CURRICULUM VITAE

VIJAY GUPTA

Professor, Department of Mechanical and Aerospace Engineering
University of California, Los Angeles
Professor, Department of Materials Science and Engineering
University of California, Los Angeles
Professor, Department of Biomedical Engineering, Interdisciplinary Program
University of California, Los Angeles

Office: 38-137E, Engineering IV Building
Department of Mechanical and Aerospace
Engineering, University of California, Los Angeles
Los Angeles, CA 90095-1597.
Phone: (310) 825-0223
Fax: (310) 206-2302 e-mail: *vgupta@ucla.edu*

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS
Ph.D. in Mechanical Engineering, December 1989. Minor in Management of Technology at the Sloan School of Management.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS
M.S. in Civil Engineering, February 1987.

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY, INDIA
Bachelor of Technology in Civil Engineering, August 1985.
Awarded the Institute Silver Medal for the best scholastic performance in the graduating class of 1985.

PROFESSIONAL EXPERIENCE

July 1995 -Present	**Full Professor, Department of Mechanical, and Aerospace Engg** **UNIVERSITY OF CALIFORNIA, LOS ANGELES**
July 2002 -Present	**Full Professor, Department of Bioengineering** **UNIVERSITY OF CALIFORNIA, LOS ANGELES**
July 1998 -Jan 2002	**Co-chair, Biomechanics, Biomaterials, and Tissue Engineering Sub-field of the Biomedical Engineering Program** **UNIVERSITY OF CALIFORNIA, LOS ANGELES** *Laid the academic foundation for the Biomechanics, Biomaterials and Tissue Engineering Subfield of the Biomedical Engineering Program. by developing the curriculum for the MS and Ph.D. programs*

Developed a graduate course in Biomechanics

July 2002 -Present	**Full Professor, Department of Materials Science and Engineering UNIVERSITY OF CALIFORNIA, LOS ANGELES**
January 1990 -June 1995	**Assistant Professor of Engineering Sciences THAYER SCHOOL OF ENGINEERING, DARTMOUTH COLLEGE Hanover, New Hampshire, USA**
January 1986 -January 1990	**Research Assistant, Mechanical Engineering Department MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, Massachusetts, USA**
September 1985 -December 1985	**Research Assistant, Civil Engineering Department MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, Massachusetts, USA**

AWARDS/MEMBERSHIPS

2005	Elected Fellow of The American Society of Mechanical Engineer (ASME)
2001	Who's Who in America
2000	Young Investigator Award-American Academy of Mechanics
2000	Theodore Tromovitch Award from the American College of Mohs Micrographic Surgery
1994	Who's Who in Asian Americans
1993	Outstanding Young Scientist and Engineer Award from the International Union of Materials Research Societies. The award was given in Tokyo, Japan on 3rd September, 1993.
1985	J.N. Tata Scholarship. Outstanding Engineering Graduates in India
1985	S.D. Sethna Scholarship. Best Engineering Graduate of India
1985	Institute Silver Medal. Best scholastic performance in Civil Engg at I.I.T. Bombay
1985	Institute Citation, I.I.T. Bombay.
1988	Tau Beta Pi Engineering Honorary Society
1994	Member of Sigma Xi

Member of the American Academy of Mechanics, American Society for Mechanical Engineers, Metallurgical Society of AIME, Materials Research Society, American Ceramic Society, American Society for Composites.

PATENTS

A.

1. Measurement of thin film interface strength by using a laser spallation technique.
2. Interferometry on diffuse surfaces in high velocity measurements.
3. Nanosecond rise-time laser-produced stress pulses with no asymptotic decay.

A United States Patent with Patent No. 5, 438, 402 was issued on August 1, 1995, covering all of the above three inventions.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 2 of 37

Technology based on the '402 patent has been transferred to Intel Corporation, and has been used for product development in different industries such as Semiconductor (Intel Corporation, Hitachi, Texas Instruments, Dow Corning Corporation), Automobile (Delphi Electronics, Ford), Television (LG Gould in Korea), Biomedical (Pacesetter Inc.), Paint (Boeing, Du Pont), and Dentistry (improved Ti implants with highly adherent calcium-phosphate coating). Negotiations are underway for transfer of the technology to few companies.

B. Glass-Modified Stress Waves for Adhesion Measurement of Ultra Thin Films and Nanoelectronics Device Fabrication. United Stated Patent No. 7,487,684, issued on February 10, 2009.

C. Laser Generated Stress Waves for Stiction Repair. United Stated Patent No. 7,435.611, issued on October 14, 2008.

D. Strength Measurement of Solder Joints Using Laser Generated Stress Waves. Filed with USPTO on February 17, 2006.

E. Material for mitigating impact forces with collision durations in nanoseconds to milliseconds range. Filed USPTO, October 2012 under UC Case 2011-177.

F. Laser based bacterial disruption for treatment of infected wounds. Filed USPTO, October 2011 under UC Case 2009-230.

FEDERAL AND INDUSTRY SUPPORT

Professor Gupta's research in the general area of mechanical behavior of advanced materials under static and dynamic load conditions is supported by the United States Office of Naval Research, Army Research Office, United States Air Force Office of Scientific Research, and the National Science Foundation. He has secured over 20 million dollars in research funds from these agencies on a single PI basis. Professor Gupta has also served as a consultant to over 30 companies world-wide.

CHAIRED SYMPOSIA AT INTERNATIONAL CONFERENCES

1. Chaired a session on *Metallized Plastics* at the 180th Annual Meeting of the Electrochemical Society held in Phoenix, Arizona (1991), October 13-18.

2. Chaired the Symposium on *Numerical Methods in Composites* organized by the International Union of Materials Research Societies at the Third International Conference on Advanced Materials held in Tokyo, Japan (1993), September 1-4.

3. Chaired the session on *Ice Mechanics* at the 12 International Offshore Mechanics and Arctic Engineering Conference IV held in Glasgow, United Kingdom (1993) June 20-24.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 3 of 37

4. Chaired the session on *Experimental Methods* at the Joint Meeting of the Society of Engineering Sciences, American Society of Civil Engineers and the American Society of Mechanical Engineers held in Charlottesville, Virginia (1993), June 6-9.

5. Chaired the session on *Interfaces* organized as a part of a joint symposium by the Minerals Metals and Metallurgical Society and the American Society of Metals on the *Commonalty of Phenomenon in High Performance Composites* at the 1994 TMS Fall Meeting held in Rosemont, Illinois (1994), October 2-6, 1994.

6. Chaired a session on *Micromechanical Modeling and Damage Characterization in Advance Materials*, AMD-MD'95 Joint Applied Mechanics and Materials Meeting, UCLA, Los Angeles. June 29, 1995.

7. Chaired a session on *Structural Mechanics and Numerical Methods*, AMD-MD'95 Joint Applied Mechanics and Materials Meeting, UCLA, Los Angeles, June 30, 1995.

8. Chaired a session on *Mechanical Properties: Thin Films and Novel Test Methods*, MRS Fall 1996 Meeting, Boston, December 2-6, 1996.

9. Chaired a session on *Mechanics of Surfaces and Interfaces*, MRS Fall 1996 Meeting, Boston, December 2-6, 1996.

10. Chaired the session on *State of the Art Lectures in Deformation and Fracture of Engineering Solids*, Winter ASME Meeting, Dallas, November 16-21, 1997.

11. Chaired one session of the *Symposium on Micromechanics and Laminate Analyses*, held at the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA, Nov. 15-20, 1998.

12. Chaired one session at the *3rd European Mechanics of Materials Conference: EUROMECH-MECAMAT,* held Oxford-U.K., 23-25 Nov., 1998.

13. Chaired one session at the Sixth Pan-American Congress of Applied Mechanics (PACAM IV), Rio De Janerio, Brazil, January 4-8, 1999.

14. Chaired one session of the *Symposium on Micromechanics and Micromechanisms of Deformation and Fracture*, held at the 1999 TMS Annual Meeting, San Diego, March 1-3, 1999.

15. Chaired one session at the 1999 Integrity, Reliability, Failure Conference, Porto, Portugal, July 19-22, 1999.

16. Chaired one session at the ISAPS'99: Advances in Applied Plasma Science, Osaka, September 20-24, 1999.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 4 of 37

17. On the Executive Committee of the 4th International Symposium on Applied Plasma Science, September 1-5, Kyoto, Japan, 2003.

18. Session Chair: Failure Prediction in composite Materials and Composite Structures-III. ASME International Mechanical Engineering Congress and Exposition, November 17-22, 2002, New Orleans, Louisiana.

19. Session Chair, Plasma Sources , Plasma Processing, at the 4th International Symposium on Applied Plasma Science, September 1-5, Kyoto, Japan, 2003.

20. Session Chair: Processing, Dynamic Behavior of Nanophased Composites. At the 2004 ASME International Mechanical Engineering Congress and R& D Expo, November 13-19, Anahiem, California, 2004.

SPECIAL INVITED PRESENTATIONS

(see list of over 140 invited and contributed presentations later)

1. ONR workshop on Carbon-Carbon Composites, March 9 (1990), Washington, D.C.

2. ONR-AFOSR Joint workshop on Tailored Interfaces for High Temperature Metal-Ceramic Composites, September 9-13 (1990), Cornell University, Ithaca, New York.

3. ARO Workshop on Army Applications for Metal Matrix Composites, August 25-27 (1991), North Carolina.

4. Department of Defense Workshop on Carbon-Carbon Composites, Institute of Defense Analysis, October (1992), Virginia.

5. A week-long lectures on "Interface Engineering" September 4 to 12 (1993), Tohuko University, Sendai, Japan.

6. Army Workshop on Snow and Ice, Gallatin Gateway, October 3-6 (1995), Montana.

DISSERTATIONS/STUDENTS SUPERVISED

Doctoral Theses-in progress

1. Ryan Crum (expected 2014)," Laser shock effects in Cu."
2. Artemio Navarro (expected 2013), "Laser-generated stress waves for disruption of biofilms."

Selected Doctoral Theses

1. Johan Grape (1996),"Microdeformation-based failure laws for laminated composites under biaxial loading." While presenting his thesis work, Johan received the *ASME's best paper award* at the 1993 Joint ASME-ASCE-SES Meeting held in Charlottesville, Virginia. Johan is presently working in the industry.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 5 of 37

2. Catalin Picu (December 1995), "Crack nucleation mechanisms in brittle materials." *Picu is an Assistant Professor (tenure-track) at RPI, Troy.*

3. Alexander Pronin (June 1995),"Application of laser-produced stress pulses for materials characterization: measurement of interface fracture toughness and non-destructive testing of flaws in composites." For this work Alexander was awarded the *Thayer School's Distinguished Fellow Award for the 1994-95 academic year.* Alexander works in the Silicon Valley.

4. Jun Yuan (1993), " Measurement of interface strength, interface fracture mechanisms and their relationship to interface microstructure and chemistry." For this work Jun was awarded the *Charles F. and Ruth D. Goodrich Prize for outstanding thesis work.* He is a manager in a Silicon Valley Firm.

5. Jianxin Wu (1998), "The effect of processing and surface variables on metal-ceramic adhesion." He works for a thin film deposition company in Los Angeles.

