

Neil Panchal

Engineering Résumé

Preamble

- Interdisciplinary software engineer currently working at Rigetti Quantum Computing Inc. in Berkeley, CA.
- Insatiable desire to automate pretty much anything and everything.
- Ability to clearly articulate problem statements, delegate tasks in a complex interdisciplinary team environment and organizing key deliverables.
- Managing multi-faceted projects involving high-risk, cost, reliability, speed, evolving intercepts, planning for unexpected events. Decisive and prudent.
- Explicit is better than implicit and I take conscious steps to simplify, add clarity and to untangle complex problems.
- Exhibit a bottom-up philosophy towards problem solving - understand the physics, engineering and cost limits; question the status quo, argue respectfully and in the interest of solving/improving the problem/product/service.
- 8+ years of experience in developing frontends and backend software (full stack), ETL tools, database schema architecture, engineering UX/UI, imaging metrology, instrumentation, robotics, critical production monitoring systems, tool-data-exchange (TDX) standards, and management of pathfinding laboratory serving 45 engineers.

Contact	
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Employment History	Date Range	Location
Rigetti Computing	July 2019 - Present	Berkeley, CA, USA
Intel Corporation	Feb 2011 - June 2019	Chandler, AZ, USA Hillsboro, OR, USA
Lockheed Martin Aeronautics	Summer 2010	Marietta, GA, USA
General Electric Company	2006 - 2008	Charleston, SC, USA

Experience / Rigetti Quantum Computing (July 2019-Present)

Role	Responsibilities and Impact
Sr. Quantum Software Engineer [2019-Present]	Summary: Responsible for internal software used to design, simulate, fabricate, test and characterize quantum ICs and test chips.
	Author of Rigetti Fab's ETL (Extract-Load-Transform) tool that continuously uploads room temperature and cryo-metrology data to the production database. This data is streamed continuously to a dashboard.
	Co-author of Rigetti Fab's Data API, written in Python + FastAPI, asynchronous and high performance database adapter. The first API at Rigetti to decouple database access from applications.
	Author of Rigetti's Scientific Data API that provides interface for computing yield metrics.
	Co-architected of Hamiltonian specification, simulation, room-temperature targets to a hierarchical structure with history. This provides designers to organize Hamiltonian information (SQUIDs, resonators, purcell filters, edges/couplers specification) and provide a common interface over the Data API.
	Maintainer of Rigetti's internal dashboard for design, metrology and fabrication data. Comprises of over 15 views with wafer maps, analysis tools and tabulated data written in Angular javascript framework.
	Maintainer of Rigetti's chip viewer application - aka Google Maps for wafers with ultra high resolution images streamed from Amazon S3 buckets, with tiling logic to allow for fast browsing of the map.
	Maintainer of Rigetti's design software suite backend that operates on GDS format, automatically tiles layout for wafers, uploads data to the production database. Recently worked on decoupling the ORM, streamlining package management and architected API endpoints.
Maintainer of Rigetti Fab-1 autoprobng software. This software is responsible for fetching component locations from the database, calibrating the stage, aiding alignment process and automatically probing resistance and capacitance measurements, and uploading to the database.	

Experience / Intel Corporation (2011-2019)

