PROFORMA FOR BIO-DATA

Name and full correspondence Address:

Dr. S. Shanmugan

Associate Professor, Department of Integrated Research & Discovery -Physics,

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+91 9565258522, +91 6382027920 (WharApps)

Institution: Koneru Lakshmaiah Education Foundation

Date of Birth: 13.06.1979

Gender (M/F/T): M

Category Gen/SC/ST/OBC: OBC

Whether differently abled (Yes/No): No

Academic Qualification (Undergraduate Onwards): M.Sc, M.Tech., Ph.D., PDF

S.No	Degree	Year	Subject	University/Institution	Percentage ofmarks
1.	B.Sc(Full Time)	2003	Physics	Bharathiyar University	68%
2.	M.Sc (Full Time)	2007	Physics	Bharathidasan University	67%
3.	Ph.D (Full Time)	2013	Physics	Karpagam University	68%
4	PDF (Full Time)	2015	Material Science	Tanta University/Egypt Uppsala University/Sweden	Highly Commented

Ph.D thesis title, Guide's Name, Institute/Organization/University, Year of Award.

Ph.D thesis title : Modeling and performance of single slope single basin solar still

Guide Name : Dr. B. Janarthanan

Institute/Organization

/University : Karpagam University

Year of Award : 2013

Work experience (in chronological order).

S.No	Positionsheld	NameoftheInstitute	From	To
1	Post-doctoral Research Fellow	Tanta University, Egyptian.	22 April. 2012	18 June 2013
2	Assistant Professor	Dhanalakshmi College of Engineering	22 April. 2012	18 June 2013
3	Post-doctoral Research Fellow	Uppsala University, Sweden	15 Aug.2014	10 Dec. 2014
4	Assistant Professor	Veltech Multitech Dr. RR & Dr. SR Engineering College	16. Dec. 2014	10.Feb.2019
5	Assistant Professor	K L University, Vijayawada, Andhra Pradesh	11.Feb.2019	Till date

Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

S.No	NameofAward	AwardingAgency	Year
1	World Top 2% scientist	Stanford University	2024
2	World Top 2% scientist	Stanford University	2023
3	Best Teacher Award	Department of Physics, Koneru Lakshmaiah Education Foundation, Vijayawada, Andhra Pradesh.	2023
4	World Top 2% scientist	Stanford University	2022
5	Best Teacher Award	Department of Physics, Koneru Lakshmaiah Education Foundation, Vijayawada, Andhra Pradesh.	2022
6	Best Teacher Award	Department of Physics, Koneru Lakshmaiah	2021

		Education Foundation, Vijayawada, Andhra Pradesh.	
7	Best Teacher Award	Department of Physics, Veltech Multitech Dr. RR & Dr. SR Engineering College in Chennai, Tamilnadu, India	2018
8	Young Scientist Award	InDA-2018, Anna University, Trichy Tamilnadu, India.	2018
9	Best Paper Award	ICAMS, VIT, Vellore, Tamilnadu, India.	2017
10	Best Teacher Award	Department of Physics, Veltech Multitech Dr. RR & Dr. SR Engineering College in Chennai, Tamilnadu, India	2015
11	Young Scientist Award	Karpagam University, Coimbatore, Tamilnadu, India.	2011

Experience as a journal reviewer

Served as a peer reviewer for reputed international journals published by Elsevier and Wiley

- Heat Transfer
- Nano Energy
- Advance Materials
- Renewable and Sustainable Energy Reviews
- Applied Energy
- Journal of Cleaner Production
- Journal of Energy Storage
- Applied Thermal Engineering
- Case Studies in Chemical and Environmental Engineering
- Case Studies in Thermal Engineering
- Ceramics International
- Desalination
- Energy
- Energy Conversion and Management

- Engineering
- International Journal of Thermal Sciences
- Journal of the Taiwan Institute of Chemical Engineers
- Materials Science and Engineering: B
- Materials Today: Proceedings
- Optical Materials
- Optics & Laser Technology
- Solar Energy, etc.,

Publications (List of papers published in SCI Journals, in year wise descending order).