6. Jun Tian (2005), "Measurement of strength of solder joints using the laser spallation technique." She works for Intel Corporation.

7. Xuemei Wang (2005), "Chemical construction, mechanical characterization and durability of metal and composite structural joints." She works for ABAQUS.

8. Jaewoo Shim (2005), "The laser spallation technique for measurement of tensile strength of cell/tissue-biomaterial interface and its applications.

9. Amit Jain (2006), "Strength/Moisture Relationship for Interfaces and Joints for Robust Prediction of Reliability."

10. Jyh-herng Shih, "Laser ultrasound for detection of corrosion damage in structural components."

11. Xu Chen (2005), "Mechanical properties of highly ordered nanoporous films."

12. Andrew Kim (2007), "Measurement of interface strength in electronic devices."

13. George Youssef (2011), "Dynamic properties of polyurea."

14. Jason Citron (2012), "Impact properties of polyurea modified Foams."

Other Dissertations

1. Doctoral Thesis committee of Tim Smith, 1991.
2. Doctoral Thesis committee of Jianxing Fang, 1992.
3. Doctoral Thesis committee of Chia-Lun Tsai, 1994.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 6 of 37

4. Doctoral Thesis Committee of Jiajing Lee, 1996.
5. Doctoral Thesis Committee of Dawei Guo, 1996.
6. Doctoral Thesis Committee of Zensheu Chang, 1997.
7. Doctoral Thesis Committee of Haeng-Ki Li, 1997.
8. Doctoral Thesis Committee of Xia Dong Zhang, 1997.
9. Doctoral Thesis Committee of Emily Asche, 2000.
10. Doctoral Thesis Committee of Terrisa Duenas, 2000.
11. Doctoral Thesis Committee of Joohyuk. Park, 1999.
12. Doctoral Thesis Committee of Hongwei Gong,, 2000.
13. Doctoral Thesis Committee of Xiaodong Zhang, 1999.
14. Doctoral Thesis Committee of Loren Chow, 1999.
15. Doctoral Thesis Committee of Sung Won Choi, 2002.
16. Doctoral Thesis Committee of Jianming Huang, 2002.
17. Doctoral Thesis Committee of Sung S. Park, 2002.
18. Doctoral Thesis Committee of Yesim Korkmaz, 2002.
19. Doctoral Thesis Committee of Brad Kirsch (Chemistry Department), 2004.
20. Doctoral Thesis Committee of Sauvik Banerjee (2004).
21. Doctoral Thesis Committee of Virginia Hiu-Hung Yong (2005).
22. Doctoral Thesis Committee of Jianming Huang (2004).

Selected Master Theses

1. Philippe Charconnet (1999)-Multilayer Device Reliability
2. Barbara Somolo (1999)-Design of Self-Assembled Monolayer for Deicing Application.
3. Anne Pianca (1999)-Heart Lead Design

4. Victor Almgren (June 1996), "Strength-structure-chemistry relationship for Al/SiO_2 interface with applications to microelectronic multi-layer devices."
5. Paul Archer (June 1996), “A study of the ice-adhesion problem.”

6. Jorgen Bergstrom (June 1995), "Mechanism of shear faulting in brittle materials." For this work Jorgen was awarded the *Charles F. and Ruth D. Goodrich Prize for outstanding thesis work.*

7. Jianxin Wu (June 1995), "Effect of substrate orientation and processing parameters on the Nb:sapphire interface strength."

8. Kamal Anand (1993), "Failure mechanisms of 2D laminated carbon-carbon composites under uniaxial compression and shear loading."

9. Doris Martinez (1991)," Energy criterion for crack deflection at an anisotropic interface." For this work Doris was awarded the *Charles F. and Ruth D. Goodrich Prize for outstanding thesis work.*

10. Dan Potter (1997), “Failure mechanisms and deformation laws for advance graphite/epoxy composites under multiaxial loading.”

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 7 of 37

11. Robert Hernandez (2001), "effects of Humidity and Temperature on the Interfacial Adhesion Strength of Polyimide/Silicon Nitride Systems and its Potential for Improved Electronic Reliability."

12. Kenny Kuwahara (2001)," Laser-Generated Stress Waves for Rupture of Fat Cells."

13. Jun Tian (2002), " A Failure Criterion of Graphite/Epoxy Laminate under in-plane Uniaxial and Biaxial Compression."

14. Xu Chen (2002), " Failure Mechanisms Graphite/epoxy Laminates Under Uniaxial and Biaxial Compression."

15. Kerri Piccinich (2002), "Manufacturing and Characterization of Chemically Joined Polyester Glass Composite and Stainless Steel Sections."

16. Erik Bruce Smith (2004), "Laser Spallation for Cell Placement and patterning."

17. Thomas Yan (2004), "Friction Characterization of Silica Thin films."

18. Bimal Gandhi (2004), "Analysis and characterization of force transduction through hip protectors during repeated impacts when simulating a lateral fall using a mechanical hip."

19. Yang Ping-Yao (2005), "A Laser-Induced Transfer Process to Manufacture NMOSFET with Mobility Exceeding 400 cm^2/ V•s on Plastic Foils."

20. Richard Snow (2004),"Stiction release in MEMS Devices Using Laser Generated Stress Waves.

Other Dissertations

1. Master Thesis committee of D.A. Fifolt, 1990
2. Master Thesis committee of Mustafa Vahanvaty, 1990
3. Master Thesis committee of Johan Grape, 1992
4. Master Thesis committee of Benjamin Jia, 1999
5. Master Thesis committee of Rudolph Duran Martinez, 2000

Bachelor of Engineering Thesis

1. Victor Almgren (1994), "Design and analysis of a steel bridge on the Carriage road to Mt. Moosilauke." For this work Victor was awarded *High Honors.*
2. Jorgen Bergstrom (1993), "Design of a car bumper against impact loading."

Post Doctoral and Visiting Research Associates

1. Michael O'Brien (1998-1999)
2. Philippe Charconnet (1998-1999)

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 8 of 37

3. Kitty vanDijk (1996-97)
4. Mao Tian (1995-97)
5. Alexander Pronin (1995-1996)
6. Ming He (1993)
7. Vassili Kireev (1998-present)
8. Yunzhong Liu (1999-2000)
9. Fang (2011-2014)

COURSES TAUGHT AND CURRICULUM DEVELOPMENT

Courses Taught

Structural Dynamics-Graduate Level (Dartmouth)
Structural Analysis-Graduate Level (Dartmouth)
Fatigue and Fracture-Graduate Level (Dartmouth)
Solid Mechanics Undergraduate Level (Dartmouth)
Micromechanisms of Fracture-Graduate Level (Dartmouth)
Mechanical Behavior of Materials-Graduate Level (Dartmouth)

Mechanics of Materials-Senior-Level (UCLA)
Statics and Dynamics-Undergraduate Level (UCLA)
Analytical Fracture Mechanics-Graduate Level (UCLA)
Plasticity-Graduate Level (UCLA)
Introduction to Biomechanics (UCLA)

Curriculum Development

1. Developed the graduate curriculum for the new Biomedical Engineering Interdepartmental Program at UCLA. From 1998-2002, served as Co-Chairman of the Biomechanics, Biomaterials, and Tissue Engineering Sub-Division of this program.

2. Developed a course module on Thin Film and Interface Mechanical Properties for the new MEMS Program.

COMMITTEE ASSIGNMENTS

Dartmouth Committees

Thayer School (Dartmouth College) Graduate Admissions Committee (1991-93; 1995-96)

Thayer School Graduate Programs Committee (1992-94)

Committee to hire the Director of Corporate Relations for the Thayer School (Summer and Fall of 1991).

Representative faculty invitee to the Spring Annual Meeting of the Overseers of the Thayer School of Engineering in February 1991.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 9 of 37

UCLA Committees

Co-Chair of the Biomechanics, Biomaterials, and Tissue Engineering Sub-Division of the Biomedical Engineering Program (1997-2002)

Vice Chair of the Executive Committee of the School of Engineering and Applied Sciences (1997-1999)

Member of the Executive Committee of the School of Engineering and Applied Sciences (1996-1999)

Strategic Planning Committee (1995-97)

Chair, Academic Personnel Case (1996)

Department of Mechanical and Aerospace Engineering's Ad hoc Committee on Personnel Cases (1996-97)

Admissions Committee of the Mechanical and Aerospace Engineering Department (1995-96)

Mechanical and Aerospace Engineering Departmental Committee for the New Faculty Hire (1995-96)

Doctoral Field Committee for Solids and Structures (1995-present)

Doctoral Field Committee for Microelectromechanical Systems (MEMS) (1997-present)

Chair, Field Committee for Structural and Solid Mechanics (2004-present)

Chair, Industrial affiliates Committee (2004-2005)

Committee on Undergraduate Admissions and Relations With School (2003-present)

Professional Society Committees

Advisory Committee-Second International Conference on Theoretical, Applied, Computational and Experimental Mechanics (ICTACEM 2001), India.

Served on the International Scientific Committee for organizing the Symposium, "High Performance Composites: Commonalty of Phenomenon," for the TMS Society (1994)

American Society of Mechanical Engineers Student Faculty Advisor (1993-94; 95-96)

On the TMS Thin Film and Interfaces Committee (1995-98)

Faculty Advisor-Dartmouth Engineering Honor Society (1995)

American Society of Mechanical Engineers Wave Propagation Committee (1996-2005)

American Society of Mechanical Engineers Fracture Mechanics Committee (1996-2005)

American Society of Mechanical Engineers Electronics Materials Committee (1996-2005)

American Society of Mechanical Engineers Materials Division Composites and Heterogeneous Materials Committee (2003-2005)

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 10 of 37

Symposium Organization

Organized a symposium entitled, " State of the Art Lectures in Deformation and Fracture of engineering Solids," at the 1997 Winter Annual Meeting of the ASME in Dallas, Texas, Nov. 16-21.

EDITORIAL SERVICES TO SCHOLARLY PUBLICATIONS

Acta Metallugica et Materialia, ASME Journal of Applied Mechanics, ASME Journal of Engineering Materials and Technology, Journal of American Ceramic Society, Journal of Applied Physics, Journal of Composite Materials, Mechanics of Materials, International Journal of Solids and Structures, Journal of the Mechanics and Physics of Solids, Experimental Mechanics, Journal of Materials Research, Composites Science and Technology, Composite Science and Technology

PROPOSAL REVIEW BOARDS

National Science Foundation-Mechanics and Materials Division, National Science Foundation-International Programs Division, National Science Foundation-Division of Materials Research, National Science Foundation-Division of Electrical Systems, Army Research Office

PUBLICATIONS IN AREA OF MECHANICS AND MATERIALS

1. "Interfaces with controlled toughness as mechanical fuses to isolate fiber damage," V. Gupta, A.S. Argon and J.A. Cornie, Journal of Materials Science, **24** (1989) 2031-2040.

2. "Intrinsic toughness of interfaces between SiC coatings and substrates of Si or C fiber," A.S. Argon, V. Gupta, H.S. Landis and J.A. Cornie, Journal of Materials Science, **24** (1989) 1207-1218.

3. "Intrinsic toughness of interfaces," A.S. Argon, V. Gupta, H.S. Landis and J.A. Cornie, Materials Science and Engineering, **A107** (1989) 41-47.

