DR. JOSHUA L. VINCENT

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SUMMARY

Senior R&D engineer at Intel driving test process development for validation and characterization of EIC/PICs. Expertise in large-scale yield analysis (SQL, Python, JMP) and leveraging SPC/DOE to correlate parametric and process data to physical failure modes. Skilled at structured problem-solving (MBPS, 8D) to determine root causes of technical problems. Strong communication and stakeholder management skills. Proven track record of delivering yield improvements through cross-functional leadership in a fast-paced manufacturing environment.

EXPERIENCE

Intel, Oregon Assembly and Test Development Factory Hillsboro, OR
Test Research and Development Engineer March 2022 - Present

- **Silicon Photonics Innovation:** Owned design validation for HVM test tools enabling concurrent micro-electrical and optical performance characterization of EIC/PIC die stacks. Received 2024 Engineering Impact Award for validating a 4 Tb/s fully integrated optical I/O chiplet (OCI) co-packaged with a CPU
- **Yield Optimization & Root Cause Analysis:** Automated analysis of manufacturing data using SQL, Python, and JMP to identify tool commonalities and spatial yield trends. Leveraged these insights to prioritize high-impact yield limiters. Initiated and led a 5-member cross-functional task force that reduced die handling yield loss by 100x, recovering 1,500 hours of technician time and $1.5M+ in cost savings
- **HVM Process Development & Integration:** Led singulated and stacked die sort process development from pilot through HVM ramp. Partnered with design, dicing, and assembly teams to correlate test data with process parameters, driving hardware and process improvements to meet yield and output targets
- **Quantitative Failure Analysis:** Diagnosed a 3 μm prober misalignment impacting 10% of the toolset by correlating optical probe mark inspections with electrical test data. Drove the supplier to implement a compensating calibration, eliminating $>$ 100 hours of tool downtime and restoring HVM capacity
- **New Product Introduction (NPI):** Supported qualification of 15 new products while sustaining factory operations. Drove automation of NPI workflows in Python to increase throughput by 250%
- Provided technical leadership and mentorship to junior engineers, contributing to a collaborative and adaptive team culture in a fast-paced environment

Arizona State University Tempe, AZ
Dean's Graduate Research Fellow August 2016 - August 2021

- **Advanced Materials Characterization:** Developed atomic-level techniques for characterizing nanoparticle surfaces using microscopy, spectroscopy, AI signal processing, and high-performance computing (HPC) — cultivating rich characterization skills applicable to complex metrology and materials problems
- **Computational Modeling & AI:** Performed quantum mechanical simulations and multi-physics CAD modeling to interpret experimental data; developed deep convolutional neural networks and machine learning methods for denoising and segmentation of $>$ 1 TB image datasets with ultra-low SNR < 0.5

National Institute of Standards and Technology Gaithersburg, MD
Visiting Doctoral Scholar March 2019 - October 2019

- Designed and executed high-impact experiments enabling direct atomic-scale visualization of active catalyst structures in reaction conditions, demonstrating precise experimental design and execution skills
- Collaborated with cross-functional teams to correlate TEM data with *in situ* X-ray and IR spectroscopy data, mapping atomic surface structures to dynamic chemical processes in transition metal catalysts

SKILLS

Device Characterization & Validation: Process development for EIC/PIC component verification, parametric yield analysis, wafer/die-level yield characterization, failure mode analysis, wafer assembly integration

Statistical Analysis & Quality Control: Statistical process control (SPC), design of experiments (DOE), model-based problem solving (MBPS), process risk management (FMEA/8D), Pareto optimization

Data Analytics & Programming: Python (automation/data science), SQL, JMP, data visualization, COMSOL multi-physics modeling, big data handling, advanced signal processing, computer vision

Advanced Metrology & Leadership: Electron microscopy and spectroscopy (TEM, SEM, EELS, EDS, FIB), optical inspection, prober metrology, global supplier/foundry management, technical mentorship

EDUCATION

Arizona State University
Ph.D., Chemical Engineering 2016 - 2021

University of Maryland, College Park
B.S. *cum laude*, Chemical and Biomolecular Engineering 2012 - 2016