

Y. KING LIU, Ph.D., L.Ac.
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CURRICULUM VITAE

January, 2012

I. Personal Data

Born in Nanking, China. Naturalized U.S. Citizen.

II. University Education

B.S. (M.E.), Bradley University, Peoria, IL	1955
M.S. (M.E.), University of Wisconsin, Madison, WI	1959
Ph.D. (Mechanics), Wayne State Univ., Detroit, MI	1963

III. Licensure

Licensed Acupuncturist, Cert. No. AC 737, State of California	1978-Date
Executive Director of University of Northern California Community Clinic	

IV. Teaching and Research Experience

Milwaukee School of Engineering, Milwaukee, WI Assistant Professor, Mechanical Engineering	1956-1959
Wayne State University, Detroit, MI Instructor, Engineering Mechanics	1960-1963
University of Michigan, Ann Arbor, MI Lecturer, Engineering Mechanics Assistant Professor, Engineering Mechanics	1963-1964 1964-1968
Stanford University, Stanford, CA Visiting Assistant Professor, Aeronautics & Astronautics	1968-1969
Tulane University Schools of Medicine & Engineering, New Orleans, LA Associate Professor, Biomechanics Professor and Director, Biomechanics Laboratory	1969-1972 1972-1978
University of Iowa Colleges of Engineering & Medicine, Iowa City, IA Professor and Director, Center for Materials Research Co-Director, Rehabilitation Engineering Center	1978-1990 1979-1983
University of California, San Francisco, CA Visiting Professor, Orthopedic Surgery	1989-1990
Professor of Biomedical Engineering and Director, Biomechanics Laboratory, University of Iowa, Iowa City, IA	1978-1994
Founded & organized the University of Northern California, President & Chairman of the Board	1993-Date
California College of Podiatric Medicine Interim President & CEO	2000-2001

V. Industrial Experience

a. Employment

J.I. Case Company, Bettendorf, IA, Product Design Engineer	1955-1956
3DMetrics, Inc., 921 Transport Way, Petaluma, CA 94954, Chief Operating Officer	2003-2005
Osseon Therapeutics, Inc., 2330 Circadian Way, Santa Rosa, CA 95407 Chairman of the Board & Chief Science Officer	2006-2010

b. Consulting

Kurz and Root Company, Cedarburg, WI	1958-1961
Vincon Corporation, Detroit, MI	1962
Various attorneys	1978-Date
Biokinetics & Assoc., Ottawa, Ontario, Canada	1981
AcroMed Corp., Cleveland, OH	1985-1989

VI. Honors and Awards

Full Tuition Scholarship, Bradley University	1952-1955
Sigma Xi, Full Member	1961-Date
American Men and Women of Science	1962-Date
Special Research Fellow, National Institutes of Health	1968-1969
Research Career Development Award, NIH	1971-1976
Visiting Professor of Biomechanics, Karolinska Institute, Stockholm, Sweden	1972
Visiting Senior Fellow, Corpus Christi College, Oxford University, Oxford, England	1976
Phi Tau Phi Scholastic Honor Society of America	1978-Date
Chairman, Biomechanics Data Bank, Working Group 87, Committee on Hearing, Acoustics and Biomechanics (CHABA), National Research Council (NRC), National Academy of Sciences.	1981
Advisor-at-Large, CHABA, NRC	1981-Date
Marquis' Who's Who	1982-Date
Sigma Xi North Central Regional Lecturer	1984-1993

VII. Current and Past Research Grants and Contracts (* Indicates current project)

1. UI-00025-01, 02, 03, PHS Grant, "The Human Body under Time-Dependent Boundary Conditions," Principal Investigator, University of Michigan, Ann Arbor, MI, September 1966-August 1969.
2. 43-67-1136, PHS Contract with NINBS, Head Injury Project, Principal Project Analyst, University of Michigan, Ann Arbor, MI, September 1967-- August 1968.
3. EC-00402-01, PHS Grant, "The Human Body under Time-Dependent Boundary Conditions," Principal Investigator, Tulane University, New Orleans, LA, September 1969-August 1970.
4. FD-00055-08, PHS Grant, "Experimental Acceleration Injury," Co-Principal Investigator, Tulane University, New Orleans, LA, September 1969-September 1971.
5. F33615-72-C-1212, Research Contract with Aerospace Medical Research Lab., U.S. Air Force Systems Command, Wright-Patterson AFB, "A Continuum Model of Primate Body Response to Impact," Principal Investigator, June 1970-March 1973. \$72,964.