Google Scholar link :https://scholar.google.co.in/citations?user=RoO5KbQAAAAJ&hl=en

Research Gate: https://www.researchgate.net/profile/Shanmugan_Sengottain

Scopus Link: https://www.scopus.com/authid/detail.uri?authorId=45461423000

WOS link: https://www.webofscience.com/wos/woscc/summary/5a052afe-fe2f-4791-99f1-9125a06f277c-011393095a/relevance/1

Author(s)	Title	Name of Journal	Volume	Page no	Year
Durga Prasad Kotla, Venkateswara Rao Anna, **S. Shanmugan**et al.	Optimizing solar still performance: A study of TiO_2nanofluid derived from Saccharumofficinarum L.	Separation and Purification Technology (Impact factor 8.6)	359	130584	2025
AmmarElsheikh, Mohamed A.E. Omer, **S. Shanmugan** et al	Recent advances and future prospects of laser welding technology for polymeric materials: A review	Journal of Materials Research and Technology (Impact factor 6.2)	35	7417-7440	2025
DharaniKolli, Sonali Biswas, **S.Shanmugan**	Modulating ZnO nanoparticle photoluminescence through Ce^{3+}-Induced defect engineering: A study of microstructural and spectroscopic properties	Ceramics International (Impact factor 5.1)	51	8472-8479	2025
Mohamed M.Z. Ahmed, Z.M. Omara, **S. Shanmugan**	Enhancing solar distiller performance for water desalination: A comparative review of Vertical modifications-based techniques	Results in Engineering (Impact factor 6.0)	25	104360	2025
GaliSai, Venkateswara Rao Anna, **S. Shanmugan, et al**	Evaluating the effects of sugarcane juice-mediated ZnOnanofluids on solar light activation for enhancing double-slope solar still performance	Applied Materials Today (Impact factor 7.2)	42	102542	2025
AS Abdullah, ZM Omara, **S. Shanmugan**	Leveraging nanoparticles for sustainable water harvesting: A review of solar still technologies	Results in Engineering (Impact factor 6.0)	25	104128	2025
AS El-Shafay, ÜmitAğbulut, **S Shanmugan**, MS Gad	Production of oxy-hydrogen with an alkaline electrolyzer, and its impacts on engine behaviors fuelled with diesel/waste fish biodiesel mixtures supported by graphene nanoparticles	Energy (Impact factor 9.0)	314	133934	2025
Ravinderkumar, **S. Shanmugan**, et al	Use of absorber plate built of ZnO/PVC/Bioactivation modified epoxy nanocomposites to improvement of double-effect Solar Distiller productivity analyzing the	Journal of Cleaner Production (Impact factor 11.1)	434	139601	2024

	Energy, Exergo-environment and Enviro-economical				
MurugesanPalaniappan, **S. Shanmugan**, et al.	Improving heat retention properties of steeped M-shape basin solar distillers utilizing paraffin RT50-enhanced silver nanoparticles and Manihotesculenta extracts.	Desalination (Impact factor 9.9)	586	117836	2024
Mohammed Almeshaal, S. Shanmugan	Improving the thermal efficiency of solar stills: Bioactive nano-PCM and Cramer's rule analysis	Separation and Purification Technology (Impact factor 8.6)	343	127119	2024
GhassanMousa, Ali Basem, **S. Shanmugan**, et al	Harnessing fluorescence resonance energy transfer for improved solar still performance with zinc oxide nanoparticles and activated carbon.	Applied Materials Today (Impact factor 7.2)	38	102196	2024
Fadl A. Essa,, Z.M. Omara, **S. Shanmugan**, et al.	Innovative configurations for spherical solar distillation: Ball rotation and preheating for improved productivity	Case Studies in Thermal Engineering (Impact factor 6.268)	59	104489	2024
Fadl A. Essa,, Z.M. Omara, **S. Shanmugan**, et al	Innovative configurations for spherical solar distillation: Ball rotation and preheating for improved productivity	Case Studies in Thermal Engineering (Impact factor 6.268)	59	104489	2024
S. Shanmugan, et al	A technical appraisal of solar photovoltaic-integrated single slope single basin solar still for simultaneous energy and water generation.	Case Studies in Thermal Engineering (Impact factor 6.268)	54	104032	2024
ZM Omara, **S. Shanmugan**, et al	A comprehensive review of nano-enhanced phase change materials on solar stills with scientometric analysis	Results in Engineering (Impact factor 6.0)	22	102088	2024
N. Premkumar, **S.Shanmugan**, et al	Utilizing the lignocellulosic fibers from Pineapple Crown Leaves extract for enhancing TiO2 interfacial bonding in dye-sensitized solar cell photoanodes.	Materials for Renewable and Sustainable Energy (Impact factor 4.8)	3	1-15	2024
Sethu Narayanan Tamilselvan, **S. Shanmugan**	Towards sustainable solar cells: unveiling the latest developments in bio-nano materials for enhanced DSSC effciency	Clean Energy (Impact factor 2.9)	8	238–257	2024
A. Sangeetha, **S. Shanmugan**, et al.	A review on PCM and nanofluid for various productivity enhancement methods for double slope solar still: Future challenge and current water issues.	Desalination (Impact factor 9.9)	551	116367	2023
A. Sangeetha, S. Shanmugan, et al.	Experimental evaluation and thermodynamic Gibbs free energy analysis of a double-slope U-shaped stepped basin solar still using activated carbon with ZnO nanoparticles	Journal of Cleaner Production (Impact factor 11.1)	380	135118	2022
Ravinder Kumar, **S. Shanmugan** et al	Experimental study on double effect solar distiller using bioactivity nanoparticles with analysis of thermo-economic and enviro-economical.	Case Studies in Thermal Engineering (Impact factor 6.268)	47	103045	2023
S. Sivakumar, **S. Shanmugan**, et al	Intelligent and assisted medicine dispensing machine for elderly visual impaired people with deep neural network fingerprint authentication system.	Internet of Things (Impact factor 5.9)	23	100821	2023
Ravinder Kumar, **S. Shanmugan et al**	Performance improvement of single and double effect solar stills with silver balls/nanofluids for bioactivation: An experimental analysis.	Solar Energy (Impact factor 7.188)	259	452-463	2023
Bhavani,, **Shanmugan, Sengottaiyan et al**	Precise Fourier series and fuzzification method analysis of standardized thermal energy of solar box cooker performance: economic and environmental studies.	Environmental Science and Pollution Research (Impact factor 5.19)	30	77890–77904	2023
Bahaa	Using Direct Solar Energy Conversion in Distillation	Processes (Impact	11(6)	1734	2023

