# Sandipan Kumar Das

*Office 107, Mechanical Engineering Department, IIT(ISM) Dhanbad. 914 704 5784 (C). sandipan@iitism.ac.in*

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## Publications

➢ ***Journal:***

❖ **Das, S.K.**, 'Solution of the Poisson Equation by the Boundary Integral Method', ***International Journal of Numerical Methods for Heat and Fluid Flow***, volume 34, 2024.

❖ Roy, A., Sen Gupta, S., Samanta, A., Likhith, P.V.S.S. and **Das, S.K.**, 'Prospects of energy-efficient power generation system with ammonia as Hydrogen carrier', ***International Journal of Hydrogen Energy***, volume 71, 2024.

❖ Sengupta, A., **Das, S.K.**, Nandi, B.K. and Sharma, P., 'Characterizing pulverized coal combustion for high-ash content Indian coal', ***Energy Sources, Part A: Recovery, Utilization and Environmental Effects,*** volume 46, 2024.

❖ **Das, S.K.**, 'Extension of the Boundary Integral Method for different boundary conditions in steady-state Stokes Flows', ***International Journal of Numerical Methods for Heat and Fluid Flow***, volume 33, 2023.

❖ **Das, S.K.**, 'A Reynolds Stress model with a new elliptic relaxation procedure for stratified flows', ***International Journal of Heat and Fluid Flow,*** volume 83, 2020.

❖ **Das, S.K.**, 'Analytical expression for concentration overpotential of anode-supported Solid Oxide Fuel Cell based on the Dusty Gas Model', ***Journal of Electrochemical Energy Conversion and Storage,*** volume 17, 2020.

❖ **Das, S.K.**, 'General Dusty Gas Model for porous media with a specified pore size distribution', ***Chemical Engineering Science,*** volume 203, 2019.

❖ **Das, S.K.**, 'Elliptic relaxation model for stably stratified turbulence', ***International Journal of Heat and Fluid Flow,*** volume 74, 2018.

❖ **Das, S.K.**, 'Towards enhancement of carbon capture by Molten Carbonate Fuel Cell through controlled thermodiffusion', ***International Journal of Heat and Mass Transfer,*** volume 127, part A, 2018.

❖ **Das, S.K.**, 'Direct solver for pentadiagonal matrix containing tridiagonal submatrices', ***Numerical Heat Transfer, Part B: Fundamentals,*** volume 72, issue 1, 2017.

❖ **Das, S.K.**, 'A new turbulence induced theoretical breakage kernel in the context of the population balance equation', ***Chemical Engineering Science,*** volume 152, 2016.

❖ **Das, S.K.**, 'Development of a coalescence model due to turbulence for the population balance equation', ***Chemical Engineering Science,*** volume 137, 2015.

❖ **Das, S.K.** and Durbin, P.A., 'Prediction of atmospheric dispersion of pollutants in an airport environment', ***Atmospheric Environment,*** volume 41, issue 6, 2007.

❖ **Das, S.K.** and Durbin, P.A., 'A Lagrangian stochastic model for dispersion in stratified turbulence', ***Physics of Fluids,*** volume 17, issue 2, 2005.

➢ ***Book:***

❖ **Das, S.K.,** 'Pollutant dispersion prediction in airports: A Lagrangian stochastic modeling approach', *VDM publishers,* ISBN # 9783639124798, 2009. (My Ph.D. thesis has been published as a book by the publisher)
https://www.amazon.com/Pollutant-Dispersion-Prediction-Airports-Lagrangian/dp/3639124790

➤ *Conference/Talk/Media:*

❖ **Das, S.K.**, 'General Dusty Gas Model for Porous Media with a Specified Pore Size Distribution', featured in *Advances in Engineering*, (https://advanceseng.com/general-dusty-gas-model-porous-media-specified-pore-size-distribution/).