6. DABCOL-73-1068, Research Contract with U.S. Army Aeromedical Research Lab., Ft. Rucker, AL, "The Effect of Initial Configuration on Pilot Ejection," Principal Investigator, January-July 1973. \$9,968.
7. GK 32047, National Science Foundation Research Grant, "The Structural Biomechanics of the Human Spine," Principal Investigator, January 15, 1972- December 31, 1974. \$79,996.
8. NS 10517, National Institute of Neurological Diseases and Stroke, NIH Research Grant, "Acceleration Injuries to the Spinal Cord and Brainstem," Principal Investigator, May 1972-December 1974. \$63,299.
9. DAMD 17-74-G-9384, Research Contract with U.S. Army Aeromedical Research Lab., Ft. Rucker, AL, "The *In Vivo* Dynamic Materials Properties of the Spinal Cord-A Feasibility Study," Principal Investigator, September 1973-August 1974. \$4,991.
10. GM-40723, NIH Research Grant, "The Biomechanics of the Musculoskeletal System," Research Career Development Awardee, May 1971-April 1976. \$119,500 for 5 years.
11. M-19107, National Institute of General Medical Sciences, NIH Research Grant, "The Traumatology of the Head and Spine," Principal Investigator, June 1972- January 1976. \$118,555.
12. Edward G. Schlieder Educational Foundation, Research Grant, "Localization of Acupuncture Points in Experimental Animals," Principal Investigator, July 1, 1974-June 30, 1976. \$36,983.
13. NS-10517, National Institute of Neurological Diseases and Stroke, NIH Research Grant, "Acceleration Injuries to the Spinal Cord and Brainstem," Principal Investigator, May 1975-September 1978. \$115,509.
14. DABT-01-75-C-0237, Research Contract with U.S. Army Aeromedical Research Lab., Ft. Rucker, AL, "The *In Vivo* Dynamic Material Properties of the Spinal Cord," Principal Investigator, April 1975-March 1976. \$16,363.
15. GM-19107-06, Research Grant with National Institute of General Medical Sciences, NIH, "The Traumatology of the Head and Spine," Principal Investigator, February 1, 1976-January 31, 1979. \$181,542.
16. F33615-76-C-0526, Research Contract with Aerospace Medical Research Lab., U.S. Air Force Systems Command, Wright-Patterson AFB, "Investigation of Cervical Spine Dynamics," Principal Investigator, September 1976 - December 1979. \$48,552.
17. DABT-01-77-C-0015, Research Contract with U.S. Army Aeromedical Research Lab., Ft. Rucker, AL, "The *In Vivo* Dynamic Material Properties of the Canine Spinal Cord," Principal Investigator, November 1976-October 1977. \$24,239.
18. DABT-01-C-0086, Research Contract with U.S. Army Aeromedical Research Lab., Ft. Rucker, AL, "The *In Vivo* Dynamic Material Properties of the Canine Spinal Cord," Principal Investigator, February 1978-December 1979. \$27,632.
19. GM-26608-01, Research Grant with National Institute of General Medical Sciences, NIH, "The Traumatology of the Head and Spine," Principal Investigator, April 1, 1979-March 31, 1981. \$169,598.