Saleh, **SengottiyanShanmugan**, et al	via Evacuated Solar Tube with and without Nanomaterials	factor 3.352)			
S. Shanmugan, et al.	Chemical potential of different phases inside the pyramid stepped basin solar still through Gibbs free energy	Case Studies in Thermal Engineering (Impact factor 6.268)	49	103277	2023
AS Abdullah, Wissam H Alawee, **S Shanmugan**, ZM Omara	Techniques used to maintain minimum water depth of solar stills for water desalination–A comparative review.	Results in Engineering (Impact factor 5.12)	19	101301	2023
A Simon Prabu, V Chithambaram, M Anto Bennet, **S Shanmugan**, B Janarthanan	Performance of solar cooker with evacuated tubes and photovoltaic panels with phase change materials.	Energy Efficiency (Impact factor 3.134)	16	72	2023
A Mohandass Gandhi, **S Shanmugan**, et al.	SiO_2/TiO_2nanolayer synergistically trigger thermal absorption inflammatory responses materials for performance improvement of stepped basin solar stillnatural distiller	Sustainable Energy Technologies and Assessments (Impact factor 7.632)	55	101974	2022
Waheed Sami Abushanab, Essam B Moustafa, Mooli Harish, **S Shanmugan**, Ammar H Elsheikh	Experimental investigation on surface characteristics of Ti6Al4V alloy during abrasive water jet machining process	Alexandria Engineering Journal (Impact factor 6.626)	61	7529-7539	2022
EmadIsmatGhandourah, A Sangeetha, **S Shanmugan**, et al.	Performance assessment of a novel solar distiller with a double slope basin covered by coated wick with lanthanum cobalt oxide nanoparticles	Case Studies in Thermal Engineering (Impact factor 6.268)	32	101859	2022
S Pavithra, T Veeramani, S SreeSubha, PJ Sathish Kumar, **S Shanmugan**, et al	Revealing prediction of perched cum off-centered wick solar still performance using network based on optimizer algorithm	Process Safety and Environmental Protection (Impact factor 7.926)	161	188-200	2022
S Bhavani, V Chithambaram, R Muthucumaraswamy, **S Shanmugan**, et al.	Laplacian tactic for the prediction of the temperature components of solar cooker with logical prediction by fuzzy rules.	Solar Energy (Impact factor 7.188)	236	369-382	2022
AS Abdullah, ZM Omara, Fadl A Essa, Umar F Alqsair, MutabeAljaghtham, Ibrahim B Mansir, **S.Shanmugan**, Wissam H Alawee	Enhancing trays solar still performance using wick finned absorber, nano- enhanced PCM.	Alexandria Engineering Journal (Impact factor 6.626)	61	12417-12430	2022
Abdulmohsen O Alsaiari, S Shanmugan, et al.	Applications of TiO_2/Jackfruit peel nanocomposites in solar still: Experimental analysis and performance evaluation	Case Studies in Thermal Engineering (Impact factor 6.268)	38	102292.	2022
Arulraj Simon Prabu, VenkatesanChithambaram, **SengottaiyanShanmugan**, et al.	The performance enhancement of solar cooker integrated with photovoltaic module and evacuated tubes using ZnO/AcalyphaIndica leaf extract: response surface study analysis.	Environmental Science and Pollution Research (IF 5.19)	30	15082–15101	2022
FA Essa, AS Abdullah, Wissam H Alawee, A Alarjani, Umar F Alqsair, **S Shanmugan**, et al	Experimental enhancement of tubular solar still performance using rotating cylinder, nanoparticles' coating, parabolic solar concentrator, and phase change material	Case Studies in Thermal Engineering (Impact factor 6.268)	29	101705	2022
Ammar H Elsheikh, **S Shanmugan,**et al.	Low-cost bilayered structure for improving the performance of solar stills: Performance/cost analysis and water yield prediction using machine learning	Sustainable Energy Technologies and Assessments (IF	49	101783	2022