❖ **Das, S.K.** (Lead Author), Hanson, H. (Topic Editor),'Modeling Atmospheric Dispersion of Pollutants', *Encyclopedia of Earth* (http://www.eoearth.org), *Ed: Cutler J. Cleveland,* 2007.

❖ **Das, S.K.**, 'Backward Lagrangian Stochastic Modeling for Pollutant Dispersion in Airports', *LAX Air Quality and Source Apportionment Study, Technical Work Group Meeting No. 4,* March 22, 2007.

❖ **Das, S.K.** and Durbin, P.A., 'Airport Pollutant Dispersion Modeling', *Thermal and Fluid Sciences Affiliates & Sponsors Conference,* Stanford University, 2004.

❖ **Das, S.K.**, Kalitzin, G. and Durbin, P.A., 'A Model for Prediction of Bypass Transition', *Thermal and Fluid Sciences Affiliates & Sponsors Conference,* Stanford University, 2003.

# Patents granted

➤ 'An integrated fluidized bed reactor system for Ammonia combustion to obtain Hydrogen and power and method to do the same'. *Patent Number:* 541857 (India). *Grant Date:* June 14, 2024. *Date filed:* March 15, 2023. *Inventors: Sandipan Kumar Das*, Arunkumar Samanta, Siddhartha Sengupta, Soumyajit Sen Gupta. *Brief Description:* The invention is a double reactor that combusts ammonia in an integrated two-step reaction process; the first being the decomposition of Ammonia and the second being the combustion of the produced Hydrogen.

➤ 'Method and system for optimum usage of Ammonia by generating power using coupled heat exchanger-combustor'. *Patent Number:* 513499 (India). *Grant Date:* February 21, 2024. *Date Filed:* December 1, 2022. *Inventors: Sandipan Kumar Das*, Aditi Sengupta, Laltu Chandra. *Brief Description:* The idea is to utilize Ammonia as a fuel in power plant through an optimal two-step process of first decomposing the Ammonia and then combusting the generated Hydrogen to produce power.

➤ 'Desalter Inlet distributor designs and methods'. *Patent Number:* 1173415. *Type:* Grant (USA). *Date of Patent:* November 16, 2021. *Date Filed:* August 13, 2019. *Inventors: Sandipan K. Das*, Andrew P. Sullivan, Magaly C. Barroeta. *Brief Description:* With the help of CFD simulations involving population balance model, invented a desalter inlet that promoted coalescence of water droplets with an aim to promote water and oil separation at the desalter.

➤ 'Housing for multiple fuel cell stacks'. *Patent Number:* 10622660. *Type:* Grant (USA). *Date of Patent:* April 14, 2020. *Inventors:* Frank Hershkowitz, Timothy A. Barckholtz, Paul J. Berlowitz, *Sandipan K. Das*, Thomas A. Badgwell. *Brief Description:* Performed CFD simulations to invent an optimal way to place a large number of fuel cell stacks in an underground chamber for uniform flow distribution.

- ‘Nozzle for wet gas scrubber’. ***Patent Number:*** 10478835. ***Type:*** Grant (USA). ***Date of Patent:*** November 19, 2019. ***Inventors:*** Glenn M. Beatty, Christopher J. Fowler, Venkatesh Subramania, ***Sandipan K. Das***, John B. Barnes, Laura Johnsen. ***Brief Description:*** Conducted Large Eddy Simulations to invent a nozzle that generated the required spray angle for a wet gas scrubber system.

- ‘Sludge management system for crude oil storage tanks’. ***Patent Number:*** 10384242. ***Type:*** Grant (USA). ***Date of Patent:*** August 20, 2019. ***Inventors: Sandipan Kumar Das***, Sally Ann Thomas. ***Brief Description:*** Invented an optimal strategy with rotating nozzles to create flow circulation within a crude tank for minimizing sludge formation.

- ‘Injector nozzle quenching process for piping systems’. ***Patent Number:*** 9650691. ***Type:*** Grant (USA). ***Date of Patent:*** May 16, 2017. ***Inventors: Sandipan Kumar Das***, Steven Allen Trese. ***Brief Description:*** Conducted CFD simulations of the quenching process of two streams within a pipe to invent an optimal process by an injector nozzle.

