

Suraj P

Sukrutham (H), Makkada (PO), Kakkodi (Via)
Kozhikode, Kerala, India

+91-8281253480  surajvvv121@gmail.com (P)

+91-6282030223 poyilil.suraj@gmail.com

 [Google scholar profile](#)



Profile summary

I am currently working as a Research Associate at the Centre for Sustainable Technologies, Indian Institute of Science (IISc), Bangalore, focusing on biomass gasification and sustainable energy systems. I hold a Ph.D. in Mechanical Engineering from the National Institute of Technology Calicut (NITC), with research on the thermochemical valorisation of biomass. My work involves experimental research on biomass pyrolysis and gasification systems, along with detailed material characterisation to advance clean and resource-efficient energy technologies.

Education

Program	Institution/Board	%/ CGPA	Year
Ph.D (Thermal Sciences, Mechanical Engineering)	National Institute of Technology Calicut, Kozhikode, India	-	2025
M.Tech. (Energy Engineering and Managemet)	National Institute of Technology Calicut, Kozhikode, India	9.25/10	2017-19
B.Tech	Kannur University, Kerala, India	75.15%	2012-2016
Intermediate Examination (Computer science and PCM)	Central Board of Secondary Education, India	88%	2012
Secondary School Examination	Central Board of Secondary Education, India	9.6/10	2010

Work/Academic Experience

- Teaching Assistance during Ph.D., NIT Calicut, India
 - Heat Transfer 2019 - 2024
 - Thermodynamics
 - Fluid Mechanics
- Teaching Assistance during M.Tech., NIT Calicut, India
 - Heat Engines laboratory July 2017- July 2019
- Assistant Professor, Department of Mechanical Engineering
 - College of Engineering Thalassery, Kannur, Kerala, India. Aug. 2019 – Nov. 2019

Achievements and awards

- Secured **first rank with gold medal** for M.Tech. in Energy Engineering and Management in the year 2019 from NIT Calicut, India.
- Achieved best paper award in different conferences (International Conference on Energy & Environment (ICEE 2021) April 09-10, 2021, Jyothi Engineering College, Thrissur and International Conference on Technologies and Innovations for Sustainable Development (TISD 2023) October 27-29, 2023. Organized by Motilal Nehru National Institute of Technology Allahabad, Prayagraj, India).

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- Qualified national level **GATE exam** in 2017.
 - Acquired **first class with honours** for B.Tech.
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Projects undertaken

Associated with the following projects as Senior Research Fellow:

1. “**Agglomeration abatement in fluidized bed gasification of ligno-cellulosic biomasses**” funded by SERB, DST, Govt. of India. PI: Dr. Arun P, CO PI: Dr. C. Muraleedharan.
2. “**Investigations on valorisation of coffee husk through slow pyrolysis and fluidised bed gasification**” funded by KSCSTE, Govt. of Kerala through the research project under ETP Scheme. PI: Dr. Arun P, CO PI: Dr. C. Muraleedharan.

Major Roles: Conceptualisation, Proposal writing, Design and fabrication, Experimental investigation, Characterisation, Research article writing, Preparation of annual reports and presentations.

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|--------------|---|
| PhD | <ul style="list-style-type: none">• Integrated Thermochemical Processing of Coffee-husk for Energy Production, Nanomaterial Synthesis, and Environmental Remediation. |
| MTech | <ul style="list-style-type: none">• Design and numerical analysis of a circulating fluidized bed gasifier. |
| BTech | <ul style="list-style-type: none">• Effect of magnetic energization of fuel on the performance of four stroke petrol engine. |
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Research Expertise

- Design and numerical analysis of Fluidised bed gasifiers.
 - Software: MS-Office, Ansys Fluent, Aspen Plus, Origin Pro, X'Pert HighScore Plus.
 - Programming language: C++, MATLAB (basics).
 - Design and operation of pyrolyser and gasifiers.
 - Hands on experience in operating a laboratory scale bubbling fluidized bed gasifier.
 - Writing research articles, review papers and book chapters.
 - Experience in analysing different characterisation methods such as XRD, XPS, SEM EDS, TEM, TGA, XRF, UV-Vis spectroscopy, FTIR spectroscopy, Raman spectroscopy etc. Fluorescence spectroscopy.
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Selected Journal Publications

