VARAD LAD

602-388-6861 • vlad3@asu.edu • LinkedIn • Portfolio

Portfolio

SUMMARY

5 years of experience in mechanical design, optimizing thin-film/vacuum deposition equipment, opto-electronics/display and owning critical systems across semiconductor fabs & data centers, set up & troubleshot (8D, FMEA) high-vacuum assemblies integrating CAD

WORK EXPERIENCE

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

- Delivered 4nm, 2nm semiconductor fab build; designed and installed vacuum deposition system as a lead mechanical engineer
- Saved $120,000 in maintenance costs by troubleshooting vacuum issues via design modification and a N+1 redundancy plan
- Reduced downtime by 25% by diagnosing real-time critical thin-film and vacuum system failure issues across the production line
- Troubleshot critical environment-cleanroom mechanical systems, cooling towers, RCTO, chillers, and validated, P&IDs, & PFDs
- Built code compliant installation 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 | **Senior Opto-Mechanical Engineer Intern** | R&D, Hardware & Thermal Test | Tempe, AZ **Jan 2024 – May 2024**

- Boosted display-packaging hardware performance & 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 wafer-level packaging 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 Engineer Intern** | NASA L'SPACE Program| Tempe, AZ **Aug 2022 – Dec 2022**

- Modeled and tested 40 CAD mechanical 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
- Reduced annual BOM spend 18%, equivalent to $300,000 by building an ERP that auto-generated BOMs from CAD drawing and algorithmically ranked regional suppliers on cost, quality and certification, cutting sourcing cycle time by 66%

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

Vacuum & Thin-Film Tools: PVD, CVD, ALD, PECVD, high-vacuum chambers, leak testing, RGA, wafer-level and display packaging system
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

EDUCATION

Arizona State University | Master of Science in Mechanical Engineering | Sun Award of Excellence Recipient **May 2024**