VARAD LAD

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SUMMARY

5 years of experience designing and testing mechanical systems and mission-critical infrastructure for semiconductor fabs and data centers, integrating FEA/CFD, CAD, and GD&T per ASME and ASHRAE standards; skilled in CVD, PVD, ALD, thermal and hardware testing

WORK EXPERIENCE

TSMC | **Mechanical Engineer, Facilities** | Critical Facilities Systems | Phoenix, AZ **Jul 2024 – May 2025**

- Delivered 4nm, 2nm semiconductor fab build out; designed and installed critical facilities systems as a lead mechanical engineer
- Saved $120,000 in future maintenance costs by resolving PM issues via N+1 redundancy planning in collaboration with operations
- Reduced downtime by 25% by diagnosing critical abatement and HVAC system failure issues in data-utility center using SCADA
- Troubleshot critical environment-cleanroom mechanical systems, cooling towers, RCTO, chillers, and validated, P&IDs, & PFDs
- Built code compliant construction schedule following ICC, IBC, IMC, IFC and NFPA codes; passed inspection with 0% rework
- Developed Power Bi and Tableau dashboards to streamline contractor milestones, commissioning, design submittals and city code reviews, which improved project timelines and enhanced stakeholder collaboration during mechanical package review

Rayn Innovation | **Process Engineer Co-op** | Opto-Mechanical R&D, Hardware & Thermal Test | Tempe, AZ **Jan 2024 – May 2024**

- Boosted opto-electronic hardware performance and electric conductivity by synthesizing thin film via CVD, PVD, ALD techniques
- Detected 90% of surface defects in nano thin-film by performing metrology on microstructure using SEM, TEM, XRD, and UV-Vis
- Increased film uniformity by 12% and reduced material waste by 40%, by optimizing process parameters using DOE & SPC in JMP
- Tested hardware and thermal properties of coated semiconductors using controlled heating and sensor-based feedback systems
- Drove 28% yield performance gain of the product prototypes by enhancing thermal management through parameter tuning
- Improved synthesis-stage purity by 15% through big-data analysis of deposition variables and defect trends using JMP and Python

Marketech International Corporation | **Mechanical Engineer Intern** | Tool Interconnect | Phoenix, AZ **Jun 2023 – Aug 2023**

- Designed and improved utility connection reliability from 82% to 94% for 15 installed semiconductor critical-facility system tools
- Reduced system downtime by 15% through effective troubleshooting of mechanical system in critical fab environment
- Resolved BIM system clashes and verified HVAC chillers and duct-system models in Revit, significantly reducing installation issues

NASA | **Mechanical Project Specialist Co-op** | NASA L'SPACE Program | Tempe, AZ **Aug 2022 – Dec 2022**

- Modeled 40 CAD mechanical system parts using Siemens NX, approved 7+ patentable projects and authored project proposals
- Identified 10 KPIs of each project in collaboration with NASA Marshall Chief Technologist, resulting in 15% project improvement
- Collaborated with aerospace engineering and chief scientists to develop system concepts for NASA mission simulation projects

Chemtech Systems | **Senior Mechanical Engineer** | High-Volume Manufacturing | India **Jun 2019 – May 2022**

- Led a team of 5 technicians in a 24/7 high-volume blade manufacturing plant to meet daily production and procurement targets
- Saved approximately $30,000 and reduced tool downtime by outsourcing predictive maintenance for the critical equipment
- Increased cutting performance by 80% by identifying wear patterns and redesigning blades for self-sharpening functionality
- Saved $18,000 on the product testing costs by outsourcing final testing and commissioning to third-party contractors
- Applied FMEA methodology to identify and troubleshoot production defects in equipment during high-volume manufacturing

PROJECTS

Data Center Thermal Management System for Scalable Cooling Optimization

- Improved cooling performance by 27% and reduced hotspots by 32% by simulating liquid vs air-cooling in SimScale using a Fusion 360-designed DC server hall, optimized VRF airflow zoning and adaptive fan control to benchmark efficiency across both methods

Microsoft Underwater Data Center, Project Natick-inspired Land-Based Data Center Cooling Pod

- Improved land-based data center thermal reliability by 25% and projected a 35–40% reduction in hardware failure rate by designing and simulating sealed, nitrogen-cooled pod environments modeled on Microsoft's Project Natick, underwater data centers

TECHNICAL SKILLS & LEADERSHIP

CAD Design & Simulation: Revit, Siemens NX, ANSYS (CFD & FEA), AutoCAD, SolidWorks, CATIA, Creo, Fusion 360, SimScale
Data Analysis, Coding & BI Tools: Python, MATLAB, JMP, SQL, DoE, SPC, Power BI, Tableau, RCA, FMEA, SAP HANA, PLC, HMI, G-code
Leadership: President of Employee Collaboration Club at TSMC, Spokesperson for past organizations (2 years), Technical Public Speaker

EDUCATION

Arizona State University | Master of Science in Mechanical Engineering | Sun Award of Excellence Recipient **May 2024**
Sanjay Ghodawat University | Bachelor of Technology in Mechanical Engineering | Minor in Design & Modeling **May 2022**
Latthe Education Society's Polytechnic | Diploma of Engineering in Mechanical Engineering **May 2019**