		7.632)			
Ammar H. Elsheikh, Hitesh N. Panchal, **ShanmuganSengottain** et al.	Applicationof Heat Exchanger in Solar Desalination: Current Issues and Future Challenges	Water (Impact factor 3.53)	14	852	2022
KishorkumarSadasivuni, Hitesh Panchal, AnuradhaAwasthi, Mohammad Israr, FA Essa, **S Shanmugan**, M Suresh,	Ground water treatment using solar radiation-vaporization & condensation-techniques by solar desalination system.	International Journal of Ambient Energy (Impact factor 3.63)	43	2868-2874	2022
AS Abdullah, ZM Omara, Fadl A Essa, Umar F Alqsair, MutabeAljaghtham, Ibrahim B Mansir, **S Shanmugan**,	Enhancing trays solar still performance using wick finned absorber, nano-enhanced PCM	Alexandria Engineering Journal (Impact factor 6.626)	61	12417-12430	2022
Arulraj Simon Prabu, VenkatesanChithambaram, RajamanickamMuthucumaraswamy, **SengottaiyanShanmugan.**	Experimental investigations on the performance of solar cooker using nichrome heating coil—Photovoltaic with microcontroller PIC 16F877A	Environmental Progress & Sustainable Energy (Impact factor 2.824)	42	e14028	2022
M Meena, A Kavitha, S Karthick, S Pavithra, **S Shanmugan.**	Effect of decorated photoanode of TiO2 nanorods/nanoparticles in dye-sensitized solar cell.	Bulletin of Materials Science (Impact factor 1.8)	45	1-9.	2022
H. Panchal, K.K. Sadasivuni, A.A.A. Ahmed, S.S. Hishan, M.H. Doranehgard, F.A. Essa, **S. Shanmugan**, M. Khalid	Graphite powder mixed with black paint on the absorber plate of the solar still to enhance yield: An experimental investigation	Desalination (Impact factor 9.9)	520	115349	2021
P.N. Belkhode, S.D. Shelare, C.N. Sakhale, R. Kumar, **S. Shanmugan** et al	Performance analysis of roof collector used in the solar updraft tower	Sustainable Energy Technologies and Assessments (Impact factor 7.632)	48	101619	2021
A.H. Elsheikh, T. Muthuramalingam, **S. Shanmugan**, et al.	Fine-tuned artificial intelligence model using pigeon optimizer for prediction of residual stresses during turning of Inconel 718,	Journal of Materials Research and Technology (Impact factor 6.267)	15	3622-3634	2022
S. Varadarajan, M.S. Kumar, **S. Shanmugan**, et al.	A new class single crystal l-lysine hydrogen chloride (LLHC) for optoelectronic applications	Journal of Materials Science: Materials in Electronics (Impact factor 2.799)	32	26351-26358	2021
G. Palanikumar, **S. Shanmugan**, et al.	Thermal investigation of a solar box-type cooker with nanocomposite phase change materials using flexible thermography	Renewable Energy (Impact factor 8.634)	178	260- 282	2021
A.S. Abdullah, Z.M. Omara, F.A. Essa, M.M. Younes, **S. Shanmugan**, et al	Improving the performance of trays solar still using wick corrugated absorber, nano-enhanced phase change material and photovoltaics-powered heaters	Journal of Energy Storage (Impact factor 8.907)	40	102782	2021
A.H. Elsheikh, **S. Shanmugan**, et al	Modeling of the Transient Temperature Field during Laser Heating	Lasers in Manufacturing and Materials Processing (Impact factor 0.498)	8	97-112	2021
H. Panchal, H. Nurdiyanto,	Experimental investigation on the yield of solar still	Case Studies in	25	100905	2021

