


Bio-data

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Institution	Sathyabama Institute of Science and Technology	
Date of Birth	19-07-1993	
Gender	Male	

Academic Qualification

S. No	Course	Month & Year of Passing	Institution	Percentage of Marks /CGPA	Division
1.	Ph. D (Technology)	Feb-2020	SSN College of Engineering, Anna University, Chennai.	-	Highly recommended
2.	M. Tech (Biotechnology)	May 2016	SRM University, Chennai.	8.736	First Class with distinction
3	B. Tech (Biotechnology)	May 2014	Karpaga Vinayaga College of Engg. & Tech, Madhuranthagam. Anna University	8.2	First Class
4	HSC	April 2010	Seventh Day Adventist, Chengalpattu	87.6	First Class
5	SSLC	April 2008	Seventh Day Adventist, Chengalpattu	82.2	First Class

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

Thesis title: Liquid Hydrocarbon Production from Microalgal Biomass Cultivated From Wastewater

Guide Name: Dr. K. P. Gopinath

Institute/Organization/University: SSN College of Engineering / ANNA University, Chennai.

Year of Award: 2020

Research guidance (PhD, NPDF, JRF, SRF, etc):

PhD Candidate: 2 (Provisional registration confirmed)

Work / Research Experience

S. No	Position	Institute	Experience	Experience time period
1	Research Scientist-C	Centre for Waste Management – ‘International Research Centre’ Sathayabama Institute of Science and Technology, Jeppiaar Nagar (OMR), Chennai- 600 119, Tamil Nadu, India.	2Y 8M	02-03-2020 till Present
2	SRF	Department of Chemical Engineering SSN College of Engineering, OMR, Kalavakkam – 603 110. Tamil Nadu, India.	0Y 9M	03-06-2019 till 28-02-2020
3	JRF (PhD)	Department of Chemical Engineering SSN College of Engineering, OMR, Kalavakkam – 603 110. Tamil Nadu, India.	2Y 5M	01-01-2017 till 30-05-2019

Academic Events

	Attended	Organized
International conferences	: 21	04 (Convener -2, Committee member-2)
National conferences	: 11	01 (Committee member)
Workshop	: 11	06
FDP	: 09	01
Seminar	: 04	02
Webinar	: 08	02
Symposium	: 03	00
Trainings	: 05	07
Resource person	: 00	06

Funded Projects

1. One of the **Principal Investigator** in the project titled ” Science Technology and Innovation Hub in Kattumannar Koil, CD Block, Cuddalore District, Tamil Nadu State” of Rs. 2,36,05,267/- duration of year is 2022 to 2025. Funded by Department of Science and Technology, New Delhi.

Important Research Publications

1. **J Arun**, R Raghu, SSM Hanif, PG Thilak, D Sridhar, N Nirmala, SS Dawn, R. Sivaramkrishnan, Hguyen Thuy Lan Chi, A. Pugazhendhi “A comparative review on photo and mixotrophic mode of algae cultivation: Thermochemical processing of biomass, necessity of bio-oil upgrading, challenges and future roadmaps”. Applied Energy 325, (2022) 119808, <https://doi.org/10.1016/j.apenergy.2022.119808>

