Patrick R. Lee, P.E.

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SUMMARY

Senior technical leader in Computer Aided Design and Engineering. Licensed professional engineer that is experienced in mechanical engineering, analysis, design and drafting using CAD/CAE tools for conceptual layouts, product design, mechanism and tooling design. Co-inventor on 18 Patents. Routinely perform FEA, modal, fatigue and CFD analyses. Accomplished in defining new CAE processes to assess innovative product concepts, new product design, product improvement, meeting schedules and team building.

COMPETENCIES

- Product Design, Development, and Documentation
- Innovative Analysis Driven Design
- Stress, Thermal and Fatigue Analysis
- Vibration Analysis
- Kinematic, Kinetic and Dynamics Analysis
- Computational Fluid Dynamics Analysis
- Configuration Control Management
- Standard Machine Shop Practices

EDUCATION

MS Mechanical Engineering, University of California, San Diego.
BS Mechanical Engineering, University of California, San Diego.

TECHNOLOGY TOOLS

Ansys Mechanical (FEA), Ansys CFX (CFD), FEMFat (Fatigue), Hypermesh (Meshing),
MatLAB, Microsoft Visual Basic,
Creo (ProE), Autodesk Inventor, SolidWorks,
Microsoft Office Suite (Word, Excel, Powerpoint, Project etc.)

WORK HISTORY

Mechanical Engineering Consultant **3/20 - Present**
Consulting work for various engineering companies.

Achates Power Inc. **7/04 - 3/20**
Senior Staff Mechanical Engineer

- Team leader for all computer aided mechanical engineering studies on new engines. This included reviewing and approving the designs, drawings, and analyses of other engineers on all Achates programs.
- Successful programs included Advanced Combat Engine (now being developed in conjunction with Cummins), two back-to-back gasoline compression ignition programs for ARPA-e, a heavy duty truck engine for CARB, as well as several OEM customer studies.
- Personally performed structural and thermal Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD) analysis, modal and dynamic analysis studies.

- These included use of Ansys Mechanical, Ansys CFX, Creo, Creo Simulate and Creo Mechanism in the design of pistons, cylinders, crankshafts, connecting rods, cylinder and piston cooling, and engine mechanisms.
- Technical lead of a group of eight engineers directing mechanical engineering analysis and design of a single cylinder opposed piston two stroke research engine which is still in use today nine years later.
- Evaluated rigid body dynamics of the overall engine balance and determined mounting requirements.
- Enjoyed taking on new challenges. As an example, developed a first-ever thermal/structural analysis methodology for the cylinder and piston in opposed piston 2 stroke engines. Ansys published an article titled "Cool Idea for Engine Design" describing this work in their trade magazine "Ansys Advantage". (https://www.ansys.com/about-ansys/advantage-magazine/volume-xii-issue-2-2018/cool-idea-for-engine-design)

KLA-Tencor, Diamond Division (formerly Phase Metrics) **1/95 - 7/04**
Senior Mechanical Design Engineer

- Primary responsibility was mechanical engineering, design and development from conception to production of test equipment products for the data storage industry.
- Duties included project leadership, design concept formulation and implementation, stress, strain, kinematic, FEA and modal analyses, precision mechanism, automation & tooling design, machine layout, system and assembly design, and some fiber optic opto-mechanical design.
- Performed materials selection and subcontractor/vendor component selection and interfacing.
- Oversaw manufacturing of prototypes, testing, and established component and system reliability
- Used ProEngineer/ProMechanica in the 3D modeling of parts and assemblies and development of detailed manufacturing drawings.
- Supervised engineers, designers and drafters and the preparation of required drawings in AutoCad and ProEngineer that were compliant with ANSI Y14.5M.
- Retained responsibility for all the mechanical aspects of a product until released to manufacturing.