K.K. Sadasivuni, S.S. Hishan, F.A. Essa, M. Khalid, S. Dharaskar, **S. Shanmugan**	using manganese oxide nanoparticles coated absorber	Thermal Engineering(Impact factor 6.268)			
Ch. Pravallika, **S. Shanmugan, et al.**	Crystal growth, spectroscopic and antimicrobial investigations on glycine-doped $ZnSO_4$–$(NH_4)_2SO_4$ single crystal	Journal of Materials Science: Materials in Electronics (Impact factor 2.799)	32	13917–13925	2021
A. Mohammed, S. **Shanmugan et al**	Efficient Artificial Intelligence Forecasting Models for COVID-19 Outbreak in Russia and Brazil	Process Safety and Environmental Protection (Impact factor 7.926)	149	399-409	2021
A.H. Elsheikh, A.I. Saba, M.A. Lu, S. Elaziz, **S. Shanmugan**, T. Muthuramalingam	Deep learning-based forecasting model for COVID-19 outbreak in Saudi Arabia	Process Safety and Environmental Protection (Impact factor 7.926)	149	223- 233	2021
A.M. Gandhi, **S. Shanmugan**, et al.	Performance enhancement of stepped basin solar still based on OSELM with traversal tree for higher energy adaptive control	Desalination (Impact factor 9.9)	502	114926	2021
P. Thamizharasu, **S. Shanmugan**, et al.	Revealing an OSELM based on traversal tree for higher energy adaptive control using an efficient solar box cooker	**Solar Energy** (Impact factor 7.188)	218	320 – 336	2021
Hitesh Panchal, Kishor Kumar Sadasivuni, **S. Shanmugan**, Naimish Pandya	Performance analysis of waste brick magnesia as a storage material in a solar still.	Heat Transfer (Impact factor 1.855)	50	1–13	2021
T. Rajesh Kumar, **S. Shanmugan,** et al	Experimental Investigation on the Performance of a Solar Still Using SiO2 Nanoparticles /JatrophacurcasL.	Silicon (Impact factor 3.4)	14	3501–3514	2021
R. Rajasekar, M. SenthilKumar, **S. Shanmugan**, M. Nagarajan	The influence of Cu_2ZnSnS_4 thin films with characteristics of treatment conditions on spray pyrolysis technique for solar cells applications	Indian Journal of Physics (Impact factor 2.0)	96	707–716	2021
Ammar H. Elsheikh, Amal I. Saba, Hitesh Panchal,**SengottaiyanShanmugan**, et al.	Artificial Intelligence for Forecasting the Prevalence of COVID-19 Pandemic: An Overview	Healthcare (Impact factor 2.8)	9	1614	2021
A.H. Elsheikh, **S. Shanmugan**, et al.	A comprehensive review on residual stresses in turning	Advances in Manufacturing (Impact factor 5.2)	10	287–312	2021
M. Laad, R. Datkhile, **S. Shanmugan**	Synthesis and Characterization of Powder Silica: A Judicious Recycling of the Natural Ceramic Rice Husk Ash	Silicon (Impact factor 3.4)	14	1123–1132	2021

Detail of patents.

S.No	PatentTitle	NameofApplicant(s)	PatentNo.	AwardDate	Agency/ Country	Status
1	Double-Slope Solar Still with Zea Mays-Activated carbon and ZnO for Freshwater Production	A. Sangeetha**,** **S. Shanmugan**	In Progress	03.02.2025	India	Grant – Applied -