2. **J Arun**, S Nachiappan, G Rangarajan, RP Alagappan, KP Gopinath, Eric Lichtfouse “Synthesis and application of titanium dioxide photocatalysis for energy, decontamination and viral disinfection: a review”. Environmental Chemistry Letters, 1-24 (2022) <https://doi.org/10.1007/s10311-022-01503-z>
3. **J Arun**, T Sasipraba, KP Gopinath, P Priyadharsini, S Nachiappan, N Nirmala, SS Dawn, Nguyen Thuy Lan Chi, Arivalagan Pugazhendhi, “Influence of biomass and nanoadditives in dark fermentation for enriched bio-hydrogen production: A detailed mechanistic review on pathway and commercialization challenges”, Fuel 327 (2022), 125112, <https://doi.org/10.1016/j.fuel.2022.125112>
4. P Priyadharsini, N Nirmala, SS Dawn, A Baskaran, P SundarRajan, KP Gopinath, **J. Arun**. “Genetic improvement of microalgae for enhanced carbon dioxide sequestration and enriched biomass productivity: Review on CO2 bio-fixation pathways modifications”. Algal Research 66, (2022) 102810. <https://doi.org/10.1016/j.algal.2022.102810>
5. N Nirmala, V Shrinithi, K Aasresha, **J Arun**, KP Gopinath, SS Dawn, A Sheeladevi, P Priyadharsini, Kathirvel Birindhadevi, Nguyen Thuy Lan Chi, Arivalagan Pugazhendhi, Removal of toxic metals from wastewater environment by graphene-based composites: A review on isotherm and kinetic models, recent trends, challenges and future directions, Science of The Total Environment, 156564 (2022), <https://doi.org/10.1016/j.scitotenv.2022.156564>
6. SS Vigneshwar, A Swetha, KP Gopinath, R Goutham, R Pal, **J Arun**, P. SundarRajan, Amit Bhatnagar, Nguyen Thuy Lan Chi, A. Pugazhendhi, “Bioprocessing of biowaste derived from food supply chain side-streams for extraction of value added bioproducts through biorefinery approach”, Food and Chemical Toxicology, 113184 (2022), <https://doi.org/10.1016/j.fct.2022.113184>
7. Goutham R, **Arun J**, Ramin F, “Photocatalytic reactive oxygen species generation and their mechanisms of action in pollutant removal with biochar supported photocatalysts: A review” Journal of Cleaner Production 346 (2022) 131155 <https://doi.org/10.1016/j.jclepro.2022.131155>
8. U Haripriyan, KP Gopinath, **J Arun**, M Govarthanan, “Bioremediation of organic pollutants: a mini review on current and critical strategies for wastewater treatment”, Archives of Microbiology 204 (5), 1-9, 2022 <https://doi.org/10.1007/s00203-022-02907-9>
9. U Haripriyan, KP Gopinath, **J Arun**. “Chitosan based nano adsorbents and its types for heavy metal removal: A mini review”, Materials Letters, 131670, 2022 <https://doi.org/10.1016/j.matlet.2022.131670>
10. **Arun J**, GK Panchamoorthy, V Nithianantharaj, “An Eco-friendly and Economical Approach for Removal of Remazol Blue, Malachite Green and Rhodamine B Dyes from Wastewater using Bio-char Derived from Chlorella Vulgaris Biomass”, Current Analytical Chemistry 18 (3), 370-382, 2022 <https://doi.org/10.2174/1573411016999201103230445>
11. A Ranjan, SS Dawn, N Nirmala, A Santhosh, **J Arun**, “Application of deep eutectic solvent in biodiesel reaction: RSM optimization, CI engine test, cost analysis and research dynamics”, Fuel 307, 121933, (2021) <https://doi.org/10.1016/j.fuel.2021.121933>”
12. **J Arun**, N Nirmala, P Priyadharsini, SS Dawn, A Santhosh, KP Gopinath, M. Govardhan, “A mini-review on bioderived carbon and its nanocomposites for removal of organic pollutants from wastewater”, Materials Letters, 131476, 2021 <https://doi.org/10.1016/j.matlet.2021.131476>