20. 13-627, Grant from Rehabilitation Services Administration, Rehabilitation Engineering Center Grant, Co-Director, September 1979-August, 1980. \$54,700 out of \$400,000 Center budget earmarked for biomechanics of the spine.
21. Grant from the American Osteopathic Academy of Sclerotherapy, "A Biomechanical Study of Connective Tissue Reaction to Irritating Substances," Principal Investigator, December 1978-July 1980. \$6,486.
22. 23-P-59176, Grant from National Institute for Handicapped Research, Department of Education, Rehabilitation Engineering Center Grant, Co-Director, September 1980 -August 1981. \$90,000 out of \$450,000 budget earmarked for engineering analysis of the spine.
23. DAMD-17-81-C-1186, Contract from the U.S. Army Aeromedical Research Lab., DOD, Ft. Rucker, AL, "A Finite-Element Model Analysis of the Protection Provided by Army Aviator Helmets to the Human Head and Neck," Principal Investigator, September 28, 1981-September 27, 1982. \$39,821.
24. 23-P-59176, Grant From National Institute for Handicapped Research, Department of Education, Rehabilitation Engineering Center Grant, Co-Director, September 1981-August 1982. \$109,825 out of \$434,200 center budget earmarked for basic studies of low back pain.
25. 23-P-59176, Grant from National Institute for Handicapped Research, Department of Education, Rehabilitation Engineering Center Grant, Co-Director, September 1982-August 1983. \$111,498 out of \$339,284 center budget earmarked for basic studies of low back pain.
26. GM-266908-03, Grant from National Institute of General Medical Sciences, NIH, "Traumatology of the Head and Spine," Principal Investigator, March, 1982-May 1985. \$262,750.
27. Research Contract from AcroMed Corporation, Cleveland, Ohio, "A Biomechanical Assessment of Spinal Instrumentation," Principal Investigator, January 1985- December 1986. \$70,000.
28. Research Contract from AcroMed Corp., Cleveland, OH, "Design and Development of an Optimal Pedicle Screw," Principle Investigator, Nov. 15, 1986-Nov. 15, 1987. \$62,758.00.
29. RR-03498, Grant from National Institutes of Health, "Real-time Digital Computer System," Program Director, April 20, 1987-April 19, 1988. \$144,000.
30. Grant from the American Osteopathic Academy of Sclerotherapy, "A Biomechanical and Morphological Study of Ligamentous Reaction to Two Sclerosing Solutions," Principal Investigator, Jan. 1988-Jan. 1989. \$10,000.
31. Research Contract from AcroMed. Corp. OH "Design and Development of an Optimal Pedicle Screw-Phase II," Principal Investigator, March 1, 1988-Feb. 28, 1989. \$72,451.
32. Research Grant from the Helen Streiffer Fund, University of Iowa Foundation "Failure Analysis of the Human Cervical Spine," Principal Investigator, March, 1989-July, 1994. \$420,000.

33. R49 CCR 903640-01, Injury Prevention Research Center, Centers for Disease Control (James Merchant, Program Director) Research Project entitled "Biomechanics of Tractor Rollover Injuries," Principal Investigator, Oct. 1, 1990 -Sept. 30, 1996. \$260,000.

VIII. Training Grants and Contracts

01007-03-04, U.S. Public Health Service Training Grant, "Multiphasic Research Training in Injury Control," Coordinator, July 1, 1969-January 31, 1972. \$350,000.

IX. Patents Issued and Pending

U.S. Patent 7,811,29, Closed Vertebroplasty Bone Cement Injection System issued on 2010-10-12

U.S. Patent 7,842,041, Steerable Vertebroplasty System issued on 2010-11-30

16 U. S. Patents pending

X. Other Relevant Research Activity

a. Grants and Contracts Review

1. Member, Injury Grant Review Committee, Center for Disease Control, PHS, Atlanta, Georgia, Aug., 1991-May 31, 1994.
2. Clinical Science B Study Section, NIH, 1979-1983.
3. Member, Safety & Occupational Health Study Section, National Institute for Occupational Safety and Health, (NIOSH), Public Health Service Term: July 1970 - July 1972.
4. National Institute for Handicapped Research, Dept. of Education, 1982.
5. National Science Foundation
6. National Institutes of Health
7. Veterans Administration
8. Ad Hoc Reviewer on Alternative Medicine, NIH, 1994 - date

b. Consultancy on Biomechanics to

1. U.S. Army Aeromedical Research Lab., Ft. Rucker, AL
2. V.A. Hospital, New Orleans, LA
3. Dept. of Neurological Surgery, University of Chicago, IL
4. Dept. of Neurosurgery, University of Texas Health Sciences Center, Houston, TX
5. Palmer College of Chiropractic, Davenport, IA.
6. Dept. of Surgery, Uniformed Services Univ. for Health Sciences, Bethesda, MD
7. U.S. Consumer Product Safety Commission
8. Dept. of Veterans Affairs, Livermore, CA

c. National and International Committees

1. Chairman, Subcommittee on Animal Research, Head and Neck Injury Research Workshop, Dept. of Transportation, 1978.
2. Chairman, Working Group on Biomechanics Data Bank, Committee on Hearing, Bioacoustics and Biomechanics (CHABA), National Research Council, National Academy of Sciences, 1977-1979.