4. "Current from shock loaded piezo-electric crystals," V. Gupta and D.J. Epstein, Journal of Applied Physics, **67**, 4 (1989) 2185.

5. "Measurement of interface strength by laser pulse produced spallation," V. Gupta, A.S. Argon, J.A. Cornie and D.M. Parks, Materials Science and Engineering, **A126** (1990) 105-117.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 11 of 37

6. "Designing interfaces in inorganic matrix composites," J.A. Cornie, A.S. Argon and V. Gupta, MRS Bulletin, **XVI-4** (1991) 32-38.

7. "An evaluation of the interface tensile strength-toughness relationship," V. Gupta, MRS Bulletin, **XVI-4** (1991) 39-45.

8. "Measurement of interface strength by laser spallation experiment," V. Gupta, A. S. Argon, D.M. Parks and J.A. Cornie, Journal of the Mechanics and Physics of Solids, **40**, 1 (1992) 141-180.

9. "Measurement of strength and toughness of Pitch-55 carbon ribbons," V. Gupta and A.S. Argon, Journal of Materials Science, **27** (1992) 777-785.

10. "Crack deflection at an interface between two orthotropic material," V. Gupta, Z. Suo and A.S. Argon, Journal of Applied Mechanics, **59**, 2 (1992) S79-S87.

11. "Measurement of interface strength by the modified laser spallation technique. Part I: Experimental technique and modeling the spallation process," J. Yuan and V. Gupta, Journal of Applied Physics, **74**, 4 (1993), 2388-2396.

12. "Measurement of interface strength by the modified laser spallation technique. Part II: Applications to metal-ceramic interfaces," V. Gupta, J. Yuan and A. Pronin, Journal of Applied Physics, **74**, 4 (1993), 2397-2404.

13. "Measurement of interface strength by the modified laser spallation technique. Part III: Experimental optimization of the stress pulse," J. Yuan, V. Gupta and A. Pronin, Journal of Applied Physics, **74**, 4 (1993), 2405-2410.

14. "Calculation, measurement and control of interface strength in composites," V. Gupta, J. Yuan and D. Martinez, Journal of the American Ceramics Society, **76** (1993) 305-315.

15. "Near-tip fields for a crack along an interface between an elastic-ideally plastic crystal and a rigid substrate," V. Gupta, Journal of the Mechanics and Physics of Solids, **41**, 6 (1993) 1035-1066.

16. "Nanosecond rise time laser produced stress pulses with no asymptotic decay," V. Gupta, J. Yuan and A. Pronin, Review of Scientific Instruments, **64**, 6 (1993) 1611-1613.

17. "Measurement of the $SnO_2/A1_2O_3$ interface strength by a laser spallation technique," V. Gupta, J. Yuan, A. Pronin, K.K. Chawla and R.U. Vaidya, Scripta Metallurgica et Materialia, **28** (1993) 1371-1376.

18. "Interferometry on diffuse surfaces in high-velocity measurements," A. Pronin and V. Gupta, Review of Scientific Instruments, **64**, 8 (1993) 2233-2236.

19. "Tensile crack-tip fields in elastic-ideally plastic hexagonal crystals and layered materials," V. Gupta, Acta Metallurgica et Materialia, **41**, 11 (1993), 3223-3236.

20. "Recent developments in the laser spallation technique to measure the interface strength and its relationship to interface toughness with applications to metal/ceramic, ceramic/ceramic and ceramic/polymer interfaces," V. Gupta, J. Yuan and A. Pronin, Journal of Adhesion Science and Technology, **8**, 6 (1994) 713-747.

21. "Energy criterion for crack deflection at an interface between two orthotropic media," D. Martinez and V. Gupta, Journal of the Mechanics and Physics of Solids, **42**, 8 (1994) 1247-1271.

22. "Failure mechanisms of laminated carbon-carbon composites. Part I: Under uniaxial compression," V. Gupta, K. Anand and M. Kryska, Acta Metallurgica et Materialia, **42**, 3 (1994) 781-795.

23. "Failure mechanisms of laminated carbon-carbon composites. Part II: Under shear loads," K. Anand, V. Gupta and D. Dartford, Acta Metallurgica et Materialia, **42**, 3 (1994) 797-809.

24. "Crack nucleation mechanism in saline ice," R.C. Picu, V. Gupta and H.J. Frost, Journal of Geophysical Research, **99**, B6 (1994) 11775-11786.

25. "Measurement of cleavage strength in freshwater ice crystal," V. Gupta and T. Xuefeng, Journal of Offshore Mechanics and Arctic Engineering, **116**, 1 (1994) 35-42.

26. "A model for the indentation-induced splitting ice floe experiments," V. Gupta and R.C. Picu, Acta Metallurgica et Materialia, **43**, 4 (1995) 1355-1362.

27. "Crack nucleation in columnar ice due to elastic anisotropy and grain boundary sliding," R.C. Picu and V. Gupta, Acta Metallurgica et Materialia, **43**, 10 (1995) 3798-3805.

28. "Observations of crack nucleation in columnar ice due to grain boundary sliding," C.R. Picu and V. Gupta, Acta Metallurgica et Materialia, **43**, 10 (1995) 3791-3797.

29. "Structure and chemistry of Nb/Sapphire interfaces, with and without the interlayers of Sb and Cr," J. Yuan, V. Gupta and M. Kim, Acta Metallurgica et Materialia, **43**, 2 (1995) 769-779.

30. "The effect of microstructure and chemistry on the tensile strength of Nb/Sapphire interfaces, with and without the interlayers of Cr and Sb," J. Yuan and V. Gupta, Acta Metallurgica et Materialia, **43**, 2 (1995) 781-794.

31. "A new technique to measure the toughness of thin film interfaces," V. Gupta and A. Pronin, Journal of American Ceramic Society, **78**, 5 (1995) 1397-400.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 13 of 37

32. "Failure mechanisms in laminated carbon-carbon composites under bi-axial compression," J. Grape and V. Gupta, Acta Metallurgica et Materialia, **43**, 7 (1995) 2657-2665.

33. "Failure in carbon-polyimide laminates under bi-axial compression," J. Grape and V. Gupta, J. Composite Materials, **29**, 14 (1995) 1850-1872.

34. "The effect of processing conditions on the compression and shear strength of 2D carbon-carbon laminates," K. Anand and V. Gupta, Carbon, **33**, 6 (1995) 739-748.

35. "Mechanisms and quantification of spalling failures in laminated composites under shock loading," A. Pronin, K. Anand and V. Gupta, J. Composite Materials, **30**, 7 (1996) 1850-1872.

36. "Effect of interfacial shear strength on crack-fiber interaction behavior in ceramic matrix composites," S. Kumaria, R.N. Singh and V. Gupta, Journal of American Ceramic Society, **79**, 1 (1996) 199-208.

37. "Singularities at grain triple junctions in two dimensional polycrystals with cubic and orthotropic grains," C.R. Picu and V. Gupta, J. Applied Mechanics, **63**, (1996) 295-300.

38. "Stress singularities at triple junctions with freely sliding grains," R.C. Picu and V. Gupta, International Journal of Solids and Structures, **33**, 11 (1996) 1535-1541.

39. "Effect of substrate orientation and deposition mode on the tensile strength and toughness of Nb/sapphire interfaces," V. Gupta, J. Wu and A.N. Pronin, Journal of the American Ceramic Society, **80**, 12 (1997) 3172-3180.

40. "Response to the comments of Nutt and King on the bond strength measurements," A.S. Argon, J.A. Cornie, V. Gupta, L. Lev and D.M. Parks, Materials Science and Engineering, **A237** (1997) 224-228.

41. "A numerical study of the effect of the microstructural parameters on the compressive and shear strength of laminated carbon-carbon composites," K. Anand, V. Gupta, and M.Y. He, J. Composite Materials, **29**, 18 (1997) 2446-2463.

42. "Brittle failure of columnar freshwater ice under off-axis compression loading," R.C. Picu, J.S. Bergstrom and V. Gupta, Scripta Metallurgica et Materialia, **36**, 1 (1997) 63-67.

43. "Three-dimensional stress singularities at the tip of a grain triple junction line intersecting the free surface," C.R. Picu and V. Gupta, Journal of the Mechanics and Physics of Solids, **45**, 9 (1997) 1495-1520.

44. "Nucleation of splitting cracks in columnar freshwater ice," V. Gupta, R.C. Picu and J.S. Bergstrom, Acta Metallurgica et Materialia, **45**, 4 (1998) 1141-1423.

45. "Measurement of thin film interface toughness by using laser-generated stress pulses," A. N. Pronin and V. Gupta, J. of the Mechanics and Physics of Solids, **46**, 3 (1998) 389-410.

46. "Measurement and control of ice adhesion to aluminum 6061 alloy," P. Archer and V. Gupta, Journal of the Mechanics and Physics of Solids, **46**, 10 (1998) 1745-1771.

47. "Failure of woven carbon-polyimide laminates under off-axis compression loading," V. Gupta, K. Anand and J. Grape," Acta Metallurgica et Materialia, **46**, 2 (1998) 711-718.

48. "Measurement of the in-situ fiber/matrix interface strength in graphite/epoxy composites," A. Yu and V. Gupta, Composites Science and Technology, **58** (1998) 1827-1837.

49. "The effect of temperature on the strength and failure mechanisms of a woven carbon/polyimide laminate under compression," J.A. Grape and V. Gupta, Mechanics of Materials, **30** (1998) 165-180.

50. "Effect of step loading history and related grain boundary fatigue in freshwater columnar ice in the brittle deformation regime," V. Gupta, J. Bergstrom and R.C. Picu, Philosophical Magazine Letters, **77**, 5 (1998) 241-247.

51. "Compressive failure of rocks by shear faulting," V. Gupta and J. Bergstrom, Journal of Geophysical Research-Solid Earth, **103**, B10 (1998) 23875-23895.

52. "Laser spallation technique: characterization of fundamental adhesion in multilayer devices", V. Gupta, V. Atluri, G. Raiser, L. Dass, K. Seshan and R. Dias, Intel Assembly and Test Technology Journal, **1** (1998) 23.

53. "Nucleation of feather cracks in columnar freshwater ice-experimental observations," V. Gupta and R.C. Picu, J. of Geophysical Research-Oceans, **103**, C1 (1998), 21767-21774.

54. "Measurement of grain-boundary tensile strength in columnar freshwater ice," V. Gupta and P. Archer, Philosophical Magazine Letters, **79**, 8 (1999) 503-509.

55. "Measurement of interface tensile strength at elevated temperatures," V. Gupta, M. O'Brien and A.N. Pronin, Journal de Physics IV France, **9** (1999) 305-310.

56. "Interfacial adhesion and its degradation in selected metal/oxide and dielectric/oxide interfaces in multi-layer devices," V. Gupta, R. Hernandez, J. Wu and P. Charconnet, Vacuum, **59** (2000) 292-301.

57. "Observations of limiting transonic interface crack speeds," J. Wu and V. Gupta, J. Mechanics and Physics of Solids, **48**, 3 (2000) 609-619.