2	Double-Slope Solar Still with Zea Mays-Activated carbon and ZnO for Freshwater Production	A.Sangeetha**, S. Shanmugan**	202441096552	13/12/2024	India	Publishe d
3	Design and development of steeped m-shape basin single slope solar still using bio-nano-phase change mat	Dr. S. Suresh, Mr. Shubham Avinash Deshmukh, **Dr. S. Shanmugan**	202341068585	27/10/2023	India	Published
4	A novel nanocomposite double slope U shape stepped basin solar still	**Dr. S. Shanmugan**, A. Sangeetha, Dr. G. Sunita Sundari, Wallaaldin Eltayeb	202341011596	17/03/2023	India	Published
5	Synthesis of Superhydrophobic Silica Nanoparticles and method for preparing Non-stick paint by using same	Dr. Y. Raja Jaya Rao, Dr. SrinivasGanganagunta, Dr. Abhay Kumar, Dr. V. B. Sreedhar, Dr. NandkishorNilkanthPadole, Dr. NitinNilkanthPadole, **Dr. S. Shanmugan,**	202241047698	23/09/2022	India	Published
6	A novel High Silica glass composition and method thereof	Dr. ChargarlamudiKavitha, Dr. K. Suresh, Dr. Madhu A, Dr. Y. Anantha Lakshmi, **Dr. S. Shanmugan**	202241042300	19/08/2022	India	Published
7	METHOD FOR FACILE SYNTHESIZING HETEROSTRUCTURE NIO-SNO2 NANOCOMPOSITE FOR SELECTIVE ELECTROCHEMICAL DETERMINATION CYSTEINE	Dr. G. Murugadoss, Dr.K.THIRUPPATHI, Dr.C.MEGANATHAN, **Dr.S.SHANMUGAN,** Dr.V.CHITHAMBARAM	202141050557	19/11/2021	India	Published
8	ENTROPY BASED IMAGE RETRIEVAL METHOD FOR FASTER RETRIEVING OF IMAGES	Mrs.K.Saraswathi, Dr.R.Reka, Dr. Anil Lamba, **Dr. S. Shanmugan,** Dr. S. R. BoselinPrabhu	202041028523	17/07/2020	India	Published

Books/Reports/Chapters/General articles etc.

S.No	Title	Author'sName	Publisher	YearofPublication
1	Polymer nanocomposite-based additively manufactured smart materials and structures	A. Sangeetha, **S. Shanmugan,** V. Rajkumar	Elsevier	2025
2	Additively manufactured smart materials	**S. Shanmugan,**	Elsevier	2025

	and structures in membrane technology	V. Rajkumar		
3	2D MXene and MBenes Innovation in Sustainable Recycling Technologies for Metal Ion Batteries Completed About the Contributors	A. Sangeetha**,** **S. Shanmugan**	IGI Global	2025
4	Analysis of Defects in Microscopic Images of Hetero Epitaxial Growth Technique Using Fuzzy K Means Clustering Algorithm	S.N.Kumar, M.Nagarajan, **S.Shanmugan**	Advanced Technologies for Science and Engineering	2024
5	Significance of Research Design	R.M.Aharsvel, S.Brindha, **S.Shanmugan**	Adam's Book Company	2024
6	Degrowth: Empirical Research and Philosophical Implications	**S. Shanmugan,**G.Bharathsurya, S.Ravichandran	Adam's Book Company	2024
7	Impact of Activated Carbon on TiO_2 Based Solar Cell Sensitized by Dyes Extracted from Celosia (Cockscombs)	Sethu Narayanan Tamilselvan, **S. Shanmugan**, S. Ravichandran	KripaDrishtiPublications	2023
8	Development of 3 D Concrete Printing Using Additive Manufacturing Processes for Construction and Building Industry	**S. Shanmugan**, T. Sandhyarani, S. Palani	Wiley Online Library	2023
9	Performance of Stepped Bar Plate-Coated Nanolayer of a Box Solar Cooker Control Based on Adaptive Tree Traversal Energy and OSELM	**S. Shanmugan**, F.A. Essa, J. Nagaraj, Shilpa Itnal.	Wiley Online Library	2021
10	Productivity enhancement of solar still by PCM and Nanoparticles miscellaneous basin absorbing materials,	**S. Shanmugan**	Water Chemistry	2019
11	Finite Element Method - Simulation, Numerical Analysis and Solution Techniques	**S. Shanmugan**	Intech Open	2017

R&D Project Details:

S. No.	Sanction order No.	Name of Funding Agency	Amount Sanctioned (Rs.)	Year	Remarks
1	DST/IC/RSF/2025/963	DST	92 Lakhs	2025	Progress
2	DST/IC/SL/CFP/2024/157	DST	29 Lakhs	2025	On going
3	TPN / 118379	DST	28 Lakhs	2025	Progress
4	DST/CEST/NEST/2024/2024/113	DST	56 Lakhs	2025	On going
5	SSY/2024/001736	SERB-ANRF	2,00,000	2024	Completed
6	DST/CD/PS-09/2019/67	DST	6 Lakhs	2020	Completed
7	1(SR/FST/PS -1/ 2018/35	DST-FIRST Level	1.10 Cores	2018	Completed

Synopsis of the scientific/ curricular path:

(i) Synopsis of Scientific/Curricular Path: Solar Materials-Based Solar Thermal Applications

