

## **Rajeev Kelkar, Ph.D.**

### **Professional Profile**

Rajeev Kelkar specializes in the biomechanics of human injury, with emphasis on soft and hard tissue tolerance to both impact and repetitive loading. He has extensive experience in the analysis of injuries associated with automotive and workplace accidents, falls, and consumer products. Dr. Kelkar's research has included analytical and experimental evaluation of upper extremity injuries, experimental and computer simulations of surgical reconstruction of the rotator cuff, and mathematical modeling of automotive and recreational accidents. He has also focused on child-safety issues, including car-seat and booster-seat performance, as well as the human body's response and tolerance to heat. Dr. Kelkar also performs computer-based accident reconstruction and simulation, including time-motion analyses, three-dimensional data acquisition using photogrammetry, and vehicle occupant dynamics.

Before joining InSciTech, Dr. Kelkar worked at Exponent Failure Analysis Associates, Inc., Menlo Park, CA, and at ProAnalysis, Inc., Mountain View, CA

### **Credentials and Professional Affiliations**

Ph.D. (Mechanical Engineering), Columbia University, 1996

M. Phil. (Mechanical Engineering), Columbia University, 1993

M.S. (Mechanical Engineering), Columbia University, 1990

B.S. (Mechanical Engineering), Worcester Polytechnic Institute (with High Distinction),  
1988

Tau Beta Pi; Pi Tau Sigma; Sigma Xi

Charles S. Neer Award for Outstanding Basic Science Research, presented at the  
Annual Meeting of the American Shoulder and Elbow Surgeons, 1996

Associate Member, American Society of Mechanical Engineers

Member, Society of Automotive Engineers

Reviewer, ASME Journal of Biomechanical Engineering

Reviewer, Journal of Biomechanics

Reviewer, Journal of Shoulder and Elbow Surgery

Reviewer, American Journal of Sports Medicine

Reviewer, NIH Special Emphasis Panel for SBIR/STTR Orthopedic and Rehabilitation  
Grant Applications

## **Publications**

"Sidewalk potential trip points: a method for characterizing walkways." *International Journal of Industrial Ergonomics*, 36 (12), 1031-1035, 2006 (with T.J. Ayres).

"Intersection right-of-way: what is an immediate hazard?" Proceedings of the 49<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, 2005 (with K. B. Kennett and T. Ayres).

"Sidewalk potential tripping points," CybErg 2005: Fourth International Cyberspace Conference (with T. Ayres).

"Driver Adjustment to Solar Glare," Proceedings of the Human Factors and Ergonomic Society 48<sup>th</sup> Annual Meeting, pp. 2295–2299, 2004 (with T. J. Ayres and W. H. Woodruff).

"Occupant injuries and crash characteristics for car and light truck rollovers," SAE/NHTSA–sponsored 2003 Government/Industry Meeting, May 2003 (with J. Padmanabhan).

"Modeling of Falls and Jumps," Proceedings of the MADYMO Users' Meeting of the Americas, Detroit, MI, 2001 (with K. B. Kennett and W. Lai).

"Glenohumeral Mechanics: A Study of Articular Geometry, Contact, and Kinematics," *Journal of Shoulder and Elbow Surgery*, Vol. 10, No. 1, pp. 73–84, 2001 (with V. M. Wang, et al).

"Children's Use of Various Internal Automobile Trunk Release Mechanisms Intended to Reduce Child Entrapment Risk," Proceedings of the Human Factors and Ergonomics Society 43<sup>rd</sup> Annual Meeting, pp. 912–915, 1999 (with C. T. Wood and S. R. Arndt).

"Contact Creep of Biphasic Cartilage Layers," *Journal of Applied Mechanics*, Vol. 66, pp. 137–145, 1999 (with G. A. Ateshian).

"Repetitive Stress Injuries: Incidence Trends, The Regulatory Landscape, and Verdicts," Proceedings, Silicon Valley Ergonomics Conference and Exposition, ErgoCon'99, San Jose, CA, June 1–4, 1999 (with R. L. McCarthy, et al).