- **P. Suraj**, P. Arun, and C. Muraleedharan, “Physico-chemical characterization study of coffee husk for feasibility assessment in fluidized bed gasification process,” *Environ. Sci. Pollut. Res.*, vol. 29, no. 34, pp. 51041–51053, Oct. 2021, doi: 10.1007/s11356-021-17048.
 - **P. Suraj**, S. Sreekumar, P. Arun, and C. Muraleedharan, “Feasibility study of coffee husk char-derived carbon dots to enhance solar photovoltaic-thermal applications,” *J. Anal. Appl. Pyrolysis*, vol. 179, p. 106509, Apr. 2024, doi: 10.1016/j.jaap.2024.106509.
 - **P. Suraj**, M. V. Vishnu, P. Arun, and C. Muraleedharan, “Development and performance investigation of coffee husk-derived carbon-based nanofluid for solar thermal applications,” *Sol. Energy Mater. Sol. Cells*, vol. 277, p. 113136, Aug. 2024, doi: 10.1016/j.solmat.2024.113136.
 - **P. Suraj**, P. Arun, and C. Muraleedharan, “Thermochemical conversion of coffee husk: a study on thermo-kinetic analysis, volatile composition and ash behavior,” *Biomass Convers. Biorefin.*, Feb. 2025, doi: 10.1007/s13399-025-06676-5.
 - M. Benny, **P. Suraj**, P. Arun, and C. Muraleedharan, “Agglomeration behavior of lignocellulosic biomasses in fluidized bed gasification: a comprehensive review,” *J. Therm. Anal. Calorim.*, vol. 148, no. 17, pp. 9289–9308, Sep. 2023, doi: 10.1007/s10973-023-12013-7.
 - V. S. Jayapal, **P. Suraj**, M. Benny, P. Arun, and C. Muraleedharan, “ANN model-based estimation of ash agglomeration temperature in fluidised bed gasification using ash composition,” *Int. J.*
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- Mansoor, **P Suraj**, P Arun, and C. Muraleedharan. "Unlocking the potential of corn husk through pyrolysis and gasification: characterization, kinetics, and agglomeration analysis." *Biomass and Bioenergy*. (**Published, SCIE, Impact factor- 5.8, Q1**)
- KT Abdul Azeez, **Suraj P**, Muraleedharan C, Arun P "Aspen Plus Simulation of Biomass Gasification: a Comprehensive Model Incorporating Reaction Kinetics, Hydrodynamics and Tar Production." *Process Integration and Optimization for Sustainability* (2022): 1-14.
- Karunakarareddy L, **P. Suraj.**, P. A., Muraleedharan C. Investigations on the pyrolysis behavior of *Sapindus mukorossi* based on kinetic and thermodynamic parameters. *J Ther Eng* 2024;10(6):1480–1493.
- Jose P Rajesh, P Suraj, P Arun, and C. Muraleedharan. "Unlocking the potential of corn husk through pyrolysis and gasification: characterization, kinetics, and agglomeration analysis." *Thermal Science and Engineering Progress*.

Selected list of Conferences

- **P. Suraj**, P. Arun, and C. Muraleedharan, "Evaluation of coffee husk-derived biochar for soil amendment: Enhancing potassium availability and pH improvement in acidic soils," in Proc. 2nd Global Conf. Decarbonizing India, NIT Calicut, Kerala, India, Mar. 6–8, 2025.
- **P. Suraj**, K. T. Abdul Azeez, P. Arun, and C. Muraleedharan, "Development of a test facility to study the agglomeration of alkali rich biomass in bubbling fluidised bed gasification," in Proc. 1st Int. Conf. Fluid, Thermal Energy Syst., Lecture Notes Mech. Eng., Singapore: Springer Nature Singapore, 2024, pp. 639–651, doi: 10.1007/978-981-99-5990-7_54.
- **P. Suraj**, M. V. Vishnu, P. Arun, and C. Muraleedharan, "Development and testing of carbon-based nanofluid for solar absorption applications," in *Proc. Int. Conf. Technol. Innov. Sustain. Dev. (TISD 2023)*, MNNIT Allahabad, Prayagraj, India, Oct. 27–29, 2023.
- **P. Suraj**, M. V. Vishnu, P. Arun, and C. Muraleedharan, "Simulation based analysis of a customized bubbling fluidized bed gasifier designed for agglomeration studies," in Proc. 3rd Int. Conf. New Front. Chem., Energy Environ. Eng. (INCEEE 2023), NIT Warangal, Telangana, India, Nov. 24–25, 2023.
- **Suraj P.**, P. Arun and C. Muraleedharan, "Physico-chemical characterization study of coffee husk for feasibility assessment in fluidized bed gasification process," in Proc. Int. Conf. Energy Environ. (ICEE 2021), Jyothi Eng. College, Thrissur, India, Apr. 9–10, 2021.

Positions of Responsibility

- **Reviewer for international journals:** Biomass and bioenergy, Biomass conversion and biorefinery, international journal of environmental science and technology, Journal of cleaner production, Renewable energy.
 - Worked as **organizing committee volunteer** in International Conference on Fluid, Thermal and Energy Systems (ICFTES'24) during June 6-8, 2024 held at National Institute of Technology Calicut, India.
 - **Branch representative** of research scholars in the Department of Mechanical Engineering NIT Calicut.
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Field of interest

- Thermodynamics, heat transfer, fluid mechanics and energy engineering.
 - Carbon based nanomaterial synthesis and application
 - Thermochemical conversion of biomass
 - Fluidised bed combustors and gasifiers
 - Renewable energy technologies, biofuels
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Personal Information

Date of birth: 25-09-1994 **Gender:** Male

Interpersonal skill Teaching and learning skill, strong work ethic, problem solving proficiency, adaptive, team working spirit, capable of handling multiple tasks strong interpersonal communication skill.

Languages

- Malayalam (RWT)
- English (RWT)
- Tamil (T),
- Hindi (RWT)

Hobbies Reciting poems, Music and Cooking

Reference

Dr. C Muraleedharan
Professor (Rtd.),
Department of Mechanical Engineering
National Institute of Technology, Calicut
Phn.: 9446668655
Email: cmuraleedharannitc@gmail.com

Dr. Arun P
Associate Professor,
Department of Mechanical Engineering
National Institute of Technology, Calicut
Phn.: 9496050083
Email: arun.p@nitc.ac.in