My research at Koneru Lakshmaiah Education Foundation over the past five years has been dedicated to advancing solar materials for enhanced thermal applications. This journey began with exploring novel nanocomposites, particularly Phase Transition Polymer (PTP) nanocomposites, to improve heat storage and transfer in solar stills. I've focused on the meticulous synthesis and characterization of materials with superior thermal conductivity and absorption properties, utilizing experimental studies to construct and test customized solar still designs. My work combines fundamental and applied physics, aiming to optimize solar materials for energy efficiency and sustainability. This has involved significant contributions to understanding various solar materials designed to optimize absorption and conversion of solar energy. I've explored advanced composites, PCMs, and nanomaterials to enhance thermal energy storage and transfer in systems like solar water heaters, distillation units, and concentrated solar power systems. A notable aspect is the integration of aluminum can configurations (ACs) and M-shaped absorber plates in solar distillation, which has shown improved heat transfer and efficiency. In collaboration with colleagues and students, I've developed methods to optimize surface area and thermal conductivity in solar collectors, maximizing energy output while minimizing costs. We've also explored different AC configurations to enhance thermal energy storage and retrieval, addressing the challenge of improving solar system efficiency for wider adoption. My work also evaluates the environmental and economic impacts of solar thermal technologies, conducting cost-benefit analyses and performance simulations to determine optimal deployment strategies for various

sectors. In the classroom, I share research findings and develop curricula on renewable energy, solar technologies, and materials science. I encourage hands-on projects and experiments, fostering innovation in addressing global energy challenges. Despite funding limitations, I've maintained research momentum, collaborating nationally and internationally.

Analytical modeling, using techniques like Cramer's rule, has been crucial in understanding and optimizing temperature profiles, improving system performance. This research focuses on achieving higher distillate outputs and improved thermal efficiencies, even in challenging conditions like nighttime operation. Economic viability is also addressed, translating lab findings into practical water purification applications. My ultimate goal is to contribute to sustainable solutions for water scarcity through innovative material design and system optimization, leveraging solar energy.

(ii) Synopsis of Scientific/Curricular Path: Solar Materials-Based Solar Thermal Applications with Artificial Intelligence and Machine Learning

My research has focused on integrating AI/ML with solar materials for enhanced thermal applications. Initially, I developed advanced materials like PCMs and nanomaterials to improve heat storage and transfer in solar systems. Recognizing AI's potential, I began applying ML techniques to optimize system performance and predict thermal efficiencies. AI algorithms now predict heat transfer behavior, optimize system configurations, and automate material design. Real-time monitoring using AI/ML allows for dynamic adjustments based on environmental conditions, enhancing energy collection and storage. ML-driven fault detection and diagnostics further improve system reliability and sustainability. In education, I've integrated AI/ML concepts into renewable energy curricula, using real-world case studies and practical projects. Students build and test ML models applied to solar thermal systems. Despite challenges, collaboration has been crucial in advancing this work. I aim to continue exploring AI/ML applications in solar energy, developing intelligent systems that improve efficiency and accessibility. This research contributes to the global transition towards sustainable energy solutions, leveraging AI to create economically viable and environmentally friendly solar thermal technologies.

(iii) Synopsis of Scientific/Curricular Path: Green and Sustainable Science and Engineering

My research at Koneru Lakshmaiah University (KLU) explores innovative solutions in solar thermal technologies, bridging material science, environmental engineering, and renewable

energy. This involves developing and testing prototypes for solar collectors, stills, and concentrated power systems, utilizing advanced materials like nanomaterials and PCMs to enhance efficiency. A crucial aspect is applying sustainability principles in engineering design, employing life cycle analysis and environmental impact assessments. This ensures the viability of green technologies for large-scale adoption, especially in developing regions. I contribute to curriculum development, designing courses that integrate sustainable engineering, renewable energy, and environmental policy. Hands-on projects and case studies encourage students to critically engage with sustainability challenges. Mentoring students in research projects further extends this impact. I emphasize interdisciplinary collaboration, encouraging students to think beyond traditional boundaries and engage with environmental science, policy, and economics. Looking forward, I am dedicated to developing next-generation renewable energy technologies, fostering a deeper understanding of sustainable practices, and preparing students to lead the transition to a low-carbon world.

