

Prof P. Mahanta

Surname:	Mahanta
First name(s):	Pinakeswar
Designation:	Professor, Head of Mechanical Engineering Department
Academic degree:	Ph.D.
Date of birth:	01-04-1963
Gender:	Male
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Education:

- Ph.D. (2001) Mechanical Engineering, Indian Institute of Technology Guwahati
- M.Tech. (1993) Mechanical Engineering, Indian Institute of Technology Kharagpur
- B.Sc. Engineering (1985) Mechanical Engineering, Regional Engineering College Rourkela

Research Experience: 12 years

Professional Qualification:

- Professor in Mechanical Engineering, IIT Guwahati (April, 2008 to date)
- Associate Professor in Mechanical Engineering, IIT Guwahati (October, 2004 to April, 2008)
- Assistant Professor in Mechanical Engineering, IIT Guwahati (January, 2001 to October, 2004)
- Assistant Executive Engineer, Govt. of Assam (May, 1986 to January, 2001)

Area of Specialization and research interest: Heat transfer, fluidization, biogas, gasification and combustion, renewable energy

Development of course material.

- **Course material on Advanced Engineering Thermodynamics**
http://www.iitg.ernet.in/scifac/qip/public_html/cd_cell/adv_engg_thermo_index.htm
- **Course material on Energy conservation and waste heat recovery**
http://www.iitg.ernet.in/scifac/qip/public_html/cd_cell/waste_heat_recov_index.htm
- **NPTEL web course on Advanced Engineering Thermodynamics**
<http://nptel.iitm.ac.in/courses/112103016/>
- **Course Material Prepared for IGNOU** Course material on Heat Power Technology
- **Course Material Prepared for IGNOU** Course material on Heat and Mass Transfer

Book Volume:

- B. Buragohain, **P. Mahanta** and V. S. Moholkar. First principles Design of a Circulating Fluidized Bed (CFB) Biomass Gasifier. In: *New Technologies for Rural Development Having Potential for Commercialization* (Editor, J. P. Shukla), Allied Publishers Pvt. Ltd., New Delhi (2009) pp.210-223.
- B. Buragohain, **P. Mahanta** and V. S. Moholkar. Thermodynamic Approach to Design and Optimization of Biomass Gasifiers Utilizing Agro-Residues. In: *Waste-to-Energy in Developing Countries and Transitional Economies* (Editor, A. Karagiannidis), Springer-

Ph.D. students supervised (7 completed)

- Mr. Buljit Buragohain worked on Design, development and performance analysis of a circulating fluidized bed biomass gasifier.

- Mr. Sushovan Chatterjee worked on Application of microbial lipase and biosurfactant for transesterification of lipids
- Mr. Moni Kankana Sharma worked on Heat Transfer in Porous Medium
- Mr. Ranjit Patil worked on Scale up effect on Circulating Fluidized Bed
- Mr. R.M. Chopade worked on Heat Transfer enhancement in a high temperature furnace using porous burner
- Mr. S. Mohapatra worked on Development and Performance Evaluation of a Natural Convection Grain Dryer
- Mr. Pankaj Kalita worked on investigation of hydrodynamics and heat transfer characteristics with biomass blend in a pressurized circulating fluidized bed.

Selected Publications: (Journal-58, Conferences-38)

