

## Curriculum Vitae

Scott L. Delp

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and Mechanical Engineering  
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### Education

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| 1987-1990 | Stanford University, Stanford, California<br>Ph.D. in Mechanical Engineering                                |
| 1985-1986 | Stanford University, Stanford, California<br>M.S. in Mechanical Engineering                                 |
| 1979-1983 | Colorado State University, Fort Collins, Colorado<br>B.S. in Mechanical Engineering, <i>summa cum laude</i> |

### Industry and Academic Experience

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| 2009-present | James H. Clark Professor of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery (by courtesy), Stanford University                                     |
| 2006-2009    | Charles Lee Powell Professor of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery (by courtesy), Stanford University                                 |
| 2002-2007    | Chairman, Bioengineering Department, Stanford University Schools of Medicine and Engineering, Stanford University  |
| 2004-2006    | Professor, Departments of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery (by courtesy), Stanford University                                       |
| 2000-2002    | Chairman, Biomechanical Engineering Division, Mechanical Engineering Department, Stanford University   |
| 1999-2004    | Associate Professor, Departments of Mechanical Engineering, Bioengineering, and Orthopaedic Surgery (by courtesy), Stanford University                             |
| 1996-1999    | Associate Professor, Departments of Biomedical Engineering (Engineering School) and Physical Medicine and Rehabilitation (Medical School), Northwestern University |
| 1991-1999    | Senior Research Scientist, Sensory Motor Performance Program, Rehabilitation Institute of Chicago  |
| 1991-1996    | Assistant Professor, Departments of Biomedical Engineering (Engineering School) and Physical Medicine and Rehabilitation (Medical School), Northwestern University |
| 1986-1990    | Biomedical Engineer, Rehabilitation R&D Center, Veterans Affairs Medical Center, Palo Alto, California   |
| 1987         | Bioengineer, Department of Orthopaedics, Centro Traumatologico Ortopedico, Florence, Italy   |
| 1985-1988    | NSF Fellow, Department of Mechanical Engineering, Stanford University  |
| 1984-1985    | Systems Engineer, Graphics Workstation Division, Hewlett Packard, Fort Collins, Colorado   |

1983	Engineer, Control Room, Fort Saint Vrain Nuclear Generation Station, Platteville, Colorado
1982-1983	Engineering Associate, Utility Engineering Corporation, Timnath, Colorado

### Companies Founded

1991-1999	Co-founder and Director, MusculoGraphics Inc, Sunnyvale, CA. (company acquired in 1999)
1996-2003	Co-founder and Director, Surgical Graphics Corp, Chicago, IL, (company acquired in 2003)
2011-present	Co-founder and Director, Circuit Therapeutics, Inc., Menlo Park, CA
2012-present	Co-founder and Director, Zebra Medical Technologies, Menlo Park, CA

### Honors and Awards

2012	<i>Fellow</i> , American Society of Biomechanics
2011	<b>Giovanni Borelli Award</b> , recognizing outstanding career accomplishment, awarded annually to an individual investigator for exemplary research in any area of biomechanics, American Society of Biomechanics
2010	Best Paper Award (with co-author Marjolein van der Krogt) Combined, ESMAC/GCMAS International Conference
2009	James H. Clark Professorship, Stanford University
2009	Journal of Biomechanics Award (with co-author, M. Llewellyn), American Society of Biomechanics
2009	Raine Professorship, University of Western Australia
2008	<b>Van C. Mow Medal</b> , awarded by ASME, is bestowed upon a single individual each year who has made significant contributions to the field of bioengineering
2008	<i>Fellow</i> , American Society of Mechanical Engineers
2007	Microstrain Award, American Society of Biomechanics, recognizing superior achievement in the development of novel instrumentation (with co-author M. Llewellyn)
2006-2009	Charles Lee Powell Professor, Stanford University
2006	Lauterbur Award, for the best MRI paper presented at the Society of Computed Tomography and Magnetic Resonance (with co-author G. Gold)
2005	Distinguished Alumnus Award, Colorado State University Engineering School
2004	James Hay Memorial Award, American Society of Biomechanics (with co-author B. Ashby)
2004	Clinical Biomechanics Award, American Society of Biomechanics (with co-author A. Arnold)
2003	<b>The Maurice E. Muller Award</b> for Excellence in Computer Assisted Surgery, recognizing career-long achievements that fundamentally advance the field
2003	<i>Fellow</i> , American Institute of Medical and Biological Engineers
2003-2005	Stanford University Fellow
2003	Journal of Biomechanics Award (with co-author, S. Blemker), American Society of Biomechanics
2002	The Calgary Award (with co-author F. Anderson), World Congress of Biomechanics
1999-2002	Powell Faculty Scholar, Stanford University

