

# SANDEEP GEORGE

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## SUMMARY

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Data Science Researcher with 5 years of experience in machine learning and large scale optimization having M.Tech& B. Tech Dual Degree in Computational and Ocean Engineering from IIT Madras. Co-authored work on Deep learning for monsoon forecasting and applied machine learning, optimization in energy and retail.

## EDUCATION

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|-------------|---|------------------|
| 2015 - 2020 | M.Tech in Computational engg and B.Tech in Ocean engg Interdisciplinary Dual Degree from <b>Indian Institute of Technology Madras</b> | (CGPA: 8.5/10.0) |
| 2015        | Class 12th CBSE   | (95.6%)          |
| 2013        | Class 10th CBSE   | (10.0/10.0)      |

## RESEARCH EXPERIENCE AND PUBLICATIONS

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### Master's Thesis, IIT Madras - Indian Institute of Tropical Meteorology, Pune Collaboration 2020

*Supervised by Dr. Bipin Kumar, Scientist F, IITM Pune*

Developed a deep learning model for rainfall forecasting, identifying architectures suitable for 2D gridded data with spatio-temporal correlations. Developed techniques to apply convolution operators on irregular 2D maps and explored weighted loss functions to improve performance on extreme events. The work was carried out in collaboration with scientists at the Indian Institute of Tropical Meteorology, Pune, as part of the Master's in Computational Engineering at IIT Madras. The work led to a co-authored publication,

“Deep learning based short-range forecasting of Indian summer monsoon rainfall using earth observation and ground station datasets” (2022). In: *Geocarto International* 37.27, pp. 17994–18021. DOI: [10.1080/10106049.2022.2136262](https://doi.org/10.1080/10106049.2022.2136262). eprint: <https://doi.org/10.1080/10106049.2022.2136262>. URL: <https://doi.org/10.1080/10106049.2022.2136262>.

## INDUSTRY EXPERIENCE

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### Senior Data Scientist, Target Corporation

Apr 2025 – Present

- Developed an inventory allocation model to minimize out-of-stocks and transportation costs in Target's supply chain. Formulated the problem as a deterministic dynamic program decomposed into a mixed-integer quadratic program and implemented it using commercial solvers such as Gurobi.
- Built a container rerouting tool by extending the existing flow-path optimizer for cost-optimal import routing to operate at container level. Worked with Python, PySpark, and SQL for large-scale data extraction and transformation around a network flow-based solution.

## Senior Data Scientist, Tiger Analytics

Sep 2020 – Mar 2025

- Used multi-objective optimization to solve the inverse problem of identifying type curves for wells in an oil field, leading to estimated annual operating cost savings of \$6M. Built a parallel framework using Spark, Ray, and multiprocessing to scale multi-objective evolutionary algorithms to 1000+ wells across multiple fields.
- Developed machine learning models to classify wells likely to be steamed, designing PySpark-based data pipelines and benchmarked over linear, tree-based, and boosting models. Presented results to business stakeholders, leading to adoption of the model.
- Contributed to a marketing mix optimization solution for a leading CPG firm by training regression models on sales data to estimate channel impact. Built a spending optimizer to allocate budget for maximum sales, solving the resulting nonlinear problem with a projected gradient method.

## KEY ACADEMIC RESEARCH PROJECTS

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### Parallel solver for Navier–Stokes in 3D

Feb 2019 – May 2019

*Supervised by Dr. Sarith P. Sathian, IIT Madras – High Performance Computing for Engineers*

- Developed a 3D Navier–Stokes solver using a message-passing model with domain decomposition .Used Python code to benchmark runtimes for different decomposition approaches and domain sizes.

### Computation of hydrodynamic coefficients of a body

Apr 2018 – Jul 2018

*Supervised by Dr. K. Murali, IIT Madras – Numerical Techniques in Ocean Hydrodynamics*

- Implemented a MATLAB boundary element method to compute added mass and damping coefficients of an oscillating body with free-surface effects. Analyzed different hull forms and investigated the effect of adding a fin to reduce motions.

### Maneuvering model for ship

Oct 2018 – Jan 2019

*Supervised by Dr. Suresh Rajendran, IIT Madras – Design and Analysis Tools in Marine Hydrodynamics*

- Contributed to development of numerical models for four-degree-of-freedom coupled motion response of a ship, solving differential equations with a Runge–Kutta method.

## SKILLS

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|-------------------|--|
| Programming       | Python, R, C++, MATLAB, SQL, LATEX                                   |
| ML & Statistics   | TensorFlow, Keras, PyTorch, scikit-learn, pandas, NumPy, pymc, SciPy |
| Distributed & HPC | Spark, Databricks, Ray, multiprocessing, mpi4py                      |
| Optimization & OR | Gurobi, PuLP   |
| Tools             | git  |

## COURSEWORK

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- Probability, Statistics and Stochastic Processes; Numerical Linear Algebra; Analytical Methods in Engineering Mechanics; Complex Variables and Transformation Techniques

- High Performance Computing; Computational Tools: Algorithms, Data Structures and Programs; Computational Laboratory; HPC Lab
- Advanced Fluid Mechanics; Foundations of Computational Fluid Dynamics; Numerical Techniques in Ocean Hydrodynamics; Mesh-free Methods in Hydrodynamics