- ‘Injector nozzle quenching for piping systems’. ***Patent Number:*** 9487842. ***Type:*** Grant (USA). ***Date of Patent:*** November 8, 2016. ***Inventors: Sandipan Kumar Das***, Steven Allen Trese. ***Brief Description:*** Invented an injector nozzle within a piping system for quenching a hot stream of incoming gas.


## Patents published

- ‘A fabric based structured bed gas-solid contractor system for capturing $CO_2$ and process for capturing $CO_2$ therein’. ***Publication Number:*** 202431032179. ***Publication Date:*** May 3, 2024. ***Date filed:*** April 23, 2024. ***Inventors:*** Arunkumar Samanta, Babuni Prasad, ***Sandipan Kumar Das***, Soumyajit Sen Gupta. (Indian Patent)

- ‘A process for the production of Hydrogen from Aluminum waste’. ***Publication Number:*** 202431005303. ***Publication Date:*** February 23, 2024. ***Date filed:*** January 25, 2024. ***Inventors:*** Arunkumar Samanta, Chitrang Jayantibhai, Babuni Prasad, Tapas Kumar Mandal, ***Sandipan Kumar Das***, Soumyajit Sen Gupta. (Indian Patent)

- ‘A system for Ammonia combustion with two stage coupled combustor’. ***Publication Number:*** 202331078073. ***Publication Date:*** December 1, 2023. ***Date filed:*** November 16, 2023. ***Inventors: Sandipan Kumar Das***, Arunkumar Samanta, Soumyajit Sen Gupta. (Indian Patent)

- ‘Dual fluidized bed chemical looping gasification system for Hydrogen production and process of Hydrogen production therein’. ***Publication Number:*** 202331073657. ***Publication Date:*** November 24, 2023. ***Date filed:*** October 30, 2023. ***Inventors:*** Arunkumar Samanta, ***Sandipan Kumar Das***, Soumyajit Sen Gupta. (Indian Patent)

- ‘An integrated fluidized bed reactor system for Ammonia combustion to obtain Hydrogen and power and method to do the same’. ***Publication Number:*** 202331017619. ***Publication Date:*** March 31, 2023. ***Date filed:*** March 15, 2023. ***Inventors: Sandipan Kumar Das***, Arunkumar Samanta, Siddhartha Sengupta, Soumyajit Sen Gupta. (Indian Patent)

- ‘Cathode collector structures for Molten Carbonate Fuel Cell’. ***Publication Number:*** 20200176783. ***Type:*** Application (USA). ***Publication Date:*** June 4, 2020. ***Date Filed:*** November 26, 2019. ***Inventors:*** Jonathan Rosen, Timothy A. Barckholtz, Heather A. Elsen, Gabor Kiss, Lu Han, Thomas M. Smith, ***Sandipan K. Das***, Chao-Yi Yuh, Carl A. Willman, Timothy C. Geary, Keith E. Davis, Abdelkader Hilmi, Lawrence J. Novacco.

- ‘Flow field baffle for Molten Carbonate Fuel Cell Cathode’. ***Publication Number:*** 20200176787. ***Type:*** Application (USA). ***Publication Date:*** June 4, 2020. ***Date Filed:*** November 26, 2019. ***Inventors:*** Timothy C. Geary, Timothy A. Barckholtz, Jonathan Rosen, ***Sandipan K. Das***, Carl A. Willman, Abdelkader Hilmi, Chao-Yi Yuh.

- ‘Integrated operation for Molten Carbonate Fuel Cells’. ***Publication Number:*** 20170271701. ***Type:*** Application (USA). ***Publication Date:*** September 21, 2017. ***Date Filed:*** March 3, 2017. ***Inventors:*** Paul J. Berlowitz, Timothy A. Barckholtz, ***Sandipan K. Das***.