58. "Effect of specimen size and sample aspect ratio on the elastic stiffness of graphite/epoxy laminates," D. Potter, V. Gupta, S. Hauert, Composites Science and Technology, **60** (2000) 2517-2524.

59. "Effects of specimen size and sample aspect ratio on the compressive strength of graphite/epoxy laminates," Composites Science and Technology, **60** (2000) 2525-2538.

60. "Effect of humidity and temperature on the tensile strength of Polyimide/Silicon Nitride interface and its implications for electronic device reliability," V. Gupta, R. Hernandez and P. Charconnet, J. Materials Science and Engineering A, **A317** (2001) 249-256.

61. "A hydrophobic self assembled monolayer with improved adhesion to aluminum for deicing applications," B. Somlo and V. Gupta, Mechanics of Materials, **33**, (2001) 471-480.

62. "A progressive damage model for failure by shear faulting in polycrystalline ice under biaxial compression," V. Gupta and J. Bergstrom, International Journal of Plasticity, **18** (2002) 507-530.

63. "The effect of structure and chemistry on the strength of FeCrAl(Y)/Sapphire interfaces: I, structure of interfaces," H. Wu, S.N. Basu, V. Kireev, and V. Gupta, Materials Science and Engineering A, **A349** (2003) 248-255.

64. "The Effect of structure and chemistry on the strength of FeCrAl(Y)/Sapphire interfaces: II, strength of interfaces," H. Wu, S.N. Basu, V. Kireev, and V. Gupta, Materials Science and Engineering A, **A349** (2003) 265-271.

65. "Glass-modified stress waves for adhesion measurement of ultra thin films for device applications," V. Gupta, V. Kireev, H. Yoshida, and H. Akahoshi, J. Mechanics and Physics of Solids, **51** (2003) 1395-1412.

66. "In-Situ intrinsic interface strength measurement at elevated temperatures and its relationship to interfacial structure," V. Gupta, V. Kireev, S.N. Basu, and H. Wu, Interface Science, **11** (2003) 359-368.

67. "Recovery of stiction-failed MEMS structures using laser-induced stress waves," V. Gupta, R. Snow, M.C. Wu, A. Jain, and J.C. Tsai, J. of Microelectromechanical Systems, **13**, 4 (2004) 696-700.

68. "Study of the interface strength of zirconia coatings by a laser spallation technique," A. Kobayashi, A. Jain, V. Gupta, and V. Kireev, Vacuum, **73** (2004) 533-539.

69. "A quantitative study of moisture adsorption in polyimide and its effect on the strength of the Polyimide/Silicon-Nitride interface," A. Jain, V. Gupta and S.N. Basu, Acta Materialia, 53 (2005) 3147-3153.

70. "Mechanisms-based failure laws for graphite-epoxy Laminates under in-plane biaxial compression," D. Potter, V. Gupta, X. Chen and J. Tian, Composites Science and Technology, **65** (2005) 2105-2117.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 16 of 37

71. "Measurement of the intrinsic and total fracture energies, and intrinsic strength of stainless steel/E-glass composite joints," X. Wang and V. Gupta, Journal of Adhesion Science and Technology, in press (2006).

72. "Effects of substrate orientation and metal film thickness on the intrinsic strength, intrinsic fracture energy, and total fracture energy of Tantalum-Sapphire interfaces," X. Wang, V. Gupta and S. N. Basu, Journal of the American Ceramics Society, 88,7 (2006) 1909-1913.

73. "Construction and characterization of chemically-joined stainless steel/E-glass composite sections," X. Wang and V. Gupta, Mechanics of Materials, **37** (2005) 1198- 1209.

74. "Mechanism-based failure laws for biaxially compressed IM7/8551-7 graphite/epoxy laminates," X. Chen, V. Gupta and J. Tian, Journal of Composite Materials, in press (2006).

75. "Probing the Effects of Nanoscale architecture on the mechanical properties of hexagonal Silica/Polymer composite thin films." B. L. Kirsch; X. Chen; E. K. Richman; V. Gupta; S. H. Tolbert, Adv. Func. Mater., **15** (2005)1319- 1327.

76. "Measurement of Intrinsic Tensile Strength of Polyurea," Youssef, G., Gupta, V., J. Materials Science (2013), in press.

77. "In-Situ Measurement of Solder Joint Strength in Board-mounted CSP Packages Using a Quantitative Laser Spallation Technique," H. Kim, J. Tian, V. Gupta, JAST (2013) in press.

78. "Measurement of Solder Joint Strength in Freestanding CSP Packages Using a Quantitative Laser Spallation Technique," J. Tian, H. Kim, V. Gupta. JAST (2013), in press.

79. "Evaluation of bonding strength between yttria and vanadium alloys for development of self-cooled liquid blanket," Hitoshi Akamatsu, Manabu Satou, Takashi Sato, Amit Jain, Vijay Gupta, Akira Hasegawa, J. Nuclear Materials, vol. 417, pp. 1253-1256, 2011.

80. "Tensile testing of thin films supported on compliant substrates," Xu Chen, Bradley L. Kirsch, Robert Senter, Sarah H. Tolbert, Vijay Gupta, Mechanics of Materials, 41 , 2009, 839-848.

81. "Dynamic Tensile Strength of polyurea bonded steel/e-glass composite joints," A. Jain, V. Gupta, J. of Adhesion Sci. & Tech, in press 2013.

82. "Construction and characterization of stainless steel/polyurea/e-glass composite joints," A. Jain, V. Gupta, J. Mechanics of Materials, vol. 46, pp. 16-22, 2012.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 17 of 37

83. "Dynamic Fracture Energy of Polyurea-Bonded Steel/E-glass Composite Joints," H. Kim, J. Citron, G. Youssef, A. Navarro, and V. Gupta, Mechanics of Materials, Vol. 45, 10-19, 2012.

84. "Dynamic Response of Polyurea Subjected to Nanosecond Rise-Time Stress Waves," Youssef, G., Gupta, V., Mech. Time-Depend. Mater. DOI 10.1007/s 11043-011-9164-7, 2012.

PUBLICATIONS IN THE AREA OF BIOMECHANICS

85. "Measurement and control of interface strength of rf magnetron sputtered CA-PO-Coatings on Ti-6Al-4V substrates by using the laser spallation technique," Kitty van Dijk, V. Gupta, A.K. Yu and J.A. Jansen, Journal of Biomedical Materials Research, **41** (1998) 624-632.

86. "Rupture of fat cells using laser-generated ultra short stress waves," K. Kuwahara, H.B. Gladstone, V. Gupta, V. Kireev, V. Neel, and R.L. Moy, Lasers in Surgery and Medicine, **32**, 4 (2003) 279-285.

87. "Trauma to long thoracic nerve and associated scapula winging in a low-velocity rear end automobile collision: case report," V. Gupta and B. Posner, J. of Trauma, **57**, 2 (2004) 1-3.

88. "Evaluation of laser spallation as a technique for measurement of cell adhesion strength," E. Hagerman, J, Shim, V. Gupta and B. Wu, Journal of Biomedical Materials Research Part A, 82A (4), 852-860, 2006.

89. "Glycosaminoglycan degradation reduces mineralized tissue–titanium interfacial strength," H. Nakamura , J. Shim , F. Butz, H. Aita, V. Gupta, T. Ogawa, *J Biomed Mater Res,* , 77A, (2006) 478–486.

90. Measurement of Tensile Strength of Cell-Biomaterial Interface Using the Laser Spallation Technique, Jaewoo Shim, Elizabeth Hagerman, Ben Wu, Vijay Gupta. Acta Biomaterialia, 4, 1657-1668, 2009.

91. An understanding of the mechanism that promotes adhesion between roughened titanium implants and mineralized tissue. J. Shim, H. Nakamura, T. Ogawa, and V. Gupta. ASME Journal of Biomechanical Engineering, 131 (5) pp. 054503, 2009.

92. "Viscoelastic Properties of Bovine Orbital Connective Tissue and Fat: Constitutive Models," Yoo, L., Gupta, V., Lee, C., Kavehpore, P., Demer, J.L., Biomechanics and Modeling in Mechano-biology 10 (6), pp. 901-914, 2011.

93. "Creep Behavior of Passive Bovine Extraocular Muscle," Yoo, L., Kim, H., Shin, A., Gupta, V., and Demer, J.L., Journal of Biomedicine and Biotechnology, Vol. 526705, 2011.

94. "Quasi-linear viscoelastic behavior of bovine extra-ocular muscle tissue," Yoo, L., Kim, H., Gupta, V. and Demer, J. L., Invest Ophthalmol Vis Sci., 50(8), pp. 3721-3728, 2009.

95. "Bacterial biofilm disruption using laser generated shockwaves," Zachary D Taylor; Artemio Navarro; Colin P Kealey; David Beenhouwer; David A Haake; Warren S Grundfest; Vijay Gupta, in Engineering in Medicine and Biology Society (EMBC), 2010 Annual International Conference of the IEEE. 2010. pg. 1028-1032

96. "Laser Induced Shockwaves on Flexible Poymers for Treatment of Bacterial Biofilms," Navarro, A., et al., Medicine Meets Virtual Reality (MMVR), The 18th Medicine Meets Virtual Reality Conference. (2011).

97. "Microwave interferometer for shock wave induced displacement measurement," J. Choi, G. Youssef, S. Breugnot, V. Gupta, and T. Itoh, QNDE 2010.

98. "Does cement technique influence the interface strength for roughened and polished femoral components?" M.F. Shepard, J.M. Kabo, V. Gupta, M. Bhakta and J.R. Lieberman, Proc. 46th Annual Meeting, Orthopaedic Research Society, Orlando, Florida (2000), March 12-15, p. 254.

99. "Transient dynamic response in a surrogate hip model during a simulated lateral fall," B. Gandhi and V. Gupta. 4th Annual Bioengineering Symposium, Abstract #58, University of California San Diego (2003), June 22-23.

Other Papers

101. "Tailoring interphase properties for damage containment in graphite/aluminum matrix composites," T. Erturk, V. Gupta, A.S. Argon and J.A. Cornie, ICCM & ECCM Sixth International Conference on Composite Materials, **2**, London (1987), p. 2156.

102. "Toughness of interfaces," A.S. Argon, V. Gupta, H.S. Landis and J.A. Cornie, Proc. of the Second International Conference on Composite Interfaces, Cleveland, Ohio (1988), June 13-17, p. 443.

103. "Tailoring interfaces in composites," V. Gupta, A.S. Argon, H.S. Landis and J.A. Cornie, Ceramic Engineering and Science Proceedings, **9** [7-8] (1988), p. 985.

104. "Intrinsic toughness of interfaces between SiC coatings and substrates of Si and Carbon Fiber," A.S. Argon, V. Gupta, H.S. Landis and J.A. Cornie, Proc. 9th Risϕ International Symposium on Metallurgy and Material Science, S.I. Andersen, H. Lilholt and O.B. Pedersen eds., Denmark (1988), September 5-9, p. 269.

105. "Measurement of strength of thin film interfaces by laser spallation experiment," V. Gupta and A.S. Argon, Proceedings of the IUTAM Symposium on Inelastic Deformation of Composite Materials, RPI, Troy (1990), May 29-June 1, p. 51.

