

## SENIOR PRINCIPAL MECHANICAL STRUCTURAL ANALYSIS ENGINEER

***High-Achieving Mechanical Structural Analysis Engineer with demonstrated success combining traditional engineering with modern computational methods for major clients and Fortune 500 companies in the heavy equipment, military, oil and gas, aerospace, and renewable industries.***

- **Body of work includes development of complex physics-based and data-driven analysis models and methods** of structural, mechanical analytical algorithm development and automation, streamlining system and component design analysis across the global company, with practical integration of AI/ML models.
- **Expertise spans static and dynamic structure analysis**, FEA, modal analysis, fatigue analysis, and multibody dynamic simulations (MBD).
- **Exceptional leader and mentor of technical teams in analysis and analytical tool development.**
- **Background includes leading multidisciplinary teams including manufacturing and quality assurance** to streamline engineered designs and ensure strength, functionality, reliability, and optimization.
- **Currently enrolled in Eastern University's rigorous Master of Science, Data Science Program** (expected completion fall 2025); recent coursework includes Statistical Modeling, Fundamentals of Data Science, Data Analytics in R, and Principles of Python Programming.

### PROFESSIONAL ACHIEVEMENTS

- **Array:** Developed a custom beam element FEA desktop program with a linear solver and a .NET user interface to model Array's solar tracker systems. The program was accepted globally across the company as the structural, mechanical design, and analysis program. Due to the high demand for AATLAS (Array's Advanced Tracker Loads Analysis System) a web-based version is actively being developed.
- **Array:** Conducted solar module clamp fatigue analysis. Engaged in stress- and strain-based fatigue analysis, used Rayleigh distribution for wind load-time series, implemented rainflow-counting algorithms, and used Palmgren-Miner damage summation to analyze component design life impacts with as observed field damage
- **Insitu:** Analyzed structural-mechanical systems under static and dynamic loading; employed FEA and classical calculations for aluminum and steel structures for unmanned air vehicles (UAV). Conducted analysis of UAV control surface rudder, elevator, flap, aileron for in-flight loading and capture/recovery loading events. Engaged in modal analysis of UAV control surfaces and dynamic and static analysis of test assets and equipment for expected loading in unintended use of launch and recovery equipment.
- **Gunnebo Johnson:** Leveraged expertise in reengineering a submersible gear housing/thruster housing for the Army Corps of Engineers, which included analyzing and quantifying increased strength while working with casting houses to ensure castable housing design for appropriate solidification and through-part material consistency.

### PROFESSIONAL EXPERIENCE

**ARRAY TECHNOLOGY**, Chandler, AZ

2020 - Present

#### **Principal Mechanical Structural Engineer, (1/2024 - Present)**

Promoted to this role to apply advanced algorithm development/digital transformation capabilities, technical expertise in structural analysis, and capacity to identify and address operational inefficiencies and innovate and implement strategic solutions that maximize business value across the organization. Leverage growing expertise in AI/ML applications to facilitate the AATLAS Algorithm development and global deployment of a revolutionary Python-based FEA desktop software solution for finite element analysis of solar tracker systems.

#### **Selected Accomplishments**

- Focused on streamlining and standardizing structural analysis and modernizing and automating engineering analysis processes.
- Architected and developed AATLAS, which delivered consistent analysis methodology across global engineering teams. Automated an analysis storage in Azure for machine learning integration for predictive modeling development.
- Created Python-based algorithms, including solar tracker modal frequency calculations, wind loading and thermal loading calculations, soil stiffness interaction with geometry, beam element FEA solver, post-processing of loads and deflection analysis, and AISC steel code checks of structural members.
- Developed a suite of specialized tools, a load spectrum analysis tool, and static structural FEA algorithm.

- Generated automated custom reports and reduced the need for commercial structural FEA software licenses.
- Recognized for designing a user-friendly VB.Net framework interface that was utilized across the organization and adoption of desktop software as organization's primary structural tracker analysis and design tool.
- Credited for dramatically reducing design cycle time from days to hours, increasing loading and stress assessment accuracy, cutting structural project costs by 5%, and standardizing analysis methods companywide.
- Streamlined engineering workflow significantly by facilitating faster iteration, design refinement, better decision-making in structural design, faster responses to market demands, and better quality control.

### **Senior Mechanical Engineer for Mechanical/Structural Systems, (2020 - 2024)**

Met rigorous objectives while conducting dynamic simulation of solar tracker system subject to wind loading events using MSC Adams software. Leveraged expertise to develop component-level load spectrums in load development defining component-level design. Engaged in linear and nonlinear FEA of tracker assemblies and components to support analytical design evaluation. Generated reports and delivered comprehensive presentations that supported internal and external customers.

#### **Selected Accomplishments**

- Applied Nueber and ESED linear to plastic correction methods and linear damage summation while conducting stress- and strain-based fatigue life analysis.
- Devised transfer functions from FEA models of local areas of interest; innovated a stress-based time series to perform fatigue analysis and cumulative damage summation using rainflow-counting algorithms.
- Conducted modal analysis tracking structures and generated Python models and ANSYS models to accurately calculate mode shapes and natural frequencies.
- Generated a Python Linear Dynamic Model of a tracker system using modal superposition method to efficiently analyze dynamic behavior and system modes.
- Created a comprehensive direct integration model to capture full nonlinear transient dynamic response, enabling validation of simpler modal approach and identification of nonlinear effects.
- Employed software development expertise and used Visual Studio to develop custom windows form application user interfaces to launch and automate Python scripts, Excel macros, and perform FEA analysis.
- Evolved analytical models in agreement with testing data to ensure analysis accuracy and completeness.