- R.P. Chopade, S.C. Mishra, **P. Mahanta**, S. Maruyama, On Configuration of Load in Radiant Furnace for Uniform Thermal Conditions, *Heat Transfer Engineering*, 35(1):1–16, 2014, Copyright © Taylor and Francis Group, LLC ISSN: 0145-7632 print / 1521-0537 ,online DOI: 10.1080/01457632.2013.810461
- L.-M. Armstrong, S. Gu, K.H. Luo, **P. Mahanta**, Multifluid Modeling of the Desulfurization Process within a Bubbling Fluidized Bed Coal Gasifier, *AIChE Journal*, 59 (6) , pp. 1952-1963 ,2013.
- P. Kalita, U. K. Saha, **P. Mahanta**, Effect of biomass blending on hydrodynamics and heat transfer behavior in a pressurized circulating fluidized bed unit, *International Journal of Heat and Mass Transfer*, 60 (1) , pp. 531-541 ,2013.
- P. Kalita, M.J. Clifford, K. Jiamjiroch, K. Kalita, **P. Mahanta**, U.K. Saha, Characterization and analysis of thermal response of rice husk for gasification applications , *Journal of Renewable and Sustainable Energy* 5 (1) , art. no. 013119 ,2013
- P. Kalita, U.K. Saha, **P. Mahanta**, Parametric study on the hydrodynamics and heat transfer along the riser of a pressurized circulating fluidized bed unit, *Experimental Thermal and Fluid Science* ,44 , pp. 620-630,2013. **Cited by 1.**
- Pankaj Kalita, Pinakeswar Mahanta, Ujjwal K. Saha, Some studies on wall-to-bed heat transfer in a pressurized circulating fluidized bed unit, 5th BSME International Conference on Thermal Engineering , *Procedia Engineering* ,56 (2013) 163 – 172.
- R.P. Chopade, S.C. Mishra, **P. Mahanta**, S. Maruyama, Estimation of power of heaters in a radiant furnace for uniform thermal conditions on 3-D irregular shaped objects, *International Journal of Heat and Mass Transfer*, 55 (15-16) , pp. 4340-4351, 2012.
- S.S. Mohapatra, **P. Mahanta**, Thermodynamic evaluation of natural convection paddy dryer Proceedings of 2nd International Conference on the Developments in Renewable Energy Technology, ICDRET art. no. 6153455 , pp. 188-191,2012 .
- B. Buragohain, **P. Mahanta**, V.S. Moholkar, Performance correlations for biomass gasifiers using semi-equilibrium non-stoichiometric thermodynamic models, *International Journal of Energy Research*, 36 (5) , pp. 590-618,2012. **Cited by 2.**
- S.S. Mohapatra, **P. Mahanta**, Performance evaluation of quality drying in a natural convection grain dryer, *Applied Mechanics and Materials*, 110-116 , pp. 2094-2100,2012. **Cited by 1.**
- R. P. Chopade, S.C. Mishra, **P. Mahanta**, S. Maruyama, and A. Komiya, Uniform thermal conditions on 3-D object: Optimal power estimation of panel heaters in a 3-D radiant enclosure, *International Journal of Thermal Sciences*, 51, (1)63-76, January 2012. **Cited by 1.**
- ARIJIT Biswas & **P. Mahanta** design and experimental analysis of condenser for the production of bamboo vinegar, *International Journal of Applied Research in Mechanical Engineering (IJARME)* ISSN: 2231 –5950, Vol-2, Iss-2, 2012.
- R. P. Chopade, S.C. Mishra, **P. Mahanta**, S. Maruyama, Effects of locations of a 3-D design object in a 3-D radiant furnace for prescribed uniform thermal conditions *Applied Thermal Engineering* 31 (16) , pp. 3262-3274,2011, **Cited by 1.**
- M. Baruah, A. Dewan, **P. Mahanta**, Performance of elliptical pin fin heat exchanger with three elliptical perforations *CFD Letters* 3 (2), pp. 65-73, 2011.
- R. S. Patil, M. Pandey and **P. Mahanta**, “Parametric Studies and Effect of Scale-up on Wall-to-Bed Heat Transfer Characteristics of Circulating Fluidized Bed Risers”, *Experimental Thermal and Fluid Science*, 35 (3), pp. 485-494, 2011. **Cited by 1.**