106. "Measurement of interface strength by laser pulse produced spallation," V. Gupta and A.S. Argon, Proc. Materials Research Society, Spring meeting in San Francisco, California (1990), April 16-21, p. 245.

107. "Interface problems in metal matrix composites," V. Gupta and A.S. Argon, Proc. of the 5th International Conference on Composite Materials in Transition, American Society for Composite Materials, East Lansing, Michigan (1990), June 12-14, p. 506.

108. "Control of toughness in composites through control of strength of fiber/matrix interfaces," A.S. Argon, and V. Gupta, Proc. of the Symposium on Ceramic Composites, the ASME Winter Annual Meeting in Atlanta, Georgia (1991), Dec. 2-6, p. 1.

109. "Measurement and control of interface strength," J. Yuan and V. Gupta, Proc. of the International Conference on Laser Applications, F. J. Duarte and D. G. Harris eds., Society of Optical and Quantum Electronics McLean, Virginia (1992), p. 851.

110. "Calculation, measurement and control of interface strength for achieving toughness in composites," V. Gupta, J. Yuan, D. Martinez and J. Deacutis, Proc. of the AIME/TMS-sponsored symposium: Development in Ceramic and Metal Matrix Composites, K. Upadhya, ed., TMS Annual Meeting, San Diego (1992), March 1-5, p. 171.

111. "Preliminary Investigations of the measurement of fracture toughness in freshwater ice crystals and bicrystals," V. Gupta, J. Ruhl, G. Kuehn and D. Martinez, Proc. of the 11th IAHR Ice Symposium, Banff, Alberta (1992), June 15-19, p. 1408.

112. "Measurement and control of interface strength and mechanical properties of coatings by laser spallation experiment," V. Gupta and J. Yuan, Metallized Plastics 3: Fundamentals and Applied Aspects, K.L. Mittal, ed., Plenum Press, New York (1992), p. 331.

113. "Failure mechanisms of 2D laminated carbon-carbon composites under uniaxial compression," V. Gupta, K. Anand and D. Dartford Proc. of the American Society of Composites, 7th Technical Conference, Penn State University (1992), October 13-15, p. 481.

114. "Shear fracture of laminated carbon-carbon composites," K. Anand, V. Gupta and M. Kryska, Proc. of the American Society of Composites, 7th Technical Conference, Penn State University (1992), October 13-15, p. 493.

115. "Measurement of cleavage strength in freshwater ice crystals by a laser spallation technique," V. Gupta and T. Xuefeng, Proc. of the 12 International Offshore Mechanics and Arctic Engineering Conference IV, Glasgow (1993), June 20-24, p. 35.

116. "Crack nucleation mechanism in saline ice," V. Gupta, R.C. Picu and H.J. Frost, Proc. of the AMD Symposium on Ice Mechanics, ASME, **AMD-Vol. 163**, New York (1993), p. 199.

117. "Nanosecond rise-time stress pulses for materials characterization," V. Gupta, J. Yuan and A. Pronin, Proc. of the AMD Symposium on Experimental Techniques in the Dynamics of Deformable Solids, ASME, **AMD-Vol. 163**, ASME, New York (1993), p. 199.

118. "Crack nucleation mechanisms and fracture toughness measurements in freshwater ice," H. J. Frost and V. Gupta, Proc. of the AMD Symposium on Ice Mechanics, the Joint SES-ASC-ASME Conference in Virginia, ASME, **AMD-Vol. 163**, New York (1993), June 6-9, p. 235.

119. "Measurement of the transverse tensile strength of carbon-carbon composites using a laser spallation experiment," K. Anand, A. Pronin and V. Gupta, Proc. of the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18, p. 60.

120. "A numerical study of the compression and shear failure in 2-D laminated carbon-carbon composites," V. Gupta, M. He and K. Anand, Proc. of the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18, p. 62.

121. "Mechanisms of deformation under compression and shear loadings," K. Anand, V. Gupta and J. Grape, Proc. of the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18, p. 108.

122. "Failure of carbon-carbon composites under bi-axial loading," J. Grape and V. Gupta, Proc. of the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18.

123. "Size effect in indentation-induced splitting floe experiments," V. Gupta and R.C. Picu, Proc. of the 12 International Offshore Mechanics and Arctic Engineering Conference IV, Glasgow (1993), June 20-24, p. 29.

124. "Nanosecond rise-time stress pulses using lasers for applications to materials characterization," V. Gupta, A. Pronin and J. Yuan, Proc. of the 3rd International Conference on Advanced Materials, Tokyo (1993), September 1-4.

125. "Tensile strength of interfaces," V. Gupta and A.S. Argon. Materials Interfaces-atomic-level structure and properties, Chapter 24 in S. Yip and D. Wolf, eds., Chapman and Hall, London (1993) p. 641.

126. A description of the laser spallation technique and the calculations of interface toughness in composites can be found in an undergraduate text book by K. K. Chawla: Ceramic Matrix Composites, Chapman & Hall (1993), p. 192; 302.

127. "The effect of processing and surface variables on the metal/ceramic adhesion and its role in tailoring interfaces in composites and tribology," V. Gupta and J. Yuan, High Performance Composites: Commonalty of Phenomenon, K.K. Chawla, P.K. Liaw and S.G. Fishman, eds, The Minerals, Metals & Materials Society (1994), p. 193.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 21 of 37

128. "A comparative study of the deformation in carbon/carbon and carbon/polyimide laminates under bi-axial compression," J. Grape and V. Gupta, Proc. of the Ninth American Society for Composites Technical Conference, the University of Delaware, Delaware (1994), September 20-22, p. 818.

129. "Crack nucleation in polycrystalline ice due to anisotropic grains," V. Gupta and R.C. Picu, Proc. of the 12th International Ice Symposium (IAHR), Trondheim, Norway (1994), August 23-26, p. 464.

130. "Characterization of thin film interfaces and spalling damage in composite laminates using nanosecond rise-time stress pulses," V. Gupta, A. Pronin, K. Anand and J. Yuan, Wave Propagation and Emerging Technologies, V. K. Kinra, R. J. Clifton and G. C. Johnson, eds., ASME, **AMD-Vol. 188**, ASME, New York (1994), p. 201.

131. "Nucleation of splitting column cracks in ice," V. Gupta, R.C. Picu and J. Bergstrom, Ice Mechanics, ASME, **AMD-Vol. 207**, New York (1995), p. 265.

132. "Design of interfaces through control of interfacial microstructure with applications to composites, tribology and multilayer devices," V. Gupta, A. Pronin and J. Yuan, Proc. of the Fourth Pan-American Congress of Applied Mechanics Conference Vol. 1: *Mechanics of Solids*, L.A. Godoy, S.R. Idelsohn, P.A. Laura and d. T. Mook eds., Buenos Aires, Argentina (1995), January 3-6, p. 503

133. "Fracture mechanisms and effect of interfacial segregants on metal/ceramic interfaces," V. Gupta, J. Yuan and M. Kim, Advanced Materials '93, III/B: Composites, Grain Boundaries and Nanophase Materials, M. Sakai ed., Transactions of the Materials Research Society of Japan, **16B**, (1995), p. 1081.

134. "A numerical study of the compression and shear failure of laminated 2-D carbon-carbon composites," V. Gupta, M. He and K. Anand, Advanced Materials '93, III/B: Composites, Grain Boundaries and Nanophase Materials, M. Sakai ed., Transactions of the Materials Research Society of Japan, **16B**, (1995), p. 1081.

135. "Crack nucleation mechanisms in columnar ice-recent developments," V. Gupta, Future Directions in Snow and Ice Research, R.L. Brown and J.D. Dent eds., Proceedings of the workshop, Future Directions in Snow and Ice Research, Army Research Office, (1995), October 3-6, p. 6.

136. "Recent developments in the laser spallation technique to measure the interface strength with applications to metal/ceramic, ceramic/ceramic and ceramic/polymer interfaces," V. Gupta, J. Yuan and A. Pronin, Adhesion measurements of films and coatings, K. L. Mittal, ed., VSP Publishers, Netherlands (1995).

137. "Measurement of interfacial adhesion in multilayer devices," V. Gupta and V. Almgren, Proc. of the 14th International VLSI Multilevel Interconnect Conference (VMIC), (1997) p. 169.

138. "Compressive failure of rocks," V. Gupta and J. S. Bergstrom, Proc. of the 36th Rock Mechanics Symposium, (1997).

139. "Characterizing basic interfacial adhesion in thin film structures with applications to thermal barrier coatings," Proc. of the 1st International Symposium on Applied Plasma Science (ISAPS97), (1997).

140. "Failure mechanisms and size effects in graphite/epoxy laminates under off-axis uniaxial and biaxial compression," Proc. of the 5th International Conference Composite Engineering, D. Hui ed., (1998) p. 347.

141. "Measurement of interface tensile strength at elevated temperatures," V. Gupta, M. O'Brien, and A.N. Pronin, Proc. of the 3rd European Mechanics of Materials Conference: EUROMECH-MECAMAT, Oxford, UK (1998), November 23-25.

142. "Failure mechanisms and size effects of graphite/epoxy laminates under off-axis uniaxial and biaxial compression," V. Gupta, S. Hauert, and D. Potter, Proc. of the Symposium on Life Prediction of Materials and Structures, the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA (1998), November 15-20.

143. "Failure mechanisms and size effects in graphite/epoxy laminates under off-axis uniaxial and biaxial compression," V. Gupta, Pro. of the Sixth Pan-American Congress of Applied Mechanics (PACAM IV), **7**, Rio De Janerio, Brazil (1999), January 4-8, p. 987.

144. "Surface science-based adhesion enhancement using a laser spallation technique," V. Gupta, Surface Engineering: Science and Technology *I*, A. Kumar, Y.-W. Chung, J.J. Moore and J.E. Smugeresky eds., The Minerals, Metals & Materials society (1999) p. 9.

145. "Tensile strength of nitride/polyimide interface and its degradation due to moisture segregation with implications for device reliability," V. Gupta, R. Hernandez and P. Charconnet, Proc. of the ISAPS'99: Advances in Applied Plasma Science, **2** (1999), p. 343.

146. "Measurement of interfacial adhesion and its degradation in multi-layer packages, devices, and blanket films using the laser spallation technique," V. Gupta, R. Hernandez, R. Dias, V. Atluri, G. Raiser, L. Skoglund and P. Zimmerman, Proc. of the 26th International Symposium for Testing and Failure Analysis, Bellevue, Washington (2000), November 12-16.

147. "Measurement of solder joint strength and its dependence on thermal aging in freestanding and board-mounted packages using a laser spallation technique," V. Gupta, J. Tian, C. Hartfield, K. Zeng, C. Chiu, and R. Stierman, to appear in the Proc. of the 30th International Symposium for Testing and Failure Analysis 2004, Worcester, Massachusetts (2004), November 14-18.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 23 of 37

148. "Novel applications of laser-generated stress waves in manufacturing of MEMS and ICs on plastics," V. Gupta, to appear in the Proc. of the 2005 NSF DMII Grantees Conference, Scottsdale, Arizona (2005), Jan 3-6.