13. J Rajagopal, KP Gopinath, R Neha, K Aakriti, RS Jayaraman, **J Arun**, A. Pugazhendhi. "Processing of Household Waste Via Hydrothermal Gasification and Hydrothermal Liquefaction For Bio-oil and Bio-hydrogen Production: Comparison with RSM Studies", Journal of Environmental Chemical Engineering, 107218, 2022 <https://doi.org/10.1016/j.jece.2022.107218>
14. R Goutham, P Rohit, SS Vigneshwar, A Swetha, **J Arun**, KP Gopinath, A. Pugazhendhi." Ionic liquids in wastewater treatment: A review on pollutant removal and degradation, recovery of ionic liquids, economics and future perspectives" Journal of Molecular Liquids, 118150, 2021 <https://doi.org/10.1016/j.molliq.2021.118150>
15. **J Arun**, SS Vigneshwar, A Swetha, KP Gopinath, S Basha, K Brindhadevi, A. Pugazhendhi, "Bio-based algal (*Chlorella vulgaris*) refinery on de-oiled algae biomass cake: A study on biopolymer and biodiesel production". Science of The Total Environment, 151579, 2021 <https://doi.org/10.1016/j.scitotenv.2021.151579>
16. P Priyadharsini, SS Dawn, **J Arun**. "Four stroke diesel engine performance and emission studies of ethanol recovered from *Kappaphycus alvarezii* reject-solid food waste mixed substrates and its blends", Chemosphere, 132689, 2021. <https://doi.org/10.1016/j.chemosphere.2021.132689>
17. **J Arun**, K. P. Gopinath, R. Sivaramakrishnan, S. Shyam, N. Mayuri, S. Manasa, A. Pugazhendhi, "Hydrothermal liquefaction of *Prosopis juliflora* biomass for the production of ferulic acid and bio-oil", Bioresource Technology 319, 124116, 2021 <https://doi.org/10.1016/j.biortech.2020.124116>
18. D. Lakshmi, D. Akhil, A. Kartik, K. P. Gopinath, **J. Arun**, A. Bhatnagar, J. Rinklebe, W. Kim, G. Muthusamy, "Artificial intelligence (AI) applications in adsorption of heavy metals using modified biochar", Science of The Total Environment, 149623, 2021 <https://doi.org/10.1016/j.scitotenv.2021.149623>
19. **J Arun**, KP Gopinath, PS SundarRajan, S Shyam, N Mayuri, R. Sivaramakrishnan, A. Pugazhendhi, "Upgradation of *Nostoc punctiforme* under subcritical conditions into liquid hydrocarbons (bio-oil) via hydro-deoxygenation: Optimization and engine tests" Journal of Environmental Chemical Engineering 9 (4), 105230, 2021 <https://doi.org/10.1016/j.jece.2021.105230>
20. S Shyam, **J Arun**, KP Gopinath, G Ribhu, M Ashish, S Ajay. "Biomass as source for hydrochar and biochar production to recover phosphates from wastewater: A review on challenges, commercialization, and future perspectives", Chemosphere, 131490. <https://doi.org/10.1016/j.chemosphere.2021.131490>
21. PV Gopirajan, KP Gopinath, G Sivaranjani, **J Arun**, "Optimization of hydrothermal gasification process through machine learning approach: Experimental conditions, product yield and pollution" Journal of Cleaner Production 306, 127302, 2021 <https://doi.org/10.1016/j.jclepro.2021.127302>
22. J Mahima, RK Sundaresh, KP Gopinath, PS SundarRajan, **J Arun**, SH Kim, A. Pugazhendhi, "Effect of algae (*Scenedesmus obliquus*) biomass pre-treatment on bio-oil production in hydrothermal liquefaction (HTL): Biochar and aqueous phase utilization studies" Science of The Total Environment 778, 146262, 2021. <https://doi.org/10.1016/j.scitotenv.2021.146262>
23. P SundarRajan, KP Gopinath, **J Arun**, K GracePavithra, AA Joseph, S. Manasa, "Insights into valuing the aqueous phase derived from hydrothermal liquefaction" Renewable and Sustainable Energy Reviews 144, 111019, 2021. <https://doi.org/10.1016/j.rser.2021.111019>