3. Advisor-at-Large, Committee on Hearing, Bioacoustics and Biomechanics (CHABA), National Research Council, National Academy of Sciences, 1979-Date.
4. Member, Executive Committee & Central U.S. Representative, International Society for the Study of the Lumbar Spine, 1983-1986.
5. Honorary Editor, (Chinese) Journal of Biomechanics, Shanghai, China, 1986-date.
6. Member, Blue Ribbon Panel to Review Brain Injury Risk of Amusement Park Rides, Brain Injury Association of America. 2002 – 2003.

XI. Publications

a. Books and Monographs

1. Liu, Y.K. and Wickstrom, J.K., "Estimation of Inertial Property Distribution of the Human Torso from Segmented Cadaveric Data," *Perspectives in Biomedical Engineering* (R.M. Kenedi, Ed.), University Park Press, Baltimore, MD, 1972, pp. 203-213.
2. Liu, Y.K., "Mechanics, Evaluation, Prognosis and Management of Head Injury," Invited Chapter in *Perspectives in Biomechanics* (Reul, Ghista, and Rau, Eds.), Vol. 1, Part B., Harwood-Academic Press, 1980, Chapter 11, pp. 573-599.
3. Hosey, R. and Liu, Y.K., "A Homeomorphic Finite Element Model of the Human Head and Neck," Chapter 18, *Finite Element Methods in Biomechanics* (Gallagher, Simon, Johnson, and Gross, Eds.) John Wiley & Son, 1982, pp. 379-401.
4. Liu, Y.K., "Dynamic Spinal Injury: Mechanisms, Modeling, Systems for Minimizing Trauma," Chap. 3, *Human Body Dynamics*, (D.N. Ghista, Ed.), Oxford University Press, 1982, pp. 127-163.
5. Goel, V.K., Liu, Y.K. and Clark, C.R., "Quantitative Geometry of the Muscular Origins and Insertions of the Human Head and Neck," *Mechanisms of Head and Spine Trauma*, (Sances, Thomas, Larson, Ewing and Unterharnscheidt, Eds.), Chap. 13, Aloray Publ., Goshen, N.Y., 1986, pp. 397-415.
6. Liu, Y.K., Clark, C.R. and Krieger, K.W., "Quantitative Geometry of Young Human Male Cervical Vertebrae," *Mechanisms of Head and Spine Trauma*, (Sances, Thomas, Larson, Ewing and Unterharnscheidt, Eds.), Chap. 14, Aloray Publ., Goshen, N.Y., 1986, pp. 417-431.
7. Liu, Y.K. and Goel, V.K., "Mathematical Models of the Spine and Their Experimental Validation," *The Lumbar Spine and Back Pain*, 3rd Ed., (Jayson, Ed.) Chapter 8, Churchill Livingstone Publishing Co., London, England, U.K. 1987, pp. 177-190.
8. Goel, V. K., Weinstein, J., Liu, Y. K., Kim, Y.E., and Okuma, T., "Biomechanics of Spine Stabilization," Chap. 4, *Biomechanics, The Lumbar Spine*, W. B. Saunders Co., Philadelphia, PA, 1990, pp. 195-212.
9. Liu, Y.K. and Dai, Q.G., "Stiffness Distribution of a Beam-Column As a Model to Assess Cervical Spine Vulnerability" *Frontiers in Head & Neck Trauma: Clinical & Biomechanical*, Yoganandan, Pintar, Larson & Sances, Eds. IOS Press, Harvard, MA, 1998, pp. 425-439
10. Voo, Liming and Liu, Y.K., "Segmented Column Model to Predict Human Cervical Spine Buckling" *Frontiers in Head & Neck Trauma: Clinical & Biomechanical*, Yoganandan, Pintar, Larson & Sances, Eds. IOS Press, Harvard, MA, 1998, pp. 440-453