149. "Measurement of thin film interfacial properties using a nanosecond laser source," A. Mal, S. Banerjee, J. Shim, E. Hagerman, Ben Wu and V. Gupta, Proc. 2nd Int Symp on Mechanical Science based on Nanotechnology, Tohoku Univ, Sendai, 21-12 Feb. 2005, pp. 21-26.

SELECTED CONFERENCE/UNIVERSITIES/COMPANY PRESENTATIONS

1. Tailoring interface properties for damage containment in Graphite/Aluminum composite, presented at the ICCM & ECCM 6th International Conference on Composite Materials held in London, United Kingdom (1987) July 20.

2. (*Invited)* Engineering interfaces in composites, presented at the SDIO/IST Advanced Composites Program Review held at Woods Hole, Massachusetts (1987) June 23-24.

3. Measurement of Strength and Toughness of interfaces between Graphite/Aluminum composites, presented at the AIME/TMS Annual meeting in Denver (1987) February 23-26.

4. (*Invited)* Toughness of interfaces, presented at the Second International Conference on Composite Interfaces, Cleveland, Ohio (1988), June 13-17.

5. Intrinsic toughness of interfaces between SiC coatings and substrates of Si and Carbon Fiber, at the 9th Risf International Symposium on Metallurgy and Material Science, held at Denmark (1988), September 5-9.

6. Overview of the Composites Program at MIT, presented at the Materials Processing Center Industry Collegium held at MIT, Cambridge (1988), June 16.

7. (*Invited)* Measurement of interface strength using a laser spallation experiment, presented at the SDIO/IST Advanced Composites Program Review held at Woods Hole, Massachusetts (1988) June 13-14.

8. Tailoring interfaces in composites, presented at the 12th Annual Conference on Composites and Advanced Ceramics held at Cocoa Beach, Florida (1988) January 17-20.

9. (*Invited)* Cracking in brittle composites, presented at the Arthur D Little Consulting Company, Cambridge, Massachusetts (1989), August.

10. (*Invited)* Tough ceramics through micromechanics, presented at the Department of Materials Science and Engineering of the University of California at Santa Barbara, California (1989) July.

11. (*Invited)* Characterization of interfaces in multilayer devices, presented at the IBM Almaden Research Center, San Jose, California (1989), March.

12. (*Invited)* Measurement of intrinsic composite properties as an aid to develop tough composites, presented at the IBM T. J. Watson Research Center in New York (1989) March.

13. (*Invited)* Asymptotic elastic-plastic crack growth solutions in hexagonal crystals and layered materials, presented at the ONR Sea-Ice Mechanics Workshop, November 12-14 (1990), Airlie House, Arlington, Virginia.

14. (*Invited)* Structure and chemistry of metal-ceramic interfaces, presented at E. I. DuPont De Nemours and Company, Delaware (1990) November 9.

15. (*Invited)* Interface problems in metal matrix composites, presented at the 5th International Conference on Composite Materials in Transition, organized by the American Society for Composite Materials, East Lansing, Michigan (1990), June 12-14.

16. (*Invited)* Measurement of strength of thin film interfaces by laser spallation experiment, presented at the IUTAM Symposium on Inelastic Deformation of Composite Materials, RPI, Troy (1990), May 29-June 1.

17. (*Invited)* Production of shock waves using lasers and their applications for materials characterization, presented at the University of California, San Diego, California (1990) April 23.

18. (*Invited)* Tailoring interfaces in composites, presented at Rutgers University, New Jersey (1990) March 20.

19. Measurement of interface strength by laser pulse-induced spallation, presented at the Materials Research Society Spring Meeting held in San Francisco, California (1990), April.

20. (*Invited)* Strength criterion for crack deflection at fiber/matrix interfaces, presented at the Department of Applied Mechanics, India Institute of Technology, New Delhi (1991), December 20.

21. (*Invited)* Measurement of material properties by using a wide-angle interferometer, presented at the International Conference on Laser Applications, San Diego, California (1991), December 9-13.

22. (*Invited)* Control of toughness in composites through control of strength of fiber/matrix interfaces, co-author but presented by Professor A. S. Argon (MIT) at the special session on Damage and Oxidation Protection in High Temperature Composites at the ASME Winter Annual Meeting in Atlanta, Georgia (1991), December 2-6.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 25 of 37

23. (*Invited)* Energy criterion for crack deflection at an interface between orthotropic media, presented at the 28th Technical meeting of the Society of Engineering Science, University of Florida, Florida (1991), November 6-8.

24. (*Invited)* Interface characterization in metallized plastics, presented at the 180th Annual Meeting of the Electrochemical Society, Phoenix, Arizona (1991), October 13-18.

25. (*Invited)* Problems in interface fracture, presented at the Department of Materials Science and Engineering, Carniegie Mellon University, Pittsburgh, Pennsylvania (1991) May 4.

26. (*Invited)* Measurement of the mechanical properties of thick coating, presented at the National Thermal Spray Conference and Exposition (ASM), Pittsburgh, Pennsylvania (1991) May 4-10.

27. Nb/alumina interface strength and its dependence on Sb and Cr interfacial segregants, presented at the Symposium on Thin Films: Stresses and Mechanical Properties III, Materials Research Society Meeting, Boston, Massachusetts (1991), December 2-6.

28. Micromechanical design of brittle composites by using the strength criterion for interface crack deflection, presented at the ASME Winter Annual Meeting in Atlanta, Georgia (1991), December 2-6.

29. Measurement of interface strength and its dependence on interfacial segregants, presented at the Materials Research Society's Fall 1991 Meeting in Boston, Massachusetts (1991), December 2-7.

30. Near-tip fields for a crack along an interface between an elastic-ideally plastic crystal and a rigid substrate, presented at the 28th Technical meeting of the Society of Engineering Science, University of Florida, Florida (1991), November 6-8.

31. (*Invited)* Overview of the Composites Research in United States, presented at the Indian Institute of Technology, New Delhi, India (1992), December 17.

32. (*Invited)* Recent developments in the laser spallation technique to measure the interface strength and its relationship to interface toughness with applications to metal/ceramic, ceramic/ceramic and ceramic/polymer interfaces, presented at the International Symposium on Adhesion Measurement of Films and Coatings, held in Cambridge, Massachusetts (1992) December 5-7.

33. (*Invited)* Some problems in interfaces, ice mechanics and laminates, presented at the Mechanical Engineering Department of the University of California at Santa Barbara, California (1992), September.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 26 of 37

34. (*Invited)* Calculation, measurement and control of interface strength for toughness maximization, presented at the Annual Meeting of the American Ceramic Society in Minneapolis, Minnesota (1992) April 12-16.

35. (*Invited)* Calculation, measurement and control of interface strength for achieving toughness in composites, presented at the AIME/TMS-sponsored symposium: Development in Ceramic and Metal Matrix Composites, organized at the TMS Annual Meeting, San Diego (1992), March 1-5.

36. (*Invited)* Tailoring interfaces in ceramic composites, presented at the Harvard University Applied Mechanics Colloquium, Harvard University, Cambridge (1992) February 19.

37. (*Invited)* Measurement of the fracture toughness of graphite ribbons, presented at the Worcester Polytechnic Institute, Worcester, Massachusetts (1992) February 12.

38. Role of transverse and axial bundle cracks in the failure of 2D carbon-carbon composites under uniaxial compression, presented at the American Society of Composites 7th Technical Conference, Penn State University (1992), October 13-15.

39. Can woven laminates undergo simple shear deformation? presented at the American Society of Composites 7th Technical Conference, Penn State University (1992), October 13-15.

40. Compressive fracture of laminated carbon-carbon composites under uniaxial compression, presented at the 29th Technical meeting of the Society of Engineering Science, held at the University of California at San Diego, California (1992), September 14-16.

41. Interply fracture toughness as a controlling parameter for carbon-carbon composites under interlaminar shear, presented at the 29th Technical meeting of the Society of Engineering Science, held at the University of California at San Diego, California (1992), September 14-16.

42. Calculation measurement and control of interface strength, presented at the 29th Technical meeting of the Society of Engineering Science, held at the University of California at San Diego, California (1992), September 14-16.

43. (*Invited)* Measurement of fracture toughness and grain boundary energy of freshwater ice and verification of the crack deflection criterion at anisotropic interfaces, presented at the 29th Technical meeting of the Society of Engineering Science, held at the University of California at San Diego, California (1992), September 14-16, 1992.

44. Preliminary Investigations of the measurement of fracture toughness in freshwater ice crystals and bicrystals, co-author but presented by H. J. Frost at the 11th IAHR Ice Symposium, Banff, Alberta (1992), June 15-19.

45. Failure laws laminated carbon-carbon composites under compressive and shear loadings, presented at the Annual Meeting of the American Ceramic Society in Minneapolis, Minnesota (1992), April 12-16.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 27 of 37

46. Asymptotic fields for cracks along an interface between an elastic, ideally plastic crystal and a rigid substrate and the implication for interface fracture mechanisms. Presented at the special session: Ductile Fracture I: Deformation, Void Growth, and Stress State at the 1992 TMS Annual Meeting in San Diego, California (1992), March 1-5.

47. (*Invited)* Elastic-plastic crack growth solutions for interface cracks with applications to composites, presented at Drexel University, Philadelphia (1993), August.

48. (*Invited)* Nanosecond rise-time stress pulses using lasers for materials characterization, presented at the AMD Symposium on Experimental Techniques in the Dynamics of Deformable Solids, held at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

49. (*Invited)* Crack nucleation mechanism in saline ice, presented at the AMD Symposium on Ice Mechanics held at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

50. Strength-structure-chemistry relationship for metal/ceramic interfaces, co-author but presented by J. Yuan at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

51. (*Invited)* A modified laser spallation experiment for interface strength measurement, presented at the Department of Manufacturing, Boston University, Massachusetts (1993), April.

52. (*Invited)* Strength-Structure-Chemistry relationship for thin film interfaces, presented at the Solid State Science Center, Arizona State University, Tempe (1993) April 19.

53. Fracture mechanisms and effect of interfacial segregants on metal/ceramic interfaces, presented at the 3rd International Conference on Advanced Materials held in Tokyo (1993), September 1-4.

54. Experimental strategy to produce nanosecond rise-time stress pulses with no post-peak asymptotic tail, presented at the 3rd International Conference on Advanced Materials held in Tokyo (1993), September 1-4.

55. Numerical simulation of the deformation in brittle laminates, presented at the 3rd International Conference on Advanced Materials held in Tokyo (1993), September 1-4.

56. (*Invited)* Energy criterion for crack deflection at an anisotropic interface, presented at the 25th National Symposium on Fracture Mechanics, held at Lehigh University (1993) June 29-July 1.

57. (*Invited)* Size effect in indentation experiments, presented at the 12 International OMAE Conference IV held in Glasgow (1993) June 20-24.

58. Measurement of cleavage strength in freshwater ice crystals by a laser spallation technique, presented at the 12 International OMAE Conference IV held in Glasgow (1993) June 20-24.

59. Kinking as a mode of deformation in carbon-carbon composites under bi-axial compression, presented at the 12 International OMAE Conference IV held in Glasgow (1993) June 20-24.

60. A numerical study of the compression and shear failure in 2D carbon-carbon composites," presented at the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18.

61. Measurement of the transverse tensile strength of carbon-carbon composites using a laser spallation experiment, at the 21st Biennial Conference on Carbon, Buffalo, N.Y. (1993), June 13-18.

