



PHILIP E. ALEI, Ph.D., P.E.
Mechanical Engineer, Principal

SUMMARY

Dr. Alei has over 30 years' experience in Mechanical Engineering design with particular expertise in prototype design and development. Projects have included design and evaluation of polymer coextrusion dies both for packaging film and optical fiber applications. His capabilities are complimented with substantial hands-on experience in most manufacturing disciplines.

Dr. Alei is very accomplished in SolidWorks, holding a CSWP (Certified SolidWorks Professional) certificate with over 20 years of professional experience in modeling parts, assemblies, and drawings. In the evenings he is an instructor of Beginning through Advanced SolidWorks at Mira Costa College in Carlsbad, CA. He is the owner of seven approved U.S. patents with others pending.

SELECT INDUSTRY EXPERIENCE

Polymer processing of film and hollow fiber, Medical device design, fabrication, and testing, Expert witness consulting in forklift issues, mechanical failures, and mechanical engineering conventions, Development of a 120 kW-hr mechanical energy storage device, Design of medical implants for spine surgery, Design, fabrication, and testing of a multitude of novel inventions, Design of genetic testing and research equipment, Development of a handheld device to detect anthrax, risen, and other biohazards. Research and development of a waterproof yet breathable fabric for outdoor use, Research and design of optical systems.

EDUCATION

Ph.D. Mechanical Engineering, University of California, Berkeley
M.S. Mechanical Engineering, Massachusetts Institute of Technology
B.S. Mechanical Engineering/Material Science, University of California, Davis

PROFESSIONAL AFFILIATIONS

Registered Mechanical Engineer, State of California
American Society of Mechanical Engineers
Certified SolidWorks Professional (CSWP)

PROFESSIONAL EXPERIENCE

1986 – present

Principal, Consultant, Berkeley Engineering And Research, Inc.

Dr. Alei is particularly interested in design and manufacture of innovative mechanical devices and prototype construction of novel inventions. Projects have included a new drinking cap design, a pulsating irrigation device, an innovative putter and a novel transportation device. His garage contains a lathe, a 3D CNC milling machine, four 3D printers and all the associated tooling to make

almost anything in wood, metal, plastic or composites. He has significant experience in 3D printing using FFF and SLA techniques, including the Markforged process of continuous fiber reinforced printed nylon parts. He plans to buy a 3D metal printer and continue to excel in this technique as well.

2016-present *Lead Principal Mechanical Engineer*, SilverGens, Inc., Miami, FL

Working as a consulting engineer, I lead a team developing a medical adherence system. Striving for “Healthy Living at Home,” I am responsible for the mechanical aspects of a 12-position pill-dispensing robot designed to help those in need to sort and deliver prescribed medication at the proper dosage and time. The real advantage of the system is communication between the patient, caregivers, pharmacists, and doctors.

2016-present *SolidWorks Instructor*, Mira Costa College, Carlsbad, CA.

I teach Beginning, Intermediate, and Advanced SolidWorks classes for the Technical Career Institute at Mira Costa College. Classes meet once or twice per week in the evenings throughout the year. Several students have passed the CSWP (Certified SolidWorks Professional) Certification Program after attending my beginner and intermediate classes.

2014-2016 *Lead Principal Mechanical Engineer*, Quantum Energy Storage, Poway, CA

I led a team of engineers developing a 120 kW-hr kinetic energy storage device. Responsibilities included all aspects of the design including bearing lubrication, vacuum design, magnetic levitation, speed control, and metallurgical rotor specification.

2011-2014 *Principal Mechanical Engineer*, Iris International, Chatsworth, CA

Responsible for all mechanical aspects of a medical device for real-time characterization of white blood cells. Integration of optics, fluidics, sample transport, and hematology into one machine.

2003-2011 *Senior Mechanical Engineer*, QTL Biosystems, Santa Fe, NM

Design, development, testing and prototype manufacturing of a hand-held biosensor device. Adaptation of principles to a continuous monitoring system. Experience included electromechanical design, fluid flow, and chemical assay handling.

2005-2006 *Senior Mechanical Engineer*, Acme Spine, Riverside, CA

Design and product development of medical implants, particularly concerning spinal implants and associated tooling. Projects included design and manufacturing of AMA approved trays, insertion tools and implants.

2001-2003 *Senior Staff Mechanical Engineer*, Torrey Mesa Research Institute, La Jolla, CA

Design, fabrication, and testing of scientific apparatus for a leading-edge genetic research facility. Significant projects include automation of experiments, robotic manipulators, and high-throughput screening of plant-based genetic material.

1999-2001 *Director of Engineering*, Jif-Pak Manufacturing, Inc.

Manufacturing of materials and machinery supporting the meat packing industry. Responsibilities include design, analysis and testing of meat packing and peeling machinery, including OSHA safety considerations. Extensive sheet metal and welded frame designs.

3/84 – 5/95 Senior Research Mechanical Engineer The Dow Chemical Company, Walnut Creek, CA
Mechanical Engineering work involving semi-permeable membranes for water purification and air separation. Design of die and take up system for polymer optical fiber research fabrication line.

8/92 - 1/93 Mechanical Engineering Instructor, University of California, Berkeley
Instructor for the Department's senior design course: ME-128, "Computer Aided Mechanical Design". Conducted lectures on the computer aided design of various mechanical systems. Responsibilities included test preparation, homework assignments and grading, four projects, and office hours.

PATENTS

U.S. Patent No. 20,170,270,274 Accepted 09/2017: "Automated Medication Adherence System" (Garcia, et. al)

U.S. Patent No. 7,108,157 Accepted 09/2006: "Liquid Dispensing Valve Assembly Having a Unitarily Formed Base and a Vacuum Release Feature" (Alei)

U.S. Patent No. 20,030,132,117 Accepted 07/2003: "Thin film electrophoresis apparatus and method" (Gutman, et. al.)

U.S. Patent No. 6,027,479 Accepted 02/1998: "Medical Apparatus Incorporating Pressurized Supply of Storage Liquid" (Alei, et. al)

U.S. Patent No. 5,598,874 Accepted 02/1997: "Loom Processing of Hollow Fiber Membranes" (Alei, et. al)

U.S. Patent No. 4,888,249 Accepted 12/1989: "Method for Improving the Bond Strength of SARAN Polymers to Polyimides" (Flores and Alei)

U.S. Patent No. 605,916 Accepted 02/1987: "Ultra Tough Plastic Material and Technique for Making Same" (Alei and Suh)

PUBLICATIONS

Manufacturing Analysis of Axisymmetric Composite Structures

Ph.D. Dissertation, published 10/90

Improvement of the Mechanical Properties of Polymers by Molecular Orientation
Masters Degree Thesis, published 10/83