Rithwik Kandukuri

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Education

MS in Engineering Mechanics – University of Wisconsin-Madison Aug 2022 – May 2025
Relevant coursework: CFD, Convection, Aeodynamics Lab, Advanced Mechanical Testing
BTech in Mechanical Engineering – Mahindra Ecole Centrale Aug 2018 – May 2022

Projects

Analysis and Optimization of an Air-Cooled Heat Sink Design

- Developed a conjugate heat-transfer model in ANSYS Icepak to design and optimize a chip-level air-cooled heat sink for a 25W package
- Applied response surface optimization to evaluate the influence of fin geometry parameters — base height, fin count, and fin thickness — on chip junction temperature
- Analyzed design trade-offs between thermal performance and physical footprint, achieving an optimized configuration that reduced junction temperature and minimized overall system size relative to baseline

Reverse-Engineered Qualcomm QCC744 Thermal Simulation Report (ANSYS Icepak)

- Reverse engineered Qualcomm's QCC744 thermal simulation by rebuilding package CAD in Icepak, including the Cu leadframe/exposed paddle, EMC body, stacked dies, and die-attach layers from report inputs
- Simulated the QCC744 package in Icepak and validated junction temperatures and thermal resistances (θ_{JA}, θ_{JB}, θ_{JC}) against values reported in the published study under the specified dual-die power loading on a 4-layer (2S2P) board

Design of a Liquid-Cooled Cold Plate

- Designed and simulated a liquid-cooled cold plate in ANSYS Icepak AEDT for a 200 W chip, modeling conjugate heat transfer and coolant flow to evaluate thermal performance. Generated a response surface in ANSYS Icepak AEDT to evaluate tradeoffs between coolant inlet flow rate and temperature on cold-plate thermal performance.

Experience

Graduate Research Assistant, University of Wisconsin-Madison October 2022 – May 2025

- Conducted 150+ RANS CFD simulations in OpenFOAM on HPC clusters (SLURM) using Pointwise-generated meshes to study vertical-axis turbines for the ARPA-E SHARKS program; correlated data with experimental results from collaborators
- Automated CFD workflow using Python and MATLAB for pre/post-processing of simulations, improving analysis throughput and consistency across datasets
- Implemented overset-mesh one-way fluid–structure coupling to map unsteady aerodynamic loads and identify deformation-driven performance trends

Graduate Teaching Assistant (Senior Design Projects), University of Wisconsin-Madison Aug 2024 – May 2025

- Mentored 12 cross-functional design teams from concept to prototype, conducting weekly reviews and offering targeted technical consultations on CAD design, FEA/CFD case setups, 3D printing, and DFM principles to drive rapid prototype iteration
- Taught project management practices, including Gantt chart planning, stakeholder communication, and technical reporting, equipping students with tools to deliver solutions and communicate effectively with clients and sponsors

Leadership & Outreach

- **Head of Logistics & Operations:** Directed planning and execution of multiple high-profile events, including a TEDx event, by managing cross-functional teams, coordinating vendors and schedules, and optimizing resource allocation to ensure smooth operations under tight deadlines
- **STEM Outreach (KidWind Challenge, Engineering Expo):** Engaged K–12 students and non-technical audiences through hands-on demos and presentations, guiding them in designing wind turbine blades, using snap circuits to illustrate power grid concepts, and translating lab research into age-appropriate formats to promote interest in renewable energy and engineering

Skills

CFD Tools: ANSYS Fluent, ICEPAK, OpenFOAM, Tecplot 360, ParaView, Pointwise
Mechanical Design & Analysis: SolidWorks, Siemens NX, Autodesk Inventor, Fusion 360, ANSYS Mechanical
Instrumentation/Measurement: Thermocouples, Pitot tube, hot-wire anemometer, pressure taps, DAQ systems
Programming & Data Analysis: Python, MATLAB, Bash, C
Thermal System Design: Heat sink and cold-plate design, TIM modeling, vapor chambers.
Numerical Methods: Finite Volume/Difference Schemes, Physics-Informed Neural Networks (PINNs)