(iv) Synopsis of Scientific/Curricular Path: Solar Materials-Based Solar Thermal Applications, Artificial Intelligence, Machine Learning, and Novel Materials

Initially, I focused on developing advanced materials like composites, Phase Change Materials (PCMs), and nanomaterials to enhance heat absorption and storage in solar systems, crucial for continuous energy supply. Integrating AI/ML has transformed traditional empirical optimization, enabling data-driven modeling and prediction of system performance. ML algorithms analyze vast datasets to determine optimal operating conditions, maximizing energy output and minimizing losses. AI has also accelerated material discovery by rapidly analyzing data to identify promising candidates for solar thermal applications. For instance, AI models predicted thermal conductivity and phase change behavior of novel composites, guiding experimental synthesis. Real-time monitoring and control using AI/ML further enhance system reliability and efficiency. Sensors collect operational data, which ML algorithms process to automatically adjust parameters, optimizing performance under diverse conditions. Beyond research, I've contributed to curriculum development, designing courses that integrate solar energy, novel materials, and AI/ML. These courses combine theory with practical projects, preparing students to apply AI in real-world solar thermal systems. Looking ahead, I am committed to pushing the boundaries of solar thermal efficiency. By leveraging AI/ML, we can create smarter, more sustainable systems, crucial for meeting global energy demands in an environmentally and economically viable manner.

Major activities & achievements:

Dr. S. Shanmugan is working as Research Centre for Solar Energy, Associate Professor in Department of Integrated Research and Discovery; Physics at Koneru Lakshmaiah Education Foundation, Vijayawada, India. A doctorate in Physics with more than 16.7 years of teaching (12.7) and research experience (2- PDF – Egypt – Tanta University and Sweden – Uppsala University), he specializes in heat Nano-material Science. Here searches focuses on synthesis and characterization of low cost and high absorption performance of Bio-Composite materials (Green synthesis) specifically TiO_2 and SiO_2nano-compostites for engineering applications. He has several research papers (230 SCI & Scopus, **5415 citations, h-index: 40, i10 - 93**) published in reputed international journals and also Patent in 10 and completed at 2crous in DST funding projects. He has also authored a book, water chemistry contributed chapters on TiO_2 composites and Smart Materials in books published by Springer & Elsevier Publishing. He is also serving as editorial board member/reviewer for some of the reputed international journals. He is a Ph. D supervisor (16mems) and also guided several Undergraduate (30mems) and Post Graduate Projects (15mems). His responsibilities mainly include establishing academic and research collaborations with universities abroad, faculty and Student mobility through Global Immersion Programmer, promoting joint research projects and publications with international partners.

As a potential ECEB member, my goals include:

- Promoting a culture of ethical research and academic integrity
- Assisting in the review of academic and research proposals for quality and compliance
- Supporting policy formulation for enhancing research standards
- Encouraging interdisciplinary collaboration and student mentoring

With a balanced perspective as both a researcher and academic contributor, I aim to uphold the values and responsibilities of the ECEB, ensuring transparency, ethical rigor, and academic excellence.

As a potential member of the Chemical Engineering Journal (ECEB), my goals include:

I aim to contribute significantly to the advancement of chemical engineering by publishing high-quality research that pushes the boundaries of current knowledge. My work

focuses on innovative solutions in areas such as renewable energy, sustainable processes, and advanced materials, which are crucial for addressing contemporary global challenges. By disseminating my research through the journal, I hope to foster discussions that stimulate further exploration in these critical fields. Chemical engineering often overlaps with various scientific disciplines, and my goal is to encourage greater interdisciplinary collaboration. Whether through co-authored research or collaborative initiatives, I aim to leverage diverse expertise from fields like materials science, artificial intelligence, and environmental engineering to foster holistic approaches to complex problems. One of my core objectives is to promote the application of sustainable practices within the field of chemical engineering. Through my work in green and sustainable technologies, particularly in energy production and waste management, I aspire to develop and share solutions that reduce environmental impact and enhance resource efficiency. The Chemical Engineering Journal provides an excellent platform to highlight research focused on sustainability in chemical processes. As a member, I would also like to take an active role in mentoring emerging researchers in the field of chemical engineering. By providing guidance on research methodology, publication strategies, and the peer review process, I hope to help the next generation of chemical engineers grow professionally. I see this as an opportunity to nurture talent and cultivate a research-driven culture within the chemical engineering community. Through my involvement, I seek to elevate the visibility and impact of chemical engineering research. The global challenges we face require engineering solutions that are both innovative and scalable. By working with fellow experts and contributing to the journal, I aim to ensure that research in this area reaches a broader audience, including industries and policymakers, thereby influencing real-world practices and decisions. Another key goal is to promote the latest innovations in chemical engineering, particularly those that integrate advanced technologies like artificial intelligence, machine learning, and novel material design. I am passionate about being at the forefront of technological advancements that drive efficiencies in industrial processes and lead to the development of cleaner, more sustainable systems.

Through my active engagement in the Chemical Engineering Journal, I aspire to contribute meaningfully to the scientific community, advance the application of chemical engineering to solve global issues, and inspire a new era of research that prioritizes sustainability, collaboration, and innovation.