11. Liu, Y.K., "Biomechanics of 'Low-Velocity Impact' Head Injury", *The Evaluation and Treatment of Mild Traumatic Brain Injury*, (Varney, Roberts, Eds.) Chap. 4, Lawrence Erlbaum Associates, Inc., Mahwah, NJ, 1999, pp. 49-62.
- b. *Papers already published and accepted for publication in technical journals or proceedings with rigorous review procedure.*
1. Denman, H.H. and Liu, Y.K., "A Graphical Procedure for the Approximation of the Period of Non-Linear Free Oscillations," *Journal of Applied Mechanics*, Vol. 31, No. 4, December, 1964, pp. 718-719.
 2. Denman, H.H. and Liu, Y.K., "Application of Ultraspherical Polynomials to Non-Linear Oscillations, II-Free Oscillations," *Quarterly Applied Mathematics*, Vol. 22, No. 4, January 1965, pp. 273-292.
 3. Denman, H.H. and Liu, Y.K., "Application of Ultraspherical Polynomials to Non-Linear Systems with Step-Function Excitation," *Journal Industrial Mathematics Society*, Vol. 15, Part 1, 1965, pp. 19-35.
 4. Liu, Y.K., "Application of Ultraspherical Polynomials to Non-Linear Forced Oscillations," *Journal of Applied Mechanics*, Vol. 34, Part 1, March 1967, pp. 223-226.
 5. Liu, Y.K., "Towards a Stress Criterion of Injury-An Example in Caudocephalad Acceleration," *Journal of Biomechanics*, Vol. 2, Part 2, May 1969, pp. 145-149.
 6. Engin, A.E. and Liu, Y.K., "Axisymmetric Response of a Fluid-Filled Spherical Shell in Free Vibrations," *Journal of Biomechanics*, Vol. 3, Part 1, January 1970, pp. 11-22.
 7. Orne, D. and Liu, Y.K., "A Mathematical Model of Spinal Response to Impact," *Journal of Biomechanics*, Vol. 41, Part 1, January 1971, pp. 49-71. (ASME Preprint No. 70-BHF-1)
 8. Liu, Y.K., Laborde, J.M. and Van Buskirk, W.C., "Inertial Properties of a Segmented Cadaver Trunk: Their Implications in Acceleration Injuries," *Aerospace Medicine*, Vol. 42, Part 6, 1971, pp. 650-657.
 9. Liu, Y.K. and von Rosenberg, D.U., "A One-Dimensional Continuum Model of Direct Closed Head Impact," *Proceedings of the Conference on International Research Committee on Biokinetics of Impacts*, Amsterdam, Holland, June 1973, pp. 285-301.
 10. Chan, H.S. and Liu, Y.K., "The Asymmetric Response of a Fluid-Filled Spherical Shell: A Mathematical Simulation of a Glancing Blow to the Head," *Journal of Biomechanics*, Vol. 7, Part 1, January 1974, pp. 43-59.
 11. Liu, Y.K. and von Rosenberg, D.U., "The Effects of Caudocephalad (+G_Z) Acceleration on the Initially Curved Spine," *Computers in Biology and Medicine*, Vol. 4, Part 1, June 1974, pp. 85-106.
 12. Liu, Y.K., Ray, G. and Hirsch, C., "The Resistance of the Lumbar Spine to Direct Shear," *The Orthopedic Clinics of North America*, Vol. 6, Part 1, January 1975, pp. 33-48.
 13. Liu, Y.K. and Chandran, K.B., "The Exact Solution to the Translational Acceleration of Inviscid Compressible Fluid in Rigid Spherical Shells," *Mathematical Biosciences*, Vol. 24, 1/2, June 1975, pp. 1-16.
 14. Liu, Y.K. and Chandran, K.B., "Package Cushioning for the Human Head I. Analytical Considerations," *Journal of Applied Mechanics*, Vol. 42, 1975, pp. 541-546. (ASME Preprint No. WA/Bio-10).
 15. Liu, Y.K., Chandran, K.B. and von Rosenberg, D.U., "Angular Acceleration of Viscoelastic (Kelvin) Material in a Rigid Spherical Shell -A Rotational Head Injury Model," *Journal of Biomechanics*, Vol. 8, No. 5, September 1975, pp. 285-292.

