying Liphase producing Yeast Cell Using, Transcriptome data	Dec 2021
[71]	Application of <i>Priestia endophytica</i> ssp lipase in the transesterification of the cotton seed oil	May 2022
[72]	Production and characterization of bioethanol from <i>Calotropis gigantea</i> leaves	May 2022
[73]	Production and characterization of alkaline protease enzyme for potential application in broiler chicken feather degradation	Dec 2022

B.Tech.

Every year two or three batches of students comprising two students per batch have been being guided

8. ADMINISTRATIVE ACTIVITIES

Sl. No	Name of the Activity	Year
[1]	Acted as warden for Emerald Hostel	1994
[2]	Acted as warden for Ruby Hostel	1996
[3]	Acted as time committee convener	2002
[4]	Have been acting as faculty adviser for Chemical Engineering from first to final year	1992 to till date
[5]	Acted as PAC Chairman for M.TECH Plant Design	2006
[6]	Acted as Board of study member Both UG and PG syllabus in the year	2006
[7]	Acted as PAC Chairman for UG II year	2007

[8]	Modernized Technical Analysis Lab	2007-2008
[9]	Acted as PAC Chairman for M.TECH Chemical Engg II year	2011-2012
[10]	Acting as PAC Chairman for M.TECH Chemical Engg II	2012-2013
[11]	Acted as Scrutiny cum verification committee members for APBS/CAS	2010
[12]	Acted as Scrutiny cum verification committee members for APBS/CAS	2011
[13]	Acted as School committee members	2007-2011
[14]	Acted as committee member for evolving comprehensive grading system	2011
[15]	Acted as Observer in temporary faculty recruitment in Mechanical department	2011
[16]	Acted as Refreshment committee member for Institute sports	2012
[17]	Acted as Observer in temporary faculty recruitment in Mechanical department	2012
[18]	Acting as Senate nominee and senate observer for Results finalization and Ph.D students selection	2007 to till date
[19]	Initiated activity of installing overhead water tank in Research lab	2012
[20]	Initiated activity to develop and Improve all the experiments in Chemical Reaction Engineering lab under Modrop Scheme	2007
[21]	Initiated activity to add five additional experiments namely Batch Reactor –I, Batch Reactor –II, Adiabatic Reactor, Mixed flow followed by plug flow reactor and mixed flow reactor were added in Chemical Reaction Engineering lab	2008
[22]	Acted as Invitation and announcers committee member on Annual sport day	2011
[23]	Acted as committee member for evolving the code of conduct in the senate meeting	2012
[24]	Acted as Secretary in the Eight Convocation steering committee for security arrangements and overall monitoring committee	2012
[25]	Acted as Department Administrative council member	2012 to 2010
[26]	Acted as Campus QIP Co-ordinator	November 2012 to November 2019
[27]	Acted as Staff advisor for LEOCLUB of this institute	2012 to 2015
[28]	Acted as HOD of chemical Engineering Department	27,Nov 2015 to 26,Nov 2018
[29]	Acted as Acting as PAC Chairman for M.TECH Chemical Engg II	June 2020 to Dec 2020

9. Others

- (i) Served as subject expert members in UPSC selection

- (ii) Served as subject expert members in R and D Project Evaluation in STEP-TERC and DST
- (iii) Served and serving as subject expert members in NBA accreditation team from 2009 onwards
- (iv) Served as subject expert members in Faculty selection in NITs and other academic institutions
- (v) Served as board of study member in Annamalai University, Anna University and other Deemed university

10. COUNTRIES VISITED

Singapore for two months under TEQIP program
Malaysia, Bali Indonesia for International conference
Russia under Collaborative project
Australia in July 2019 under Collaborative project

11. SHORT BIODATA

Dr.P.Sivashanmugam working as Professor (HAG) and in Chemical department in National Institute of Technology, Tiruchirapalli-620015, India with the 29 years of teaching and research experience. He is doing research in the area of process Engineering, Biotechnology, Bioprocess engineering and Environmental Engineering. He produced 12 Ph.Ds, guided 73 M.Tech thesis, published 125 papers in peer reviewed International Journals and 18 papers in peer reviewed national Journals and 63 papers in International and national conference. He has written a book on Basics of Environmental Engineering. He has also got many R and D projects, MODROB projects and FIST 2017.