24. T. Karuppiyah, U. Uthirakrishnan, S. Shri Vigneshwar, S. Authilingam, **J. Arun**, R. Sivaramakrishnan, A. Pugazhendhi “Processing of electroplating industry wastewater through dual chambered microbial fuel cells (MFC) for simultaneous treatment of wastewater and green fuel production” International Journal of Hydrogen Energy (Accepted), <https://doi.org/10.1016/j.ijhydene.2021.06.034>
25. A. Swetha, S. ShriVigneshwar, K. P. Gopinath, R. Sivaramakrishnan, R. Shanmuganathan, **J. Arun**, “Review on hydrothermal liquefaction aqueous phase as a valuable resource for biofuels, bio-hydrogen and valuable bio-chemicals recovery” Chemosphere, 283, 131248, 2021. <https://doi.org/10.1016/j.chemosphere.2021.131248>
26. RS Jayaraman, KP Gopinath, **J. Arun**, R Malolan, S Adithya, PS Ajay, R. Sivaramakrishnan, A. Pugazhendhi, “Co-hydrothermal gasification of microbial sludge and algae *Kappaphycus alvarezii* for bio-hydrogen production: Study on aqueous phase reforming” International Journal of Hydrogen Energy 46 (31), 16555-16564, (2021) <https://doi.org/10.1016/j.ijhydene.2021.02.038>
27. R Malolan, RS Jayaraman, S Adithya, **J. Arun**, KP Gopinath, P. SundarRajan, O. Nasif, W. Kim, M. Govarathanan, “Anaerobic digestate water for *Chlorella pyrenoidosa* cultivation and employed as co-substrate with cow dung and chicken manure for methane and hydrogen production: A closed loop approach” Chemosphere 266, 128963, 2021. <https://doi.org/10.1016/j.chemosphere.2020.128963>
28. A Kartik, D Akhil, D Lakshmi, KP Gopinath, **J. Arun**, R Sivaramakrishnan, A. Pugazhendhi, A critical review on production of biopolymers from algae biomass and their applications” Bioresource Technology, 124868, 2021 <https://doi.org/10.1016/j.biortech.2021.124868>
29. S Adithya, RS Jayaraman, A Krishnan, R Malolan, KP Gopinath, **J. Arun**, W. Kim, M. Govarathanan, “A critical review on the formation, fate and degradation of the persistent organic pollutant hexachlorocyclohexane in water systems and waste streams”. Chemosphere, 129866, 2021. <https://doi.org/10.1016/j.chemosphere.2021.129866>
30. R Neha, S Adithya, RS Jayaraman, KP Gopinath, M Pandimadevi, I. Praburaman, **J. Arun** “Nano-adsorbents an effective candidate for removal of toxic pharmaceutical compounds from aqueous environment: A critical review on emerging trends, Chemosphere, 129852, 2021. <https://doi.org/10.1016/j.chemosphere.2021.129852>
31. J Rajagopal, KP Gopinath, A Krishnan, NV Madhav, **J. Arun**, “Photocatalytic reforming of aqueous phase obtained from liquefaction of household mixed waste biomass for renewable bio-hydrogen production”, Bioresource Technology 321, 124529, 2020, <https://doi.org/10.1016/j.biortech.2020.124529>
32. **J. Arun**, KP Gopinath, R Sivaramakrishnan, NV Madhav, K Abhishek, VG. Karthik Ramanan, A. Pugazhendhi., “Bioenergy perspectives of cattails biomass cultivated from municipal wastewater via hydrothermal liquefaction and hydro-deoxygenation”. Fuel, 118963, 284, 2021. <https://doi.org/10.1016/j.fuel.2020.118963>
33. D Akhil, D Lakshmi, A Kartik, DVN Vo, **J. Arun**, KP Gopinath, “Production, characterization, activation and environmental applications of engineered biochar: a review”, Environmental Chemistry Letters, 1-37, 2020. <https://doi.org/10.1007/s10311-020-01167-7>
34. PV Gopirajan, KP Gopinath, G Sivaranjani, **J. Arun**, “Optimization of hydrothermal liquefaction process through machine learning approach: process conditions and oil yield”, Biomass Conversion and Biorefinery, 1-10, 2020. <https://doi.org/10.1007/s13399-020-01233-8>