16. Liu, Y.K., Varela, M. and Oswald, R., "The Correspondence between Some Motor Points and Acupuncture Loci," *American Journal of Chinese Medicine*, Vol. 3, Part 4, October 1975, pp. 347-358.
17. Chandran, K.B., Liu, Y.K. and von Rosenberg, D.U., "The Exact Solution of the Translational Acceleration of a Low Modulus Elastic Medium in Rigid Spherical Shells-Implications for Head Injury Models," *Journal of Applied Mechanics*, Vol 42, Part 4, December 1976, pp. 759-762.
18. Liu, Y.K., Nikravesh, P. and Beck, C., "Optimal Protection in Direct-Closed Head Impact," Institute of Electrical and Electronics Engineers, Inc., *Transactions, Biomedical Engineering*, Vol. BME-23, No. 1, January 1976, pp. 29-35.
19. Cramer, H., Liu, Y.K. and von Rosenberg, D.U., "A Distributed Parameter Model of the Inertially-Loaded Human Spine," *Journal of Biomechanics*, Vol. 9, Part 3, March 1976, pp. 115-130.
20. Chandran, K.B., Liu, Y.K. and von Rosenberg, D.U., "Stress Wave Propagation in Maxwell Fluid Contained in Rigid Spherical Shells," *Journal of Sound and Vibration*, Vol. 47, Part 1, July 1976, pp. 107-114.
21. Liu, Y.K. and Chandran, K.B., "An Experimental Study of Package Cushioning for the Human Head," *Journal of Applied Mechanics*, Vol. 43, Part 3, September 1976, pp. 469-474.
22. Van Buskirk, W.C., Watts, R.G. and Liu, Y.K., "The Fluid Mechanics of the Semi-Circular Canals," *Journal of Fluid Mechanics*, Vol. 78, Part 2, December 1976, pp. 87-99.
23. Lin, H.S., Liu, Y.K. and Adams, K.H., "Mechanical Response of Lumbar Intervertebral Joint under Physiological (Complex) Loading," *Journal of Bone and Joint Surgery*, Vol. 60:A1, January 1978, pp. 41-55.
24. Liu, Y.K. and Ray, G., "Systems Identification Scheme for the Estimation of the Linear Viscoelastic Properties of the Intervertebral Disc," *Aviation, Space and Environmental Medicine*, Vol. 49, Part 1, January 1978, pp. 175-177.
25. Liu, Y.K., "Biomechanics of Closed-Head Impact," *Journal of Engineering Mechanics Division*, American Society of Civil Engineers, Special Volume on *Biomechanics*, (T.K. Hung, Ed.), Vol. 104, No. EM1, Proc. Paper 13540, February 1978, pp. 131-152.
26. Lin, H.S., Liu, Y.K., Ray, G. and Nikravesh, P., "Systems Identification for Materials Properties of the Intervertebral Joint," *Journal of Biomechanics*, Vol. 11, 1978, pp. 1-14.
27. Domer, F., Liu, Y.K., Chandran, K.B. and Krieger, K.W., "The Effect of Hyperextension-Hyperflexion (Whiplash) on the Function of the Blood-Brain Barrier of Rhesus Monkeys," *Experimental Neurology*, Vol. 63, 1979, pp. 304-310.
28. Liu, Y.K., Tipton, C.M., Matthes, R.D., Bedford, T.G., Maynard, J.A. and Walmer, H.C. "An *In Situ* Study of the influence of a Sclerosing Solution in Rabbit Medial Collateral Ligaments and Its Junction Strength," *Connective Tissue Research*, Vol. 11, 2/3, 1983, pp. 95-102.
29. Liu, Y.K., "Mechanical Analysis of Racket and Ball during Impact," *Medicine and Science in Sports and Exercise*, 15/5, 1983, pp. 388-392.
30. Liu, Y.K., Njus, G., Buckwalter, J. and Wakano, K., "Fatigue Response of Lumbar Intervertebral Joints under Axial Cyclic Loading," *Spine*, 8, 1983, pp. 857-865.
31. Edisen, A.E.U., Liu, Y.K., Palacios, L.C., Garcia, M.C., Mundy, J.E. and Thompson, J.W., "Regional and Lateral Specificity of Acupuncture-Induced Blood-Factor Effects Inhibiting Hindlimb Flexor Reflexes in the Rabbit," *Physiol. Chem. & Physics & Med. NMR*, 15, 1983, pp. 189-199.