SAIC, Science Applications International Corporation **7/93 - 1/95**
Mechanical Design Engineer

- Mechanical power transmission design, support structure design, driveshaft design.
- Application of stress and strain analysis using MathCad and hand calculations.
- Design of actuation mechanisms and mechanical energy storage devices.
- Electronic packaging design including dip brazed construction.
- Developed steady state heat analysis program based on node-resistor approach using solver written in graduate school.
- Other responsibilities included concept formulation and implementation, component, material and vendor selection, organized and oversaw the implementation of configuration management system, participated in customer presentations, mechanical and electrical drafting compliant with ANSI Y14.5 M 1982 using AutoCad.

UCSD, Applied Mechanics and Engineering Sciences Department **1/93 - 6/93**
Teaching Assistant

- Led student tutorial sessions for Mechanical Engineering Design I and II courses.
- Evaluated various student designs for approach, completeness, fit, functionality and accuracy.
- Assisted students in developing drawings using AutoCad release 11.

Sachse Engineering Associates **8/87 - 4/92**
Associate Engineer

- Detail design of towed underwater vehicles, electric winches (3, 5, and 10 hp), a launch/recovery ramp for underwater vehicle deployment and a high impact/high acceleration camera housing.
- Developed a fairlead system for Scripps F.L.I.P. thin line towed array video system.
- Developed lines plans for vehicle fairings.
- Reverse-engineered a set of lines for an existing 50 ft work boat.

- Wrote training documentation for a Remote Operated Vehicle (ROV) used by the Deep Submergence Unit (DSU) at North Island Naval Air Station. Occasionally supervised designers and drafters.
- Used AutoCad and VersaCad to develop required drawings.
- Some hand drafting was required.
- Other responsibilities included: cost estimating, project management, ship checking and maintaining computer operations of the drafting department.

Sharp/DeFever Group **8/84 - 6/87**
Senior Designer

- Designed twin screw yachts ranging from 44 ft to 80 ft LOA - custom and production type.
- Responsibilities encompassed: Lines plans, hull development, propulsion shaft/steering design, exhaust system design, fuel oil and freshwater tank design, piping, electrical and joiner design.
- Conducted yard visits to inspect vessels during various stages of construction
- Coordinated projects with boat builder, engine suppliers, interior designers, ship's captain, etc.
- Integrated CAD into the company's design and drafting process.

PRC/Guralnick **4/84 - 7/84**
Senior Designer

- Designed high, medium and low-pressure air support system for diver recompression chamber aboard the ASDV 3.
- Supervised designers and drafters preparing required drawings
- Designed various other piping systems for DD and WMEC class of ships

Designers and Planners **9/83 - 4/84**
Designer

- Conducted ship checks to validate Basic Alteration Class Drawings (BACD) for various piping Ship Alterations.
- Developed Supplemental Alteration Drawings (SAD) when required. Designed shipboard piping systems for Aqueous Foam Fire Fighting (AFFF), Dearerating Feedwater Tank (DFT), fuel oil, high- and low-pressure air and chilled water type systems.
- Compiled and edited a technical manual for a shipboard diesel-generator set

M. Rosenblatt and Son **1/81 - 9/83**
Designer

- Conducted shipchecks to validate Basic Alteration Class Drawings (BACD) for various piping Ship Alterations.
- Developed Supplemental Alteration Drawings (SAD) when required. Designed shipboard piping systems for high- and low-pressure steam, fuel oil, cargo sprinkling, Aqueous Foam Fire Fighting (AFFF), oily waste transfer, fuel stripping, plumbing, low pressure drains, high- and low-pressure chilled water.
- Participated in validation ship checks to verify SADs before drawing release.

Texas Instruments **5/80 - 9/80**
Engineering Technician

- Supervised operators involved in the development of first-generation CMOS computer chips.
- Responsible for operating ion-implant equipment, diffusers and various photolithography equipment.

Supervisor of Shipbuilding, Conversion and Repair, San Diego **1977 - 1979**
Drafter

- Summer employee while going to college at UCI.
- Drafted using shipcheck sketches.
- Introduced to shipchecking, engineering drawings and military specifications.