2000	Dana Adams Griffin Award, Stanford University School of Engineering
1999	Best Paper Award, Gait and Posture
1999	David Morgenthaler II Faculty Scholar, Stanford University School of Engineering
1992-1998	<b>National Young Investigator Award</b> , National Science Foundation
1995-1996	Falk Faculty Scholar, Northwestern University Medical School
1993	<b>Honored at White House</b> ceremony during which President Clinton awarded grants under the Technology Reinvestment Program
1991	Outstanding Young Scientist Award, American Society of Biomechanics
1991	Baxter Faculty Fellow, The Baxter Foundation

#### Pre-doctoral

1989	ASME Student Paper Competition Winner
1985-1988	National Science Foundation Fellowship
1986	Easter Seal Student Design Competition Winner
1986	Lincoln Foundation Design Competition Winner
1985	Hewlett Packard Award for Teaching Excellence
1982	Institute of Nuclear Power Operations Scholarship
1982	American Consulting Engineers Council Scholarship
1981-1982	Colorado Consulting Engineers Council Scholarship
1982	Colorado State University Design Competition Winner
1982	Phi Kappa Phi, Tau Beta Pi, Pi Tau Sigma
1979	Outstanding Scholar Athlete Award

#### **Memberships in Professional Organizations**

2002-present	Member, Biomedical Engineering Society
1992-present	Member, Orthopaedic Research Society
1989-present	Member, International Society of Biomechanics
1987-present	Member, American Society of Biomechanics
1982-present	Member, American Society of Mechanical Engineers

#### **Editorial Service**

1998-present	Editorial Advisory Board Member, <i>Journal of Orthopaedic Research</i>
1998-present	Editorial Consultants Panel Member, <i>Journal of Biomechanics</i>
1997-present	Editorial Board Member, <i>Computer Aided Surgery</i>
1996-2003	Editorial Board Member, <i>Journal of Applied Biomechanics</i>
1995-present	Editorial Board Member, <i>Gait and Posture</i>
1999-present	Reviewer, SIGGRAPH
1998-present	Reviewer, <i>IEEE Transactions on Medical Imaging</i>
1996-present	Reviewer, <i>Annals of Biomedical Engineering</i>
1995-present	Reviewer, <i>Presence: Virtual Environments and Teleoperation</i>
1995-present	Reviewer, <i>IEEE Transactions on Rehabilitation Engineering</i>
1995-1996	Reviewer, <i>Journal of Applied Physiology</i>
1992-1995	Reviewer, <i>Biological Cybernetics</i>
1991-1997	Reviewer, <i>Journal of Orthopaedic Research</i>
1991-1995	Reviewer, <i>Journal of Biomedical Engineering</i>
1990-1998	Reviewer, <i>Journal of Biomechanics</i>
1988-present	Reviewer, <i>Journal of Biomechanical Engineering</i>
2000-present	Reviewer, <i>Journal of Neurophysiology</i>
2000-present	Reviewer, <i>Muscle and Nerve</i>

### Selected Stanford University Service

2002-2007	Chair, Bioengineering Department
2000-2002	Chair, Biomechanical Engineering Division
2001-present	Co-Director, Stanford Center for Biomedical Computation
2001-present	Bio-X Executive Committee Member
2000-2001	Steering Committee Member, iBME (Institute for Biomedical Engineering)
2000-present	Bio-X Interdisciplinary Initiatives Committee Member
2000	Search Committee Member, Tissue Engineering
2000	Search Committee Member, Imaging, Electrical Engineering Department
2000	Search Committee Member, VA Rehabilitation R&D Center Director
1999-2001	Steering Committee: BITS (Biomedical Information Technology at Stanford)
1999-2001	ME Research Laboratory Building Planning Group Member
1999-2000	Bio-X Core Facilities Committee Member

### Selected Northwestern University Service

1996-1999	Appointments, Promotions, and Tenure Committee, Medical School
1996-1997	Program Reviewer, Masters in Engineering Management Program
1995-1998	University Intellectual Property Committee
1994-1996	Medical Student Research Committee Member
1992-1995	Graduate Program Committee Member
1992-1995	Honors Program in Medical Education Interviewer
1992,1995	Whitaker Foundation Development Award Committee Member
1992-1993	Undergraduate Program Committee Member
1991-1995	Academic Standing Committee Member, Engineering School
1991-1998	Freshmen Orientation Coordinator
1991-1999	Financial Aid Committee Member
1991-1999	Program in Medical Biomechanics Steering Committee Member

### Selected National and International Service

2013-	Track Chair, World Congress of Biomechanics
1998-present	NIH review committees (NICHD)
1998-present	NIH review committees (NIAMS)
1992-present	Reviewer, National Science Foundation
1997-2012	Executive Committee