

T. Kim Parnell, PhD, PE

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Expertise Highlights

- Medical device/biotechnology – Cardiovascular, Orthopedic, Orthodontic
- Patents & Intellectual Property
- Product Liability; Personal Injury
- Consumer Electronics; Consumer Products
- Bluetooth, Zigbee, Wireless technology
- Plastics, Molding, & Manufacturing
- Composite Materials Design & Damage
- Materials & Metallurgy
- Failure Analysis & Reliability
- Fracture & Fatigue
- Laptop computers; keyboards; displays
- Telephone set design; touchpads; keypads
- User interface design
- User experience & system interaction
- Finite Element Analysis of Structures and Fluid/Heat Transfer (FEA/CFD)
- Transducers, Accelerometers, MEMs
- Software design, development, QA
- Shock & Vibration Sensitivity
- Green energy: Wind, Solar Trackers, PV Panels; Electric Vehicles, Battery tech
- Structural Mechanics, Fluid Mechanics, Heat Transfer, & Thermodynamics
- Piezoelectric components
- Vehicle & Heavy-Truck Crashworthiness
- ATV & Vehicle Design, Crashworthiness
- System Specifications & Test Procedures
- Group Manager & Project Leader; Strategic & Budgetary Planning responsibility

Education

Year	University	Degree Awarded
1984	Stanford University	Ph.D., Mechanical Engineering
1979	Stanford University	MSME, Mechanical Engineering
1978	Georgia Tech	BES, Engineering Science & Mechanics (Highest Honors)
2004	San Jose State University	Silicon Valley Executive Business Program (SVEBP)

Ph.D. Thesis: “Numerical Improvement of Asymptotic Solutions and Nonlinear Shell Analysis”, June, 1984.

Professional Associations and Achievements

- Registered Mechanical Engineer (PE, M025550) in the State of California
- ASME Fellow; American Society of Mechanical Engineers (ASME)
- IEEE Senior Member; Institute of Electrical and Electronics Engineers (IEEE)
- Member, Society of Automotive Engineers (SAE)
- ASM International Member; SMST (Shape Memory and Superelastic Technologies) Member; EDFAS (Electronic Device Failure Analysis Society) Member
- IEEE-SCV Santa Clara Valley Section Leadership Award; 2018
- IEEE Santa Clara Valley (IEEE-SCV) Section; Chair-2011, Vice Chair-2010
- IEEE Consultants’ Network of Silicon Valley (IEEE-CNSV), Board Member; Chair: 2008-2009
- NAFEMS Member – Composite Materials Working Group (CWG), Vice-Chair
- IEEE Vehicular Technology Society (IEEE-VTS); Vice-Chair, 2012-2018; Treasurer 2018-present
- IEEE Consumer Electronics Society (IEEE-CE), IEEE Computer Society, IEEE Engineering in Medicine & Biology (IEEE-EMBS), IEEE Electronics Packaging Society (IEEE-EPS)
- Reviewer, *Journal of Composite Materials (JCM)*; *International Journal of Forensic Engineering*
- Chinese American Semiconductor Professional Association (CASPA)
- The Bio2Device Group (B2DG); NanoBioConvergence (NBC), Board of Directors; Medical Device Network (MDN), Stanford University; CSIX Connect (CSIX), Board of Directors

Employment History

From: 2000
To: Present
Position:

Parnell Engineering & Consulting (PEC)

Sunnyvale, CA;

Web: parnell-eng.com

Principal & Founder

Provides independent engineering consulting & expert witness services for high-technology applications including:

- Medical device/biotech product development & concept design
- Medical device cardiovascular applications across wide product range
- Medical device orthopedic, spinal, prosthetic devices – IP, design
- VC technical due-diligence for prospective medical device investment
- Patent & intellectual property – litigation, IPR, research, due diligence
- Expert Witness & Litigation Support services – multiple technologies
- Nitinol, shape-memory applications; biomaterials applications
- Portable devices, keypads: robust design, reliability & durability
- Cell phone Li-Ion battery failure & fire; protective enclosures;
- Bluetooth, Cellular, Zigbee, Wireless technology
- Solar panel tracker technology; PV Panel technology
- Manufacturing technology; materials applications (metals, polymers)
- Reliability and failure analysis services; accelerated testing
- Research in application & damage of composite materials
- Teaching intensive workshops & training seminars on simulation, design, and reliability for practicing engineers
- Lecturer in Prof. Steve Tsai's *Stanford Composites Design Workshop*
- Composite materials design & applications
- Wind Energy, Solar Energy, Alternative Energy – technology
- Electric vehicles, battery systems: design & development
- Heavy-Truck Rollover, Vehicle & ATV Crashworthiness; Barriers
- Software design, development, user experience, QA, testing
- Application of CAE, FEA, and High-Performance Computing (HPC)

From: 2010
To: 2012
Position:

Santa Clara University

Santa Clara, CA

Faculty, Mechanical Engineering Department

Taught courses covering a range of topics including Materials Science, Manufacturing Methods, Composite Materials, Finite Element Methods, Mechanism Dynamics, Computer Graphics, & Design. Advised students on Design, Safety, and Simulation for Student Projects including SAE Formula-Hybrid Vehicles. Research in Composite Materials and High-Performance Computing. Interaction with Industry Advisory Board (IAB) & ABET Certification. Teamed with other faculty for strategic initiatives and equipment/tool grants for research. Promote IEEE, ASME, cross-disciplinary initiatives & social media avenues for student networking, professional development & project support.

From: 2006
To: 2010
Position: **MSC Software Corporation**
Sunnyvale, CA
Senior Manager, User Experience; Lead Application Engineer
Integrated feedback from customers into user interface design & specifications; Beta testing of prototypes with users; CAE software Product Management role for user interface and analysis tools including:

- Product quality, testing, and improvement; drove customer satisfaction
- Application of advanced analysis technology in design & manufacturing
- Led corporate Wind Energy initiative & revival of Fatigue product
- Composite materials – acknowledged corporate & customer expert
- Customer training courses, workshops, webinars; developed & taught
- Software design, development, QA, testing of commercial apps
- Mentoring and development of junior staff; interviewed & hired staff for India; developed and trained staff using distance learning

Applied finite element technology to applications including automotive, medical device, and electronics. Created customer satisfaction via:

- Customer support & analysis process development
- Material testing & data reduction for development of properties

From: 1999
To: 2000
Position: **Rubicor Medical, Inc.**
Redwood City, CA
Director of R&D
Led the R&D team for this start-up medical device company developing breast diagnostic and therapeutic devices. Designed device considering interaction of Physician with Device and human factors. System included a mechanical subsystem and RF generator/control electronics. Developed initial prototypes and conceptual designs; researched IP and competing technologies.

From: 1986
To: 1999
Position: **Exponent, Inc. and Failure Analysis Associates (FaAA)**
Menlo Park, CA
Senior Managing Engineer
Delivered consulting services for failure analysis, accident investigation, product liability, patent/IP, insurance-related litigation, medical device and biotechnology product development, FDA submission, and forensic/failure investigation. Performed analyses involving stress, thermal, & fluid applications; testing of material properties and use of laboratory techniques such as SEM & Optical Microscopy for inspection of material samples. Led the SAE Heavy Truck Crashworthiness, Phase II project with testing & simulation of heavy-truck cabs in rollovers. Managed the Engineering Analysis Group and had profit/loss responsibility for the Engineering Computer Center. Maintained high personal utilization/billable hours and had increasing personal/group profitability with consulting services revenue generation >\$600K.

From: 1995
To: 1996
Position: **Stanford University**
Stanford, CA
Visiting Associate Professor, Mechanical Engineering Department
Taught graduate courses in Theory of Plates and Theory of Shells in the Applied Mechanics Division (now Mechanics & Computation) of Mechanical Engineering. Part-time appointment while full-time staff-member at Exponent.

From: 1984 **SST Systems, Inc.**
To: 1986 Sunnyvale, CA
Position: *Principal Engineer in Pressure Vessels, Piping & Structures Division*
Managed software development, facilitated university collaboration, developed product specifications and enhancements based on customer feedback, supported and trained over 30 new customers, and created standardized product documentation. Provided sales and technical marketing support to CEO during product launch; formulated go-to-market campaign.

From: 1980 **Stanford University**
To: 1984 Stanford, CA
Position: *Research Assistant, Mechanical Engineering Department*
Established the theoretical basis and developed computational tools for nonlinear shell mechanics. Emphasized computational mechanics and engineering applications, including linear & nonlinear finite element methods and other numerical analysis techniques.

From: 1978 **AT&T Bell Laboratories**
To: 1980 Indianapolis, IN
Position: *Member of Technical Staff (MTS), Physical Design Group*
Design, development, and manufacturing of high-volume telecommunication components. Researched and designed dials, keypads, electromechanical systems, and piezoelectric polymer applications. Employed range of materials including elastomers, metals, polymers, and piezoelectrics for keypad and transducer applications. Emphasis on cost, reliability, and manufacturing simplicity. Developed new technologies to ultimately drive field improvements. Applied finite element simulation to improve designs and reduce prototypes.

From: 1976 **General Motors Corporation**
To: 1977 Atlanta, GA
Position: *Engineering Assistant, Plant Engineering Department*
Production line design and manufacturing applications for the GM Lakewood assembly plant. Supervised demolition and production line installation during changeover. Installed automated spotweld robot for sheet metal panels. Studied automotive manufacturing & assembly operations from start to finish.

Selected Grants & Research Programs

SA Photonics, Inc.

- 2013 – Phase I Navy SBIR – Post-IED Hull Inspection Tool, Topic N123-156

Stanford University

- 2012 – Phase II Army SBIR – Development and Implementation of Micro-Mechanics of Failure (MMF) Model for Composites in Commercial Finite Element Codes

Santa Clara University

- 2012 – Kuehler Summer Undergraduate Research Grant – student support for composite materials testing & characterization
- 2011 – Technology Innovation Grant – Acquisition of advanced DSC/TGA System for improved lab capability

- 2011 – Technology Innovation Grant – Acquisition of High-Performance Workstation for advanced simulation of large dynamic and nonlinear systems
- 2011 – Technology Innovation Grant – Materials Laboratory equipment upgrades and reorganization

Selected Presentations

- “SMA Seismic Damping Devices: Fabrication, Testing, Analysis, and Projections”, SMST-2014, Monterey, CA, May, 2014.
- “Mechanical Design for Reliability: What does it Mean?”, ASME Santa Clara Valley Section, Sunnyvale, CA, Mar, 2014.
- “Prosthetic Feet using Carbon Fiber Composites: Design, Simulation, & Testing”, ASME Santa Clara Valley Section, Jun, 2013.
- “Mechanical Design for Reliability: Beating the Tough Problems”, IEEE-SCV Reliability Society, Santa Clara, CA, Jun, 2013.
- “Prosthetic Feet using Carbon Fiber Composites: Design, Simulation, & Testing”, MSC Software 50th User Conference, Irvine, CA, May, 2013.
- “Composite Materials: Improved Understanding of Composite Failure Mechanisms with DIC Testing & Analysis”, Trillion User Conference, Philadelphia, PA, Sep, 2012.
- “Medical Device Failures – ‘Not so Good, Very Bad, and Truly Ugly’!!”, ASM (Materials Information Society) Santa Clara Valley Chapter, May, 2012.
- “C-Ply Bi-Angle NCF Tape Seam Assessment & Design Considerations for Automated Tape Laying”, Composites Design Forum, JEC Composites Conference, Paris, Mar, 2012.
- “Failure of Structures Designed with Composite Material – Delamination”, *Meet the Experts’ Forum on Composite Materials*, Joint with Prof. Steve Tsai, SMP Tech, Feb 28, 2012.
- “Shape Memory Alloy Fundamentals & Advanced Simulation Techniques for Medical Products”, *Meet the Experts’ Forum on Nitinol Properties and Unique Behavior for Medical Product Design*, SMP Tech, Sep 14, 2011.
- “Stiffness and Strength of Laminates Fabricated with Bi-Directional Tape”, ICCM-18 (International Conference on Composite Materials, Korea, Aug, 2011, (with Daniel D. Melo & Christine Tower))
- “Composite Materials – Damage & Delamination”, Santa Clara University, Mechanical Engineering Seminar, Feb, 2011
- “Composites Damage, Delamination, Failure & Curing” and “Workshop on Mic-Mac/FEA” with Prof. Steve Tsai, Stanford Composites Design Workshop, 2010-2012
- “Composite Damage, Delamination, and Failure” and “Workshop on Mic-Mac/FEA” with Steve Tsai, Stanford Composites Design Workshop, Jan, 2010
- “Composite Failure Methods – Application Comparisons”, Composites Durability Workshop-14 (CDW-14), UCLA, Jul, 2009
- “Composites Damage, Delamination, and Failure Analysis”, Stanford Composites Workshop, May 2009
- “Finite Element Analysis using a Thermomechanical Shape Memory Alloy Model”, SMST-2006, Monterey, CA, 2006.
- “Medical Device Issues & Trends”, in “Biomedical Wave: Opportunities for Non-Biologists”, MedTech Bridge Seminar Series, 2005.
- “Medical Device Development and Entrepreneurship”, IEEE Consultants’ Network of Silicon Valley (IEEE-CNSV), www.CaliforniaConsultants.org, 2004.

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