INSITU, Hood River, OR

2015 - 2020

### **Mechanical Engineer IV, PE**

Analyzed mechanical and welded/bolted structural equipment for next-generation unmanned air vehicle (UAV) retrieval systems, expertly using finite element analysis Ansys and Abaqus performing nonlinear structural analysis and dynamic capture simulation of UAV aircraft, while performing tests and classical engineering calculations to ensure margins of safety and compliance with governing standards, ASME, AISC, and MIL-STDs. Engaged in analysis of metallic structures and injection molded plastics including evaluation of stress, strain, fatigue life, buckling, modal, and rigid body dynamics.

#### **Selected Accomplishments**

- Addressed critical issues with aluminum structural weldments in government-controlled UAV recovery system; expertly engaged in FEA analysis using Ansys and Abaqus software, performed nonlinear structural analysis of UAV capture simulations, and conducted dynamic structural analysis of ground equipment during captures.
- Developed analytical tools for fatigue assessment, structural load calculation, and UAV capture simulation, developed studies to determine product/life usage, and generated engineering reports. Resolved weldment issues, accelerated production, complied with governmental/military stakeholder requirements, improved evaluation methods, and created lasting process improvements.
- Delivered technical support to optimize product manufacturability, functionality, quality, and performance. Continually worked to improve fabrication, quality, machining, operational processes, and engineering. Wrote technical reports and designed studies and investigation methods.
- Performed Abaqus dynamic structural analysis of ground equipment during UAV captures to assess structural loads and stresses.
- Assessed product life impacts of aluminum structural weldment issues for a government-controlled design with NAVAIR and DCMA involvement, by performing fatigue analysis, stress-based and strain-based, with consideration to material notch sensitivity.
- Generated studies and load histograms to assess product life/usage through various environmental conditions.
- Provided better source data for the assessment of structural damage and performance impacts by developing fatigue, structural-load, and UAV-capture calculators.
- Ensured exceptional support for full-rate production while maintaining structural integrity. Maintained full adherence to fit, form, and functional requirements for a second government-developed aluminum UAV recovery structure.

GUNNEBO JOHNSON, Tulsa, OK

2014 - 2015

### Product Development Engineer PE

Performed professional engineering analysis and designed heavy lift products, such as shackling devices and rolling blocks, for oil/gas industries and crane manufacturers. Investigated processes; continually identified and capitalized on design improvement opportunities. Provided technical support for fatigue tests and fatigue analysis, ultimate load tests, and FEA to calculate stresses, areas of strength, and kinematic functionality. Delivered engineering and test reports to qualifying entities.

### Selected Accomplishments

- Led and motivated designers and drafters to peak performance levels while ensuring 100% compliance with industry standards, product requirements, and ASME design codes.
- Analyzed and designed products that were well-received in the marketplace, such as crane blocks, swivels, and quick disconnect shackles.
- Developed first line of well service tubing blocks, successfully leading full product development lifecycle, from concept to production. Worked closely with manufacturing and marketing teams to ensure best results.
- Used baseline of analysis to redesign thruster gear housing that was used underwater by the Army Corps of Engineers.

*Earlier success* includes serving as a Mechanical Engineer PE at Alltec Lifting Systems. Served as a Mechanical Engineer at Canrig Drilling Technology Ltd., Engineer III at Hughes Christensen, Thermal Analyst / Senior Engineer at Jacobs Sverdrup / GB Tech, and Mechanical Design Engineer at Vertex RSI.

### PATENTS

- Anti-Tracking Spear Points for Earth-Boring Drill Bits (US8579051B2)
- Erosion-Resistant Fluid Passageways and Flow Tubes for Earth-Boring Tools, Methods of Forming the Same, and Earth-Boring Tools Including the Same (US7828089B2)

### EDUCATION

**Bachelor of Science, Mechanical Engineering** - UNIVERSITY OF TEXAS AT TYLER (2000)

**Master of Science, Data Science (In progress)** – EASTERN UNIVERSITY

**Certificate in Machine Learning & AI Micro Boot Camp** – ARIZONA STATE UNIVERSITY (2023)

### PROFESSIONAL CERTIFICATIONS

**Pilot License:** Airplane Single-Engine & Multi-Engine Instrument Rating

**Registered Professional Engineer:** in the states of Texas, Louisiana, Washington, Oregon, Alaska (Mechanical Discipline); Oklahoma (Mechanical & Structural Discipline)

### ADDITIONAL INFORMATION

**Professional Development:** Statistical Modeling, Data Science Fundamentals, and NumPy, Pandas, and Python

**Technical Skills:** Abaqus, Ansys, MSC ADAMS, AutoCAD, MathCAD, Excel, Excel Programming VBA, VB.NET, Python, Inventor, Microsoft Office, Outlook, PowerPoint, Simulation, SolidWorks, Visual Studio

**Professional Affiliations:** Member, National Council of Examiners for Engineering & Surveying, Records Program

**GitHub:** [https://github.com/Rflorey/Machine\\_Learning](https://github.com/Rflorey/Machine_Learning)

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"I am writing this letter to provide my strongest recommendation for Russ Florey, who served as Senior Mechanical Engineer in the Systems Analysis group at Array Technology from 2020 to 2024, and was promoted to Principal Engineer in early 2024 due to his exceptional contributions and technical leadership. ... I highly recommend Russ for any position requiring expertise in mechanical/structural engineering analysis, software development, or technical leadership. His innovative thinking, technical excellence, and collaborative approach would make him an asset to any organization." – *Mudasar Zahoor, PhD, Sr. Research Engineer/ Technical Lead, Array Technologies, Inc.*

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