"Active and Passive Restraints Against Superior Humeral Translation: The Biceps Tendon, and the Coracoacromial Arch," *Journal of Shoulder and Elbow Surgery*, Vol. 6, p. 172, 1997 (with E.L. Flatow, et al.).

### **Publications (*continued*)**

“Alcohol, Boating and the Interpretation of BAC,” Proceedings, 14th International Conference on Alcohol, Drugs, and Traffic Safety, Annecy, France, pp. 533–538, 1997 (with A.C. Donelson and E. Lau).

“Glenohumeral Stability: Biomechanical Properties of Passive and Active Stabilizers,” *Clinical Orthopaedics and Related Research*, Vol. 330, pp. 13–30, 1996 (with L.U. Bigliani, et al.).

“The Coracoacromial Ligament Passively Restrains Anterosuperior Humeral Subluxation in the Rotator Cuff Deficient Shoulder,” *Transactions of the Orthopaedic Research Society*, Vol. 21, p. 229, 1996 (with E.L. Flatow, et al.).

“Normal and Abnormal Mechanics of the Shoulder: Studies of Articular Geometry, Contact and Kinematics,” Ph.D. dissertation, Columbia University, 1996.

“Shoulder Biomechanics and Repetitive Motion,” *Repetitive Motion Disorders of the Upper Extremity*, pp. 144–155, S.L. Gordon (ed.), American Academy of Orthopaedic Surgeons Publishing, Rosemont, IL, 1995 (with R.G. Pollock, et al.).

“The Characteristics of Static Stabilizer Elements within the Glenohumeral Joint,” Proceedings, First Academic Congress of the Asian Shoulder Association, November 1995, pp. 40–51 (with J.B. Ticker, et al.).

“Three-Dimensional Topography of the Acromion: A Quantitative Study and Simulation of Surgical Alterations,” American Society of Mechanical Engineers, Advances in Bioengineering, Bioengineering Division (BED) 31, pp. 149–150, November 1995 (with W.W. Colman, et al.).

“Determination of *In Situ* Contact Areas in Diarthrodial Joints by MRI,” American Society of Mechanical Engineers, Advances in Bioengineering, BED 31, pp. 225–226, November 1995 (with G.A. Ateshian, et al.).

“The Tensile Properties of Glenohumeral Cartilage Surfaces,” American Society of Mechanical Engineers, Advances in Bioengineering, BED 31, pp. 1–2, Nov. 1995 (with S. Ebara, et al.).

**Publications (continued)**

“Contact Creep Response Between a Rigid Impermeable Cylinder and a Biphasic Cartilage Layer Using Integral Transforms,” American Society of Mechanical Engineers, Bioengineering Conference, BED 29, pp. 313–314, June 1995 (with G.A. Ateshian).

“A New Experimental Technique for Measuring the Time-Dependent and Congruence-Dependent Creep and Contact Radius in a Diarthrodial Joint Contact Model,” American Society of Mechanical Engineers, Bioengineering Conference, BED 29, pp. 145–146, June 1995 (with V.M. Wang and G.A. Ateshian).

“The Effect of Articular Congruence and Humeral Head Rotation on Glenohumeral Kinematics,” American Society of Mechanical Engineers, Advances in Bioengineering, BED 28, pp. 19–20, November 1994 (with V.C. Mow, et al.).

“Effect of Anterior Tightening on Shoulder Kinematics and Contact,” Proceedings, Second World Congress of Biomechanics, Amsterdam, The Netherlands, July 1994 (with L.U. Bigliani, et al.).

“Bovine Glenoid Cartilage Is Less Stiff Than Humeral Head Cartilage in Tension,” *Transactions of the Orthopaedic Research Society*, Vol. 19, p. 146, February 1994 (with S. Ebara, et al.).

“Three-Dimensional Kinematics of the Glenohumeral Joint During Abduction in the Scapular Plane,” *Transactions of the Orthopaedic Research Society*, Vol. 18, p. 136, February 1993 (with E.L. Flatow, et al.).

“A Stereophotogrammetric Method to Determine the Kinematics of the Glenohumeral Joint,” American Society of Mechanical Engineers, Advances in Bioengineering, BED 19, pp. 143–146, November 1992 (with E.L. Flatow, et al.).