35. A Suresh, DS Ramgopal, KP Gopinath, **J Arun**, P SundarRajan, A. Bhatnagar, “Recent Advancements in the Synthesis of Novel Thermostable Biocatalysts and Their Applications in Commercially Important Chemoenzymatic Conversion Processes”, *Bioresource Technology*, 124558, 323, 2020, <https://doi.org/10.1016/j.biortech.2020.124558>
36. P Srivatsav, BS Bhargav, V Shanmugasundaram, **J Arun**, KP Gopinath, A. Bhatnagar, “Biochar as an Eco-Friendly and Economical Adsorbent for the Removal of Colorants (Dyes) from Aqueous Environment: A Review”, *Water* 12 (12), 3561, 2020, <https://doi.org/10.3390/w12123561>
37. **J. Arun**, K. P. Gopinath, S. Shri Vigneshwar and A. Swetha. “Sustainable and eco-friendly approach for phosphorus recovery from wastewater by hydrothermally carbonized microalgae: Study on spent bio-char as fertilizer”, *Journal of Water Processing Engineering*, 101567, 38, 2020. <https://doi.org/10.1016/j.jwpe.2020.101567>
38. S Naveen, KP Gopinath, R Malolan, RS Jayaraman, K Aakriti, **J Arun**, “A Solar Reactor for Biodiesel Production from Pongamia Oil: Studies on transesterification Process Parameters and Energy Efficiency”, *Chinese Journal of Chemical Engineering (Accepted)*.. <https://doi.org/10.1016/j.cjche.2020.10.010>
39. S Naveen, KP Gopinath, R Malolan, SJ Ramesh, K Aakriti, **J Arun**. “Novel Solar Parabolic Trough Collector cum Reactor for the Production of Biodiesel from Waste Cooking Oil using Calcium Oxide catalyst derived from seashells waste”. *Chemical Engineering and Processing-Process Intensification*, 108145, 157, 2020. <https://doi.org/10.1016/j.cep.2020.108145>
40. R Malolan, K P Gopinath, Dai-Viet N Vo, R Sai Jayaraman, S Adithya, P Srinivaasan Ajay, **J Arun**. “Green ionic liquids and deep eutectic solvents for desulphurization, denitrification, biomass, biodiesel, bioethanol and hydrogen fuels: a review”. *Environmental Chemistry Letters*, 1-23, 2020.. <https://doi.org/10.1007/s10311-020-01113-7>
41. **J Arun**, KP Gopinath, R Sivaramakrishnan, PS SundarRajan, R Malolan, A. Pugalendhi. “Technical insights into the production of green fuel from CO₂ sequestered algal biomass: A conceptual review on green energy”. *Science of the Total Environment*, 142636, 2020. <https://doi.org/10.1016/j.scitotenv.2020.142636>
42. K. P. Gopinath, DVN Vo, D. G. Prakash, A. Joseph, S. Viswanathan, **J Arun**. “Environmental applications of carbon-based materials: a review”. *Environmental Chemistry Letters*, 1-26, 2020. <https://doi.org/10.1007/s10311-020-01084-9>
43. **J Arun**, KP Gopinath, PS SundarRajan, R Malolan, P AjaySrinivaasan, “Hydrothermal liquefaction and pyrolysis of *Amphiroa fragilissima* biomass: Comparative study on oxygen content and storage stability parameters of bio-oil”, *Bioresource Technology Reports*, 100465, 2020.
44. **J Arun**, KP Gopinath, DVN Vo, PS SundarRajan, S Mukundan, “Co-hydrothermal gasification of *Scenedesmus sp.* with sewage sludge for bio-hydrogen production using novel solid catalyst derived from carbon-zinc battery waste”, *Bioresource Technology Reports*, 100459, 2020.
45. **J. Arun**, K. P. Gopinath, P. SundarRajan, R. Malolan, S. Adithya, R. Sai Jayaraman, P. Srinivaasan Ajay, “Hydrothermal liquefaction of *Scenedesmus obliquus* using a novel catalyst derived from clam shells: Solid residue as catalyst for hydrogen production”, *Bioresource Technology*, 123443, 310, 2020.

46. A Krishnan, KP Gopinath, DVN Vo, R Malolan, VM Nagarajan, **J Arun**, “Ionic liquids, deep eutectic solvents and liquid polymers as green solvents in carbon capture technologies: a review”, *Environmental Chemistry Letters*, 1-24, 2020. <https://doi.org/10.1007/s10311-020-01057-y>
47. **J. Arun**, K. P. Gopinath, P. SundarRajan, V. Felix, M. JoselynMonica, R. Malolan, “A conceptual review on microalgae biorefinery through thermochemical and biological pathways: Bio-circular approach on carbon capture and wastewater treatment”, *Bioresource Technology Reports*, 100477, 2020.
48. P. SundarRajan, K. P. Gopinath, **J Arun**, K. GracePavithra, K. Pavendan, A. AdithyaJoseph, “An insight into carbon balance of product streams from hydrothermal liquefaction of *Scenedesmus abundans* biomass”, *Renewable Energy*, 79-87, 151, 2020.
49. B Jayakishan, G Nagarajan, **J Arun**, “Co-thermal liquefaction of *Prosopis juliflora* biomass with paint sludge for liquid hydrocarbons production”, *Bioresource technology*, 303-307, 283, 2019.
50. P. Sundar Rajan, K. P. Gopinath, **J. Arun**, K. Grace Pavithra, “Hydrothermal liquefaction of *Scenedesmus abundans* biomass spent for sorption of petroleum residues from wastewater and studies on recycling of post hydrothermal liquefaction wastewater”, *Bioresource technology* 36-44, 283, 2019.
51. **J Arun**, KP Gopinath, SJ Shreekanth, R Sahana, MS Raghavi, D Gnanaprakash, “Effects of Process Parameters on Hydrothermal Liquefaction of Microalgae Biomass Grown in Municipal Wastewater”, *Petroleum Chemistry*, 194-200, 59, 2019.
52. **J Arun**, KP Gopinath, PS SundarRajan, M JoselynMonica, V Felix, “Co-liquefaction of *Prosopis juliflora* with polyolefin waste for production of high grade liquid hydrocarbons”, *Bioresource Technology*, 296-301, 274, 2019.
53. D Manikandan, DG Prakash, **J Arun**, NN Gandhi, U Mani, K Kathirvan, “Antibacterial and anticancer activities of silver nanoparticles biosynthesized using *Embelia ribes* *Burm. f.* berries extract” *Indian Journal of Experimental Biology*, NISCAIR – CSIR, 175-180, 57, 2019.
54. **J Arun**, P Varshini, PK Prithvinath, V Priyadarshini, KP Gopinath, “Enrichment of bio-oil after hydrothermal liquefaction (HTL) of microalgae *C. vulgaris* grown in wastewater: Bio-char and post HTL wastewater utilization studies”, *Bioresource Technology*, 182 – 187, 261, 2018.
55. M. Pandimadevi, **J. Arun**, R. Sushma, B.S. Darshan, “Chemically enhanced coffee husks as bio-sorbents for the removal of copper and nickel ions from aqueous solutions: study on kinetic parameters”, *Desalination and water treatment*, 291-304, 121, 2018.
56. Sri Snehaa C and Sujatha S, Praveen Kumar I, **Arun J**, “Tannins of *Jatropha gossypifolia* exert antihyperlipidemic effect in streptozotocin-nicotinamide induced diabetic rats”, *European Journal of Biomedical AND Pharmaceutical sciences*, 607-614, 5, 2018.
57. **J Arun**, U Avinash, B Arun Krishna, M Pandimadevi, KP Gopinath, “Ultrasound assisted enhanced extraction of lutein (β , ϵ -carotene3,3'-diol) from Microalga (*Chlorella pyrenoidosa*) grown in wastewater: Optimization through Response Surface Methodology”, *Global Nest Journal*, 574-583, 19, 2018.
58. **J Arun**, S J Shreekanth, R Sahana, M S Raghavi, K P Gopinath, D Gnanaprakash, “Studies on influence of process parameters on hydrothermal catalytic liquefaction of microalgae (*Chlorella vulgaris*) biomass grown in wastewater”, *Bioresource Technology*, 963-968, 244, 2017.