32. Liu, Y.K., Chandran, K.B., Heath, R.G. and Unterharnscheidt, F., "Subcortical EEG Changes in Rhesus Monkeys Following Experimental Hyperextension-Hyperflexion (Whiplash)," *Spine* 9, 1983, pp. 329-338.
33. Njus, G.O., Liu, Y.K., and Nye, T.A., "The Inertial and Geometrical Properties of Helmets," *Medicine and Science in Sports and Exercise*, 16/5, 1984, pp. 498-505.
34. Goel, V.K., Fromknecht, S., Nishiyama, K., Weinstein, J. and Liu, Y.K., "The Role of Lumbar Spinal Elements in Flexion," *Spine*, 10, 1985, pp. 516-523.
35. Liu, Y.K., Goel, V.K., DeJong, A., Njus, G., Nishiyama, K. and Buckwalter, J., "Torsional Fatigue of Lumbar Intervertebral Joints," *Spine*, 10, 1985, pp. 894-900.
36. Park, H.C., Liu, Y.K. and Lakes, R.S., "The Material Properties of Bone-Particle Impregnated PMMA," *Journal of Biomechanical Engineering* 108, 2, 1986, pp. 141-148.
37. Lehmann, T.R., Russell, D.W., Spratt, K.F., Colby, H., Liu, Y.K., Fairchild, M.L., Christensen, S. "Efficacy of Electroacupuncture and TENS in the Rehabilitation of Chronic Low Back Pain Patients," *Pain*, 26, 1986, pp. 277-290.
38. Goel, V.K., Nishiyama, K., Weinstein, J.N. and Liu, Y.K. "Mechanical Properties of Lumbar Spinal Motion Segments as Affected by Partial Disc Removal," *Spine*, 11, 1986, pp. 1008-1012.
39. Liu, Y.K., Park, J.B., Njus, G.O. and Stienstra, D., "Bone Particle Impregnated Bone Cement, An *In Vitro* Study," *J. of Biomedical Materials Research*, 12, 1987, pp. 247-261.
40. Ueno, K. and Liu, Y.K., "A Three Dimensional Nonlinear Finite Element Model of the Lumbar Intervertebral Joint in Torsion," *Journal of Biomechanical Engineering, Trans. ASME*, 109, 1987, pp. 200-209.
41. Goel, V.K., Clark, C.R., Galles, K., and Liu, Y.K., "Moment-Rotation Relationships of the Ligamentous Occipito-Atlanto-Axial Complex," *J. of Biomechanics*, 21, Part 8, 1988, pp. 673-680.
42. Goel, V.K., Voo, L-M., Weinstein, J.N., Liu, Y.K., Okuma, T. and Njus, G.O., "Response of the Ligamentous Lumbar Spine to Cyclic Bending Loads," *Spine*, 13, 1988, pp. 294-300.
43. Liu, Y.K. and Dai, Q.G., "The Second Stiffest Axis of a Beam-Column: Implications for Cervical Spine Trauma," *J. of Biomechanical Engineering*, 111, 1989, pp. 122-127.
44. Liu, Y.K., Njus, G.O., Bahr, P.A. and Geng, P., "Fatigue Life Improvement of Nitrogen-Ion Implanted Pedicle Screws," *Spine*, 15, 1990, pp. 311-317.
45. Dai, K.R., Liu, Y.K., Park, J.B., Clark, C.R., Nishiyama, K., Zheng, Z.K., "Bone-Particle-Impregnated Bone Cement: An *In Vivo* Weight Bearing Study," *J. of Biomedical Materials Research*, Volume 25, Number 2, Feb. 1991, pp. 141-150.
46. Dai, Q.G. and Liu, Y.K., "Failure Analysis of a Beam-Column Under Oblique-Eccentric Loading; Potential Failure Surfaces for Cervical Spine Trauma," *Journal of Biomech. Engineering*, 114, 1992, pp. 119-
47. Gordon, L. Garrison, J.L., Cheng, J.C., Liu, Y.K., Nathan, R.P., and Levinsohn, D.G. "Biomechanical Analysis of a Step-Cut Technique for Flexor Tendon Repair," *J. Hand. Surg. [BR]*, 17 (3), 1992, pp. 282-285.
48. Henrich, D.E., Cram, A.E., Park, J.B., Liu, Y.K., and Reddi, A.E., "Inorganic Bone & Demineralized Bone Matrix Impregnated Bone Cement: A Preliminary *In Vivo* Study," *J. of Biomedical Materials Research*, Vol. 27, 1993, pp. 277-280
49. Pintar, F.A., Yoganandan, N., Goel, V.K., Liu, Y.K. and Sances, A., "Tractor Induced Wheel Runover Injuries," *SAE International Conference*, Paper #941728, Milwaukee, WI, Sept. 12-14, 1994