62. Mechanisms of deformation under compression and shear loadings, presented at the 21st Biennial Conference on Carbon, Buffalo, New York (1993), June 13-18.

63. Failure of laminated composites under bi-axial compression, at the 21st Biennial Conference on Carbon held at the State University of New York at Buffalo (1993) June 13-18.

64. Crack nucleation mechanisms and fracture toughness measurements in freshwater ice, at the AMD Symposium on Ice Mechanics held at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

65. Failure surfaces of carbon laminates in compression-compression quadrant, at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

66. Flaw characterization using laser pulse produced shock waves, at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

67. A parametric study of the effect of the cracks and bundle crimps on the compressive and shear properties of carbon-carbon composites, presented at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

68. Crack nucleation mechanism in saline ice, at the AMD Symposium on Ice Mechanics held at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

69. Modeling and determination of interlaminar shear properties of carbon-carbon laminates, at the Joint SES-ASC-ASME Conference in Virginia (1993), June 6-9.

70. Energy criterion for crack deflection at an anisotropic interface, presented at the Materials Research Society's Spring Meeting in San Francisco (1993) April 12-16.

71. Fracture mechanisms and effect of interfacial segregants on metal/ceramic interfaces, presented at the Materials Research Society's Spring Meeting in San Francisco (1993) April 12-16.

72. (*Invited)* Mechanics of shear faulting in brittle solids, presented at the Materials Research Society's Spring Meeting in San Francisco (1993) April 12-16.

73. Crack nucleation mechanism in brittle solids at high strain rates, presented at the Materials Research Society's Spring Meeting in San Francisco (1993) April 12-16.

74. (*Invited)* Application of laser spallation experiment to characterize interfaces in multilayer devices, presented at the AT&T Bell Laboratories, Murray Hill, New Jersey (1994) July.

75. (*Invited)* Failure mechanisms in brittle carbon-carbon and carbon-polyimide laminates under uniaxial, biaxial and off-axis compression, and implications for ductile laminate design, presented at the Mechanical Engineering Department of the Massachusetts Institute of Technology, Cambridge (1994) November 14.

76. (*Invited)* Characterization of composite laminates using nanosecond rise-time stress pulses, presented at the ASME Symposium on Wave Propagation and Emerging Technologies held at the Winter Annual Meeting in Chicago (1994), November 6-11.

77. (*Invited)* The effect of processing and surface variables on the metal/ceramic adhesion and its role in tailoring interfaces in composites and tribology, presented at the Symposium on Commonality of Phenomenon in Composites: Interfaces at the TMS Fall Meeting in Rosemont, Illinois (1994), October 2-6.

78. (*Invited)* Measurement of fracture toughness by a new spontaneous delamination technique, presented at the Department of Mechanical Engineering, University of Michigan, Ann Arbor (1994) September 20.

79. (*Invited)* Non-destructive evaluation of metal-epoxy bonds using laser ultrasound, presented at the Ford Motor Company Manufacturing Division in Dearborn, Michigan (1994) September 19.

80. (*Invited)* The effect of processing and surface variables on the Metal/Ceramic adhesion, presented at a Symposium on Joining and Welding held at General Electric Research and Development Center, Schenectady, New York (1994), April 20.

81. (*Invited)* Design of interfaces through control of interfacial microstructure with applications to composites, tribology and multilayer devices, presented at the University of Connecticut, Storrs, Connecticut, February, 1994.

82. A new technique to measure the toughness of interfaces, presented at the Materials Research Society's Fall Meeting held at Boston, Massachusetts (1994), November 27-December 2.

83. (*Invited)* Crack nucleation at grain triple junctions due to elastic anisotropy of grains, presented at the Materials Research Society's Fall Meeting held at Boston, Massachusetts (1994), November 27-December 2.

84. Failure mechanisms in carbon-carbon laminates under biaxial compression, at the Materials Research Society's Fall Meeting held at Boston, Massachusetts (1994), November 27-December 2.

85. Failure mechanisms in carbon-polyimide laminates under biaxial and offaxis compression loadings, at the Materials Research Society's Fall Meeting held at Boston, Massachusetts (1994), November 27-December 2.

86. A comparative study of the deformation behavior in carbon-carbon and carbon-polyimide laminates, presented at the 9th American Society for Composites Technical Conference held at University of Delaware, Delaware (1994), September 20-22.

87. (*Invited)* Crack nucleation in polycrystalline ice due to anisotropic grains, presented at the 12th International Ice Symposium (IAHR) held at Trondheim, Norway (1994), August 23-26.

88. Use of nano-second stress pulses as a non-destructive evaluation tool, presented at Baxter Healthcare Corporation, Deerfield, Illinois (1995), January 24.

89. Design of interfaces through control of interfacial microstructure with applications to composites, tribology and multilayer devices, presented at the Fourth Pan-American Congress of Applied Mechanics held at Buenos Airs, Argentina (1995), January 3-6.

90. (*Invited)* Nucleation of splitting cracks in columnar ice, AMD-MD'95 Join Applied Mechanics and Materials Meeting, UCLA, Los Angeles (1995), June 29.

91. Measurement of interface fracture toughness using laser-produced stress pulses, in Symposium on Micromechanics and Constitutive Modeling of Composite Materials at the AMD-MD'95 Join Applied Mechanics and Materials Meeting, UCLA, Los Angeles (1995) June 29.

92. (*Invited)* The nucleation of Cracks in ice, Army Workshop on Snow and Ice, Gallatin Gateway, Montana (1995), October 3-6.

93. (*Invited)* A new way to characterize mechanical properties of thin film interfaces, Rockwell Science Center, Thousand Oaks, California (1995), October.

94. (*Invited)* Measurement of interface strength in multilayer paint assembly, Courteauls Aerospace, Burbank, California (1996), March.

95. (*Invited)* Adhesion of paints to structural surfaces, E. I. Du Pontís Marshall Laboratories, Pennsylvania (1996), June.

96. (*Invited)* Measurement of interface strength and toughness in composites and thin film structures," in symposium on Mechanics and Materials Issue in Structural life Prediction, 1996 ASME Mechanics and Materials Conference, The Johns Hopkins University, June 12-14, 1996.

97. (*Invited)* Shear faulting in ice, IAHRí96, 13th International symposium on ice held in Beijing, China (1996), August 27-30.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 31 of 37

98. (*Invited)* Measurement and control of intrinsic interface strength and toughness, California Institute of Technology, Pasadena (1996), October 21.

99. (*Invited)* Failure laws for carbon/polyimide composites under compression, Department of Civil Engineering, UCLA (1996), October, 24.

100. (*Invited)* A new technique to measure the toughness of interfaces, Hughes Research Laboratories, Malibu, California (1996), October 30.

101. (*Invited)* Materials and mechanics problems in electronic devices, Dow Corning Corporation, Midland, Michigan (1996), November 6.

102. (*Invited)* Measurement and control of intrinsic interface strength and toughness using laser-generated stress waves, in symposium on Interfacial Fracture, at the 1996 ASME International Mechanical Engineering Congress and Exposition, Nov. 22, 1996.

103. (*Invited)* Mechanism-based failure laws for carbon and polymer matrix composites and design of damage-tolerant microstructures, Department of Civil Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts (1996), December 5.

104. (*Invited)* Strength and toughness measurements at elevated and cryogenic temperatures, Pratt and Whitney, Connecticut (1996), Dec. 6.

105. Crack nucleation at grain triple junctions due to elastic anisotropy of grains, in Symposium on Computational Modeling of Damage Initiation, Evolution and Identification in Composite Materials and Structures at the 1996 ASME International Mechanical Engineering Congress and Exposition, Nov. 21, 1996.

106. (*Invited)* Failure mechanisms in brittle carbon-polyimide laminates under uniaxial, biaxial and off-axis compression loading. and implications for ductile laminate design, in symposium on Failure Mechanisms and Mechanism-based Modeling in High Temperature Composites, at the 1996 ASME International Mechanical Engineering Congress and Exposition, Nov. 21, 1996.

107. Failure Mechanisms and modeling of brittle carbon-carbon and carbon-polyimide laminates under biaxial compression, in symposium on Compressive Failure of Fiber Composite Materials at the 1996 ASME International Mechanical Engineering Congress and Exposition, Nov. 22, 1996.

108. Laser-generated waves for detection of corrosion of damage in aircraft components, in symposium on Ultrasonic Evaluation of Damage Materials at the 1996 ASME International Mechanical Engineering Congress and Exposition, Nov. 22, 1996.

109. Measurement of interfacial adhesion in multilayer devices, in symposium on Mechanics of Surfaces and Interfaces, Materials Research Society Fall Meeting, Boston (1996), Dec. 2-6.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 32 of 37

110. Measurement of in situ fiber/matrix interface strength in composites, in symposium on Mechanical Properties: Thin Films and Novel Test Methods, Materials Research Society Fall Meeting, Boston (1996), Dec. 2-6.

111. Effect of substrate orientation and deposition mode on the tensile strength and toughness of Nb/sapphire interfaces, in Symposium on Thin Films, Materials Research Society Fall Meeting, Boston (1996), Dec. 2-6.

112. (*Invited)* Strength and toughness measurements at elevated and cryogenic temperatures, Pratt and Whitney, Connecticut (1996), Dec. 6.

113. (*Invited)* Adhesion of Ti leads in Pacesetter devices, Pacesetter Inc., Los Angeles (1997), June 10.

114. (*Invited)* Interface crack velocity measurements and implications for brittle-to-ductile transition, Caltech: Special symposium to Honor Rod Clifton, Pasadena (1997), June 21.

115. Measurement of interfacial adhesion in multilayer devices, 14th International VLSI Multilevel Interconnect Conference (VMIC), Santa Clara (1997), June 10.

116. (*Invited)* Reliability of glass/oxide interfaces in multilayer devices, Intel Corporation, Santa Clara (1997), June 11.

117. (*Invited)* Compressive failure of rocks, 36th U.S. National Rock Mechanics Symposium, New York (1997), June 29.

118. (*Invited)* Measurement of the in situ fiber/matrix interface strength in composites, Joint SES, ASME, ASCE Meeting, Chicago (1997), July 2.

119. (*Invited)* Applications of laser-generated stress waves in biomedical engineering, University of Nijmegen, The Netherlands (1997), August 20.

120. (*Invited)* Characterizing basic interfacial adhesion in thin film structures with applications to thermal barrier coatings, 1st International Symposium on Applied Plasma Science (ISAPSí97), UCLA (1997), Sept. 23.

121. Strength-structure-chemistry relationship for thermal barrier coatings, ASME Winter Annual Meeting, Dallas (1997), Nov. 21.

122. (*Invited)* Interface failure mechanisms at elevated temperatures, MRS 1997 Fall Meeting, Boston (1997), Dec. 3.

123. (*Invited)* Application of laser spallation technique to multilayer Si devices and packages, Intel Corporation, Chandler, Arizona (1998), Jan 22.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 33 of 37

124. (*Invited)* Failure Mechanisms and Size Effects in Graphite/Epoxy Laminates under Off-axis Uniaxial and Biaxial Compression, presented at the 5th International Conference Composite Engineering, held in Las Vegas, July 1998.