Book chapters published: 6 (Springer and CRC press)

Research History of Dr. J. Arun

J. Arun has started his research career during 2014. He has started with biochemistry based work and extended his work on anti-diabetic studies using *Jatropha gossipyfolia* on in vivo model. He excelled in many molecular biology research practices during this project. These practices include, Electrophoresis, PCR, animal tissue culture, in vivo animal model, Western blotting, SDS PAGE and ELISA.

On 2016, he has become a full time research scholar in the department of chemical engineering, SSN College of engineering, Anna University, Chennai. His work deals production of energy from waste. He developed photo-bioreactor to degrade wastewater by cultivating algal species in it. He worked on real time municipal wastewater treatment using *Chlorella* species. He presented many papers on this topic in various international conferences in India. He guided many project students in this topic and related areas.

His research findings were published in high impact factored journals. The results were a breakthrough in to the industrial wastewater treatment field. He further utilized the algal biomass cultivated from photo bioreactor for biofuels production. This technique was a combination of both wastewater treatment and renewable fuel production process.

He excelled in hydrothermal liquefaction of microalgal biomass process. The process conditions for better bio-oil yield were expelled and also identified that presence of nanoparticles as catalyst resulted in higher bio-oil yield. He further upgraded bio-oil onto transportation biofuels. He has developed a cheaper mode for producing renewable energy (biofuels) from microalgae cultivated from wastewater.

He has completed his PhD in Feb-2020 and joined as Research Scientist-‘C’ in the Centre for Waste Management-International Research Centre, Sathyabama Institute of Science and Technology to start his research career. He is now working on various field such as hydrogen production via photo catalysis of various wastewater, microalgae as a promising candidate for simultaneous wastewater treatment and biomass production via photo bioreactor, Thermochemical conversion of biomass into biofuels, Recovery of value added products from wastewater via various biomasses, etc. Recently he has worked on processing household solid waste for bioenergy recovery through hydrothermal techniques. Few basic research data were published in leading Q1 journals.

Being more interested in environment and energy, his majority of publications are within renewable energy, biochar, wastewater, remediation, etc. He has also worked on synthesis of biochar from various biomasses, utilized it in recovery of phosphate, organic pollutants, and pharmaceutical compounds, and published a review article on carbon-based materials in Environmental chemistry letters. He has published carbon based papers in journals like chemosphere, journal of water processing engineering, bioresource technology, water, etc.