50. Voo, L.M., Pintar, F.A., Yoganandan, N. and Liu, Y.K., "Static and Dynamic Bending Responses of the Human Cervical Spine", *J. of Biomechanical Engineering*, Vol. 120, 1998, pp. 693-696.
 51. Liu, Y. K. "Brain Injury Following Whiplash: A Selective Expository Review of the Tulane Primate Data and Its Potential Clinical Applicability, Part I. Effect of Hyperextension-Hyperflexion (Whiplash) on the Function of the Blood-Brain Barrier of Rhesus Monkeys, Part II. Subcortical EEG Changes in Rhesus Monkeys Following Experimental Hyperextension-Hyperflexion (Whiplash), Part III. Behavioral Changes in Rhesus Monkeys Following Experimental Whiplash" *J. of Whiplash & Related Disorders*, Vol. 2, Number 2, 2003, pp. 49-89.
 52. Yoganandan, Zhang, J, Pintar, F. A, and Liu, Y. K. "Lightweight low-profile nine-accelerometer package to obtain head angular accelerations in short-duration impacts" *Journal of Biomechanics*, 39 (2006) 1347-1354
- c. *Invited papers published in Proceedings, Congresses, and Symposia*
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XII. Administrative Experience

- I. *At the University of Northern California (May, 1993 - date)*
 1. Founder, President and Chairman of the Board. Organized the University of Northern California and obtained all approvals from the State of California & U.S. Department of Justice, Immigration & Naturalization Service.
 2. Dean, College of Engineering & Chairman, Department of Biomedical Engineering.
- II. *At Osseon Therapeutics, Inc. (April 2006 - date)*
 1. Chairman of the Board of Directors
 2. Chief Science Officer
- II. *At Sapheon, Inc. (October 2008 - date)*
 1. Member of the Board of Directors
- II. *At Tisugen Therapeutics, Inc. (April 2006 - date)*
 1. Chairman of the Board of the Directors
 2. Chief Science Officer
- II. *At GridLock Solar Security, Inc., (May 2009 - date)*
 1. Member of Board of Directors
- III. *At California College of Podiatric Medicine (January 2000-March 2001)*
Interim President and CEO
- IV. *At the University of Iowa (1978-1993)*
 1. Member, Administrative Council of the College of Engineering (1978-1990). The Council consisted of the four Department Chairmen (Biomedical, Mechanical, Electrical and Industrial), Institute Directors (Institute for Hydraulic Research and Center for Materials Research) and the Dean and Associate Dean of the College.
 2. Professor and Director, Center for Materials Research (1978-1990). The Center concentrated on biomedical engineering research with a Biomechanics Laboratory, Hemodynamics Laboratory, Biomedical Image Analysis and Processing Laboratory and Applied Mechanics Laboratory. It consisted of six affiliated faculty members from the Biomedical Engineering Department, one Administrative Assistant, one Research Engineer, as well as fourteen graduate research assistants and numerous undergraduate student aides. The research budget for the Center averaged in excess of \$400,000 per year.

3. Engineering Co-Director, Rehabilitation Engineering Center, University of Iowa Hospitals and Clinics and the College of Engineering (1979-1983). This Center concentrated on the use of engineering technology in the rehabilitation of chronic low-back pain patients. The following departments participated in the research of the Center: Orthopedic Surgery, Materials Engineering and Physical Therapy. The Center budget was \$500,000 per year. The share for the College of Engineering is approximately one-third of the budget.
4. Member, Human Subjects Research Review Committee, 1979-1981.
5. University Central Electron Microscopy Facility Advisory Committee, 1981-1984.
6. Member, Center for Sports Medicine, 1982-1993

V. At Tulane University (1969-1978)

1. Professor and Director, Biomechanics Laboratory, Department of Orthopedic Surgery, Tulane University School of Medicine. This Laboratory was the research arm of the Department. Its main thrust was research in orthopedic biomechanics in general and head and spine injuries in particular. When it started in 1969, Dr. Liu was the only staff member and, by 1978, there were three faculty members, two post-doctoral fellows, four graduate research assistants and two research technicians. The annual research budget was some \$250,000. For 90% of its research grants and contracts, Dr. Liu was Principal Investigator.
2. Coordinator, Public Health Service Training Grant on "Multiphasic Research Training in Injury Control," July 1, 1969-January 31, 1972. This training grant involved the following departments of Tulane University: Orthopedic Surgery, Anatomy, Neurosurgery and Mechanical Engineering. There were ten faculty trainers and fifteen graduate student trainees.

V. At the University of Michigan (1963-1969)

1. Course Director for Dynamics, 1964-1968.
2. Graduate Admission and Financial Aid Committee, 1964-1967.