ABHIJITH SIVAPRASADAN

M.Sc. Sustainable Energy Engineering (KTH, 2026) | Turbine Heat Transfer | CFD/CHT | Gas Turbine Technology
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PROFILE

Mechanical engineer completing an M.Sc. in Sustainable Energy Engineering at KTH Royal Institute of Technology, Sweden, with seven months embedded at Siemens Energy Finspång conducting conjugate heat transfer and compressible CFD analysis of gas turbine test hardware. My thesis required building CHT models in ANSYS Fluent from scratch, conducting mesh independence studies, applying Biot number analysis to decompose thermal performance, and translating simulation results into engineering decisions. I have direct experience with Siemens Energy engineering standards, Siemens NX, and Teamcenter PLM2020. I am motivated to develop deeper expertise in turbine component heat transfer and cooling design within the Siemens Energy R&D environment in Gurgaon.

EXPERIENCE

Master Thesis Student / Contract Test Engineer

Siemens Energy AB, Fluid Dynamic Lab, Finspång, Sweden Apr 2025 - Nov 2025

CFD and conjugate heat transfer analysis of reducer geometries for the Pulsatorn high-temperature gas turbine test rig. Academic supervisor: Prof. Jens Fridh, KTH.

- Built steady-state compressible CFD and conjugate heat transfer models of two reducer geometry variants in ANSYS Fluent 2025 R1 using the k-omega SST turbulence model. Inlet conditions: T = 673 K, P_gauge = 100,000 Pa. Three outlet pressure cases per geometry across six adiabatic and six CHT simulations.
- Conducted a three-level mesh independence study confirming spatial discretisation independence to within 2% on all key performance indicators before proceeding to the full CHT simulation campaign.
- Applied Biot number analysis (Bi = 0.003 to 0.004) and insulated reference simulations to decompose thermal performance and identify the governing thermal mechanism. Established that external convective surface area drives thermal delivery independently of internal geometry - this kind of thermal decomposition approach is directly applicable to turbine component heat transfer analysis.
- Identified flow-regime asymmetry between the two geometry configurations: redesigned geometry achieved near-choked conditions (Ma = 0.990) while the legacy geometry produced a localised supersonic vena contracta (Ma = 1.006). Interpreted physics, applied relevant assumptions, and delivered engineering recommendations.
- Managed full CFD workflow independently: geometry reconstruction in ANSYS SpaceClaim, structured meshing with prismatic inflation layers in ANSYS Meshing, solver configuration, convergence monitoring, and post-processing. Developed Python scripts for automated extraction and comparison of results.
- Used Siemens NX and Teamcenter PLM2020 throughout the project within the Siemens Energy engineering environment.
- Experimental phase: commissioned NI-DAQ measurement chains, ran independent test campaigns at temperatures up to 700 degrees C, and conducted a formal root cause analysis of a heater failure with documented findings that resulted in an approved project scope change.

Energy Efficiency Intern

Alleima AB, Sandviken, Sweden (Remote) Dec 2024 - Jun 2025

- Developed ISO 50001-aligned energy performance methodology. Designed KPI frameworks and analytical workflows in Python to identify loss mechanisms in industrial process data.

Backend Engineer

QBurst, Thiruvananthapuram, Kerala, India Sep 2021 - Jun 2023

- Developed backend APIs and automated test workflows in Python and TypeScript. Strong skills in structured documentation, systematic testing, and version control applicable to engineering tool development.

RELEVANT PROJECTS

Turbine Test Rig CFD and Heat Transfer Analysis

KTH Master Thesis at Siemens Energy Finspång 2025

- Full CHT analysis of gas turbine test hardware. Built compressible flow and conjugate heat transfer models, conducted mesh independence study, applied Biot number analysis, and identified flow-regime behaviour (near-sonic and supersonic vena contracta) between geometry variants. Directly relevant to turbine component thermal analysis methodology.

ML Heating Demand Forecasting

KTH Course Project (Python, scikit-learn) 2025

- Built day-ahead heat demand prediction model achieving 93.7% accuracy using time-series feature engineering and neural networks in Python. Demonstrates Python programming and data-driven analysis capability.

Heating Dispatch Optimisation - MILP

KTH Course Project (Python, PuLP) 2025

- Implemented annual dispatch optimisation model in Python with cost and emissions objectives. Demonstrates structured problem formulation and Python tool development.

EDUCATION

M.Sc. in Sustainable Energy Engineering (expected 2026)

KTH Royal Institute of Technology, Stockholm, Sweden 2023 - 2026

Thesis: Numerical Investigation of Steady-State Thermo-Fluid Performance of a Reducer for a High-Temperature Dynamic Pressure Sensor Calibration Rig. TRITA-ITM-EX 2026:14. Supervisor: Prof. Jens Fridh.

Relevant coursework: Numerical Heat Transfer in Energy Technology (grade A), Applied Heat and Power Technology (gas turbines, compressible flow, turbomachinery), Sustainable Power Generation, AI Applications in Sustainable Energy Engineering (grade A), Methods of Research in Sustainable Energy.

B.Tech in Mechanical Engineering

APJ Abdul Kalam Technological University, Kerala, India 2017 - 2021

Relevant coursework: Heat and Mass Transfer, Fluid Mechanics and Machinery, Thermodynamics, Thermal Engineering, Compressible Fluid Flow, Strength of Materials, Computer Aided Design and Analysis.

TECHNICAL SKILLS

CFD / CHT:	ANSYS Fluent (compressible flow, conjugate heat transfer, k-omega SST, mesh independence, prismatic inflation layers, convergence monitoring). Star CCM+ and CFX: no current experience, motivated to develop.
Heat transfer:	Conjugate heat transfer methodology, Biot number analysis, thermal boundary condition setup, near-wall treatment, turbulence modelling fundamentals (RANS), dimensional analysis
FEA:	ANSYS for CFD workflows. Structural FEA (ABAQUS, NX Simcenter): not yet practiced, motivated to develop.
1D/2D tools:	Flow network and correlation-based approaches: coursework level. In-house tools: no current experience, ready to learn.
CAD / PLM:	Siemens NX (used at Siemens Energy Finspång), Teamcenter PLM2020 (used at Siemens Energy Finspång), SolidWorks, ANSYS SpaceClaim
Programming:	Python (NumPy, SciPy, pandas, matplotlib, scikit-learn, PuLP, automated post-processing), MATLAB, C++, Git. NX Open: not yet practiced.
SAP:	No current experience.

CERTIFICATIONS

Applied Computational Fluid Dynamics (Siemens) | SSG Entre / Industrial Safety, Sweden (valid Jan 2025 - Jan 2028) | IBM Python for Data Science | Digital Manufacturing and Design Technology (University at Buffalo)

LANGUAGES

English: professional proficiency | Malayalam: native | Swedish: beginner