- R.P Chopade, E. Agnihotri, A.K.Singh, A.Kumar, R.Uppaluri, S.C Mishra, **P.Mahanta**, Application of a particle swarm algorithm for parameter retrieval in a transient conduction-radiation problem, *Numerical Heat Transfer; Part A: Applications* 59 (9), pp. 672-692, 2011. **Cited by 4.**
- Monikankana Sharma, Subhash C. Mishra, & P. Mahanta AN EXPERIMENTAL INVESTIGATION ON EFFICIENCY IMPROVEMENT OF A CONVENTIONAL KEROSENE PRESSURE STOVE, *International Journal of Energy for a Clean Environment*, 12(1), 79–93 (2011)
- R.P Chopade, S.C Mishra, **P. Mahanta**, S. Maruyama, Numerical analysis of an inverse boundary design problem of a 3-D radiant furnace with a 3-D design object, *Numerical Heat Transfer; Part A: Applications* 60 (1) , pp. 25-49, 2011. **Cited by 4.**
- R. S. Patil, M. Pandey and **P. Mahanta**, Effect of scale-up of lower and middle splash region on heat transfer characteristics of circulating fluidized bed risers *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy* 224 (8) , pp. 1059-1068 ,2010.
- **P. Mahanta**, R. S. Patil, and M. Pandey, Effect of particle size and sand inventory on wall-to-bed heat transfer characteristics of circulating fluidized bed riser, *WCE 2010 - World Congress on Engineering*, 2, pp. 1495-1500, 2010.
- R. S. Patil, **P. Mahanta** and M. Pandey Effect of scale-up on heat transfer characteristics of cyclone separators of circulating fluidized beds, *International Energy Journal* 11 (3) , pp. 123-130, 2010.
- R.N.Mehta, M. Chakraborty, **P. Mahanta**, P.A. Parikh, Evaluation of fuel properties of butanol-biodiesel-diesel blends and their impact on engine performance and emissions, *Industrial and Engineering Chemistry Research* 49 (16) , pp. 7660-7665, 2010. **Cited by 7.**
- B. Buragohain, **P. Mahanta**, V.S. Moholkar, Thermodynamic optimization of biomass gasification for decentralized power generation and Fischer-Tropsch synthesis , *Energy* 35 (6) , pp. 2557-2579, 2010. **Cited by 9.**
- B. Buragohain, **P. Mahanta**, V.S. Moholkar, Biomass gasification for decentralized power generation: The Indian perspective, *Renewable and Sustainable Energy Reviews* 14 (1), pp. 73-92, 2010. **Cited by 32.**
- A. Dewan, P. Patro, I. Khan, **P. Mahanta**, The effect of fin spacing and material on the performance of a heat sink with circular pin fins, *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy* 224 (1), pp. 35-46, 2010. **Cited by 1.**
- R. S. Patil, M. Pandey, **P. Mahanta**, “Effect of Scale-up on Heat Transfer Characteristics in Upper Splash Region of Circulating Fluidized Bed Risers”, *Journal of Energy and Power Engineering*, 04 (6), 9-15, 2010.
- Monoj Baruah, Anupam Dewan and **P. Mahanta**, “Comparison of straight, perforated and tapered elliptical pin fin compact heat exchangers”, *IUP Journal of Mechanical Engineering*, 2010.
- I. Khan, M., Baruah , A. Dewan, **P. Mahanta**, Computational investigation of energy efficient pin fin cross section for a compact heat exchanger, *International Energy Journal* ,10 (4) , pp. 233-246, 2009.
- P. Goswami, L. Barbora, S.S. Cameotra, **P. Mahanta**, S. Chatterjee, Silk-fiber immobilized lipase-catalyzed hydrolysis of emulsified sunflower oil, *Applied Biochemistry and Biotechnology* ,157 (3) , pp. 593-600, 2009. **Cited by 3.**
- P. Kalita, G. Mohan, G. P. Kumar and **P. Mahanta**, Determination and comparison of kinetic parameters of low density biomass Fuels, *Journal of Renewable and Sustainable Energy, American Institute of Physics*, Vol.1, 023109, pp.1-12, 2009.
- S. Kakati, **P. Mahanta**, Effect of fin-aided burner on thermal performance of pressurized kerosene stove, *Journal of Enhanced Heat Transfer* ,16 (1) , pp. 35-42, 2009.
- Pankaj Kalita, U. S. Dixit, **P. Mahanta** and U. K. Saha, A Novel Energy Efficient Machine for Plate Manufacturing from Arecanut Leaf Sheath, *Journal of Scientific and Industrial Research* ,67 (10) , pp. 807-811, 2008. **Cited by 1.**
- B.B. Sahoo, N. Sahoo, **P. Mahanta** , L., Borbora, P. Kalita, U.K.Saha, Performance assessment of a solar still using blackened surface and thermocol insulation, *Renewable Energy*, 33 (7), pp.1703-1708, 2008. **Cited by 8.**
- Y.S. Kushwah, **P. Mahanta**, S.C.Mishra, Some studies on fuel characteristics of mesuaferrea, *Heat Transfer Engineering*, 29 (4) , pp. 405-409, 2008. **Cited by 2.**
- **P. Mahanta**, J.K. Sarmah, P.Kalita, A.Shrivastava, Parametric study on transesterification process for biodiesel production from pongamiapinnata and Jatrophacurcus oil , *International Energy Journal*, 9(1) , pp. 41-46, 2008. **Cited by 3.**
- A.K. Sarma ,J.K.Sarmah, L.Barbora, , P.Kalita, S.Chatterjee, **P. Mahanta** ,P.Goswami, Recent inventions in biodiesel production and processing - A review, *Recent Patents on Engineering* ,2 (1) , pp. 47-58, 2008. **Cited by 5.**

- Sushovan Chatterjee, Lepakshi Barbor, Swaranjit Singh, Cameotra, **Pinakeswar Mahanta**, Pranab Goswami, Silk-fiber immobilized lipase-catalyzed hydrolysis of emulsified sunflower oil, *Applied Biochemistry and Biotechnology* 157:593,600 (2008). **Cited by 6.**
- U. K. Saha, B. B. Sahoo, **P. Mahanta**, P. Kalita and L. Borbor, Performance assessment of a solar still using blackened surface and thermocol insulation, *Renewable Energy*, Vol. 33/7, pp 1703-1708, 2008
- **P. Mahanta**, S.C. Mishra, Y.S. Kushwah, An experimental study of Pongamiapinnata L. oil as a diesel substitute, *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy* 220 (7), pp. 803-808, 2006. **Cited by 16.**
- D. Sarma, S.C., Mishra, **P. Mahanta**, Analysis of collimated radiation in participating media using the discrete transfer method, *Journal of Quantitative Spectroscopy and Radiative Transfer*, 96 (1), pp. 123-135, 2005. **Cited by 11.**
- A. Dewan, **P. Mahanta**, K.S. Raju, P. Suresh Kumar, Review of passive heat transfer augmentation techniques, *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy*, 218 (7), pp. 509-527, 2004. **Cited by 52.**
- A.S. Grinspan, U.K. Saha, **P. Mahanta**, Experimental investigation of twisted bladed savonius wind turbine rotor, *International Energy Journal* 5 (1), pp. 1-9, 2004. **Cited by 5.**
- P. Rath, S.C. Mishra, **P. Mahanta**, U.K. Saha, K. Mitra, Discrete transfer method applied to transient radiative transfer problems in participating medium, *Numerical Heat Transfer; Part A: Applications*, 44 (2), pp. 183-197, 2003. **Cited by 31.**
- **P. Mahanta**, S.C. Mishra, Collapsed dimension method applied to radiative transfer problems in complex enclosures with participating medium, *Numerical Heat Transfer, Part B: Fundamentals*, 42 (4), pp. 367-388, 2002. **Cited by 7.**
- **P. Mahanta**, S.C. Mishra, Modified Collapsed Dimension Method for Radiative Heat Transfer Problems, *Journal of Thermophysics and Heat Transfer*, 15 (2), pp. 246-248, 2001. **Cited by 1.**

Patents: Removal of toxin from *Jatropha* sp. seed cakes for probable applications (applied for Indian Patent)

R&D Projects:

- Design and development of a high performance biogas digester for north eastern region of India
- Biomass gasification with fluidized bed
- Design, development and commercialization of pilot scale circulating fluidized bed (CFB) gasifier
- Synthesis of green transportation fuels (Biomass gasification integrated Fischer-Tropsch)
- Modelling and computation of three dimensional turbulent convective heat transfer for design of energy efficient pin heat exchanger
- Development of model to calculate radiative heat transfer in fuel channel of PHWRs
- Setting up of a technical backup unit (TBU) at IIT Guwahati for R&D interface with KVIC sector
- Earth radiation budget
- Development of a multi-fuel cooking stove
- Biomass gasification with fluidized bed
- Biogas development and training centre for the north eastern region
- Development of model to calculate radiative heat transfer in fuel channel of PHWRs
- Modelling and computation of three dimensional turbulent convective heat transfer for design of energy efficient pin heat exchanger
- Design, development and commercialization of pilot scale circulating fluidized bed (CFB) gasifier
- Synthesis of green transportation fuels (Biomass gasification integrated Fischer-Tropsch)
- Design of 25kW circulating fluidized bed unit.
- Building Global engagements in research (energy)- EPSRC funded-1 year
- Design and Development of Digester for Utilization of Lignocellulosic Waste for Biogas Production
- Design and Development of Compact Cistern System for Blackwater Reutilization

Latest Achievement:

Offered with Indian Distinguishing visiting fellowship by University of Nottingham, UK for the period 10.06.2010 to 10.07.2010. Was involved in research on clean coal and biomass gasification technology.

Organized and delivered lectures in short term courses (STC)

- Organized **summer school on efficient fuel energy technologies** during July 4-10, 2011 funded by EPSRC engd. Training Centre university Nottingham.
- **“Renewable Energy Systems”** during September 7-11, 2001 at IIT-Guwahati.
- **2“Renewable Energy Applications in North Eastern Region”** during October 21-26, 2003 at IIT-Guwahati.
- **“Energy Conservation Practices”** during July 12-17, 2004 at IIT-Guwahati.
- **“Fuel and Combustion Technology”** during December 5-9, 2005 at IIT-Guwahati.
- **CNG-LPG retrofitment to automotive engines**, 8-9 March, 2007.
- organized 6th Indo-German winter academy, December 13-19, 2007 at IIT Guwahati
- **“Hydrogen fuel and its applications”** during September 15-19, 2008.

Keynote lectures/ seminars and workshop attended:

- **MIMT 2011 Singapore.**
- **ICDRET 2012 Bangladesh**
- **India-UK Innovation Forum**, 8-10th September, 2010 at London, UK.
- **IAENG conference Mechanical Engineering**, July 2, 2010, Imperial College London, UK.
- **UK-India Sustainable Energy Technology Network, Nottingham, UK, 8-10 September, 2009.**
- **2nd Indo-Us Frontiers of Engineering symposium**, Irvine, California, 27Feb-1 March, 2008
- Key note lecture on **Technology development of biodiesel as an energy alternative** at the International conference on challenges and strategies for sustainable energy, efficiency and environment, U. P. Technical University, June 10-11, 2006
- **7th ISHMT-ASME Conference and 18th National Heat and Mass Transfer Conference**, Jan2006.
- **22nd National convention of Mechanical Engineers’ on “Energy Technologies-Strategies for Optimal Utilization of Natural Resources”**, The Institution of Engineers’ (India), Guwahati, 9-10 September, 2006.
- **Modelling and quality control for advanced and innovative fuel technologies**, 14-25 November, 2005, ICTP, Trieste, Italy (In collaboration with IAEA Vienna, Austria).
- **Role of partitioning and transmutation in the mitigation of the potential environmental impacts of nuclear fuel cycle**, 20-24 November, 2006, ICTP, Trieste, Italy (In collaboration with IAEA Vienna, Austria)
- workshop on **Energy Technology R&D in India and the United States: Opportunities for cooperation**, New Delhi, 19-21 August, 2004.
- **7th Triennial International Symposium on Fluid Control, Measurement and Visualization**, Sorrento, Italy, August 25-28, 2003
- **4th ISHMT - ASME Heat Transfer Conference and 15th National Heat and Mass Transfer Conference**, Pune, India, January 2000.
- **6th ISHMT - ASME Heat Transfer Conference and 17th National Heat and Mass Transfer Conference**, IGCAR, Kalpakkam, India, January 2004.