Role	Responsibilities and Impact
Staff Pathfinding Engineer [2018-2019]	Responsible for developing metrology strategy for media through the backend fab process and assembly.
	Intel packaging architecture (Client and Handheld products) lead for media, laser-mark, handling and inspection modules. Own future outlook and needs for metrology, process, equipment, engineering-hiring and external suppliers.
	Managed MIHL (Media, Inspection, Handling and Laser) laboratory serving 45 engineers, conducted training, mentorship and build up prototyping capabilities.
Senior Pathfinding Engineer [2016-2018]	Responsible for developing inspection metrology for TPE-adhesive substrate program to reuse media resulting in savings of \$75MM+ NPC over 4 years.
	Project lead for supply-chain imaging metrology for TPE-adhesive. Solely-responsible for developing/managing equipment installed across LVM/HVM and supply-chain sites. Developed modular inspection optics/vision stack to be installed as "plug-and-play" into various process modules.
Senior R&D Packaging Engineer [2013-2015]	Drove development of proprietary algorithms for void detection in layered TPE stacks and enabled PSA delamination detection using 2D and 3D vision with partnership from top industry experts in the machine vision industry.
	Researched and developed targeted 20µm FM classification programs ability to segregate FM based on shape, size, contrast, micron-level location, material composition resulting in \$4MM+ savings in media yield.
	Conducted large scale Monte-Carlo simulation using 1.6M particle images to determine optimal clustering parameters, enabling detection of contamination signatures.
	Developed 3D Warpage metrology capable of 10µm repeatability on semi-translucent thermo-plastic elastomer surface using 3D laser profilometry.
	Developed human finger-print detection using DBSCAN and K-Means clustering on individual residue particles (20µm-350µm size) adhered to skin.
	Investigated source of contamination by matching defect signatures in 30M particle image database. Provided exploratory data analysis to drive cleanroom efforts resulting in \$5MM+ NPC ROI.
	Developed full-stack real-time dashboard for HVM production monitoring collecting 500K images per day framework.
	Analyzed surface defect images from SEM using Vision Pro, quantified roughness modulation due to impregnation of CF/CNT/PTFE in PC material.
R&D Packaging Engineer [2011-2013]	Conceived, developed, qualified and proliferated processes for 32nm matrix BGA strip/substrate handling. Delivered 50 DPM performance on robotic systems handling matrix BGA strips and singulated substrates for HVM.
	Successfully transferred 32nm, 22nm and 14nm nodes for pick-n-place HVM processes. Specifically, drove and deployed disruptive technologies in high speed machine vision systems used for measurement of a wide range of features and defects.
	Utilized CAD tools to perform product/media interactions, strip warpage, end-effector design and compliance, chip package KOZs and design rules, interference and dimensional analysis, rapid prototyping, reverse-engineering of mechanisms and parts.
	Developed and innovated wireless telemetry for vibration characterization on high-speed Cartesian robotic maneuvers to improve quality/yield. ISO 18436-2 training certification in Vibration analysis.
	Researched and investigated particle cleaning technologies for high-speed cleaning of polymer materials. Conducted experiments to study ultrasonic, turbulent agitation, supersonic CO2 blasting, and UPW spray technologies.

Experience / Lockheed Martin Aeronautics Corporation (2010)

Role	Responsibilities and Impact
Graduate Internship / Stress Analysis Group [2010]	Conducted FEA Post-processing of the Aerial Refueling System on the C-130J Aircraft.
	Determined Strain Gauge placements for ground test certification of the C-130J refueling receptacle to verify FEA models, especially near the hatch opening joints and surrounding manifold.
	Designed and performed stress analysis for a fuselage intercostal fitting supporting 4,000 lb of passenger seat load. This activity supported the reconnaissance version of the C130J aircraft for search and rescue operations. Intercostal fittings would allow a height adjustable stowable seat to be mounted on the side of the Station 43 fuselage section, and allow the operator to scan for search and rescue for extended periods of time.

Expertise and Skills

Category	Tools & Software
Programming Languages	Python, C, C++, Java
Databases	PostgreSQL
Frontend	Flask, Angular, React, WForms, Utility-first CSS frameworks
Data Science	Pandas, Julia DataFrames, R, JMP
Robotics and Embedded Programming	SEGGER suite/debuggeres, PI Mikromove, Fanuc HT/Vision, FreeRTOS and Zephyr
Image Analysis and Machine Vision	Matlab Imaging Toolbox, OpenCV, Scikit-Image, Cognex Vision Pro, HALCON
CAD, ECAD	Solidworks, Catia v5, Altium Designer
Mechanical Analysis	ANSYS, NASTRAN, PATRAN, ANSYS CFX, Fluent 6.0

Publications

Author	Title
Panchal, Neil	"Detection of High-risk FM Contamination on TPE Adhesive Bumps Using Machine Learning Techniques." Intel Assembly & Test Technology Journal Vol. 20 (2017): Print.

Education

Year	Degree	University	GPA
2009	Bachelors of Science in Mechanical Engineering	Georgia Institute of Technology	3.8 / 4.0
2010	Masters of Science in Mechanical Engineering	Georgia Institute of Technology	3.9 / 4.0