125. (*Invited)* Laminate Mechanics, presented at the Mechanics of Composite Materials Program Review, Dayton, OH, October. 14-16,1998.

126. (*Invited)* Failure Mechanisms and Size Effects of Graphite/Epoxy Laminates under Off-Axis Uniaxial and Biaxial Compression, presented at the Symposium on *Life Prediction of Materials and Structures*, held at the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA, Nov. 15-20, 1998.

127. (*Invited)* Mechanism-Based Failure Laws for Graphite/Epoxy Laminates Under Compression, presented at the Symposium on *Micromechanics and Laminate Analyses*, held at the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA, Nov. 15-20, 1998.

128. (*Invited)* A Micromechanical Model for Predicting Crack Density in Cross-Ply Composites Under Compression, presented in the Symposium 2: *Micromechanical Failure in Composites*, at the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA, Nov. 15-20, 1998.

129. (*Invited)* Measurement of Interface Strength at Elevated and Cryogenic Temperatures, V. Gupta, R. Hernandez, presented at the International Mechanical Engineering Congress & Exposition-Winter Annual Meeting of the ASME, Anaheim, CA, Nov. 15-20, 1998 (Invited).

130. (*Invited)* Measurement of Interface Tensile Strength at Elevated Temperatures, Presented at the 3rd European Mechanics of Materials Conference: EUROMECH-MECAMAT, held Oxford-U.K., 23-25 Nov., 1998 (Invited).

131. Failure Mechanisms and Size Effects in Graphite/Epoxy Laminates Under Off-Axis Uniaxial and Biaxial Compression, presented at the Sixth Pan-American Congress of Applied Mechanics (PACAM IV), Rio De Janerio, Brazil, January 4-8, 1999.

132. (*Invited)* Measurement of the Interface Crack Velocity and the Brittle-to-Ductile Transition Temperature, presented at the Symposium on *Micromechanics and Micromechanisms of Deformation and Fracture*, held at the 1999 TMS Annual Meeting, San Diego, March 1-3, 1999.

133. (*Invited)* Surface Science-Based Adhesion Enhancement Using a Laser Spallation Technique, presented at the Symposium on Surface Engineering: Science and Technology I, held at the 1999 TMS Annual Meeting, San Diego, March 1-3, 1999.

134. Adhesion Enhancement and Avoidance of Cracking in Low-k Dielectric Films Via Control of Process Temperature and Film Thickness, Presented at the 1999 Spring Materials Research Society Meeting, San Francisco, April 5-9, 1999.

135. (*Invited)* Effect of Humidity and Temperature on the tensile Strength of Oxide/Polyimide Interfaces in Multilayer Devices and Packages, presented in Symposium on *Mechanics and Mechanisms of Failure of Interfaces in Engineering Materials*, held at the 1999 ASME Mechanics and Materials Conference, Blacksburg, Virginia, June 27-30, 1999.

136. Compressive Failure of Rocks by Shear faulting, presented in Symposium on *Shear Banding and Dynamic Failure*, held at the 1999 ASME Mechanics and Materials Conference, Blacksburg, Virginia, June 27-30, 1999.

137. Observations of Transonic Crack Velocity at an Anisotropic Metal/Ceramic Interface, in Symposium on *Penetration and Impact Problems*, held at the 1999 ASME Mechanics and Materials Conference, Blacksburg, Virginia, June 27-30, 1999.

138. (*Invited)* A Hydrophobic Self-Assembled Monolayer with Improved Adhesion to Aluminum for Deicing Application, in Symposium on *Fracture of Thin Films, Coatings and Multi-Layers*, held at the 1999 ASME Mechanics and Materials Conference, Blacksburg, Virginia, June 27-30, 1999.

139. (*Invited)* Mechanics of Multilayer Delamination, presented at the Intel Premises of Portland, Oregon, July, 1999.

140. KEYNOTE LECTURE: Effect of Humidity and Temperature on the Tensile Strength of Oxide/Polyimide Interfaces in Multilayer Devices and Packages, presented at the 1999 Integrity, Reliability, Failure Conference, Porto, Portugal, July 19-22, 1999.

141. (*Invited)* Mechanical Reliability of Packages, presented at Delco Electronics Systems, Kokkomo, IN, August, 1999.

142. (*Invited)* Tensile Strength of Nitride/Polyimide Interface and Its Degradation due to Moisture Segregation with Implications for Device Reliability, V. Gupta, R. Hernandez, and P. Charconnet, presented at the ISAPS'99: Advances in Applied Plasma Science, Osaka, September 20-24, 1999.

143. KEYNOTE LECTURE: Recent Advances in Laser Spalltion Technique for Measurement of Interfacial Strength in Thin Films and Multilayers, Opened the Session on *Thin Films*, at the XXXI Annual Boulder Damage Symposium, Boulder, Colorado, October 4-7, 1999.

144. (*Invited)* Mechanical Reliability of Multilayer Devices and Packages, presented at the Tropical Research Conference on Reliability, sponsored by SRC and SEMATECH, University of Austin, Texas, November 1-3, 1999.

145. (*invited)* Measurement of Interfacial Adhesion and its Degradation in Multi-layer Packages, Devices, and Blanket Films using the Laser Spallation Technique, at the 26th International Symposium for Testing and Failure Analysis, Bellevue, Washington, November, 12-16, 2000.

146. A Global/Local Model to Predict Failure of laminates under Biaxial Compression, Nov. 10, 2000 ASME Meeting, Orlando, Florida.

147. Probing Interfacial Chemistry Effects on Adhesion Using Laser Spallation Technique, Presented at the Army Research Laboratory, Maryland, January 17, 2001.

148. (Invited) In-situ Adhesion measurement in Electronic Packages, Presented at Sandia National Labs, NM, April 23, 2001.

149. (*Invited*) Physical, Chemical, and Mechanical Bonding Concepts/Mechanisms for Joining steel and Composite Sections. Presented at the ONR Hull Life Assurance Meeting, Naval Surface Warfare Center, Washington DC, April 24, 2001.

150. (*Invited)* Laser-induced Cavitation of Human Fat, presented at Lumenis Corporation, Pleasantan, CA, August 3, 2001.

151. (Invited) Effect of Y on the Tensile Strength of Alumina/ FeCrAl Alloy Film Interface. Presented at 2001 TMS Meeting, Indianapolis, November, 6-8, 2001.

152. (*Invited*) Physical, Chemical, and Mechanical Bonding Concepts/Mechanisms for Joining steel and Composite Sections. Presented at the ONR Hull Life Assurance Meeting, Naval Surface Warfare Center, Washington DC, April 2-3, 2002.

153. (*(invited)* Applications of Laser-Generated Stress Waves in Biological Sciences, Presented at the Biomedical Engineering Department, UCLA, October 4, 2002.

154. Glass-Modified Waves for Decohesion of Ultrathin Films, Presented at Intel Corporation, Chandler, Arizona, August 9, 2002.

155. (*invited)* V. Gupta and X. Wang, "Effect of moisture and silane chemistry on the steel/E-glass composite joint toughness and related reliability prediction. Presented in symposium: Failure Prediction in composite Materials and Composite Structures-III. ASME International Mechanical Engineering Congress and Exposition, November 17-22, 2002, New Orleans, Louisiana.

156. V. Gupta and V. Kireev, " Adhesion measurements of ultrathin multilayers using glass modified stress waves, in Symposium on Damage and Failure at coating interfaces, ASME International Mechanical Engineering Congress and Exposition, November 17-22, 2002, New Orleans, Louisiana.

157. V. Gupta, J. Tian, V. Kireev, "In-situ Interface adhesion measurements in electronic packages and Devices, in Symposium on Mechanical Issues in Microelectronics & Photonics: Structural Integrity of Microelectronic Packaging, ASME International Mechanical Engineering Congress and Exposition, November 17-22, 2002, New Orleans, Louisiana.

Boeing v. Regents Univ. Cal., IPR2024-00761
Exhibit 2010 / Page 36 of 37

158. (*invited*) V. Gupta, A. Jain, and A. Kobayashi, " Measurement of interface strength and residual stress management in zirconia coatings," at 4th International Symposium on Applied Plasma Science, September 1-5, Kyoto, Japan, 2003.

159. (*invited*) V. Gupta, "Measurement of intrinsic strength, and intrinsic and total fracture energies of metal/ceramic interfaces, steel/E-glass joints, and solder joints in the electronic packages. Invited Presentation in Surface Engineering-Fundamentals and Applications. Presented at the MRS Fall Meeting, 2004, in Boston, Massachusetts.

160. (*invited*) Gupta, V. Use of Laser ultrasound in Surgery, presented at the UCLA's Materials Science and Engineering Department's Board Meeting, March 12, 2004.

161. (*invited*) Gupta, V. Characterization of Lead Free Solder Joints using Stress Waves. Presented at Texas Instruments, Dallas, Texas, March, 17, 2004.

162. V. Gupta, K. Zeng, C. Hartfield, J. Tian, "Understanding effects of board chemistry and heat treatment on the tensile strength of BGA solder balls using laser spallation technique. 2004 ASME International Mechanical Engineering Congress and R& D Expo, November 13-19, Anahiem, California, 2004.

163. V. Gupta, Xu Chen, B. Kirsch, S. Tolbert, "Mechanical Properties of periodic surfactant-templated mesoporous silica/polymer composite films." 2004 ASME International Mechanical Engineering Congress and R& D Expo, November 13-19, Anahiem, California, 2004.

164. (*invited*) Using Nanoscale Architecture to Control Functionality in Mesostructured Materials Produced Through Inorganic/Surfactant Co-organization Sarah H. Tolbert, Bradley Kirsch, Xu Chen, Vijay Gupta, Will Molenkamp, Andrew Clark, Dong Sun, Andrew Riley and Scott Korlann. Presented at the MRS Fall Meeting, 2004, in Boston, Massachusetts.

165. Medicine Meets Virtual Reality (MMVR) 18 Conference. (Feb. 11, 2011). Presented poster on "Laser Induced Shockwaves on Flexible Polymers for Treatment of Bacterial Biofilms."

166. Zachary D Taylor; Artemio Navarro; Colin P Kealey; David Beenhouwer; David A Haake; Bacterial biofilm disruption using laser generated shockwaves. Engineering in Medicine and Biology Society (EMBC), Presented at the2010 Annual International Conference of the IEEE. 2010.

167. Yoo, L., Kim, H., Gupta, V., and Demer, J. L. Quasi-linear viscoelastic behavior of bovine extra-ocular muscle tissue. Poster presentation at ARVO, Fort Lauderdale, May 2009.

168. J. El-Awady, H. Kim, V. Gupta, N. Ghoniem and S. Sharafat, Toughness Measurements of Tungsten Coated Ferritic Steels Using Laser Induced Stress Pulses. 13th International Conference on Fusion Reactor Materials, December 10-14, 2008, Nice, France.

169. H. Kim, J. El-Awady, V. Gupta, N. Ghoniem and S. Sharafat, Interface Strength Measurement of Hot Isostatic Pressed Tungsten Coatings on F82H Substrates, . Presented at the 13th International Conference on Fusion Reactor Materials, December 10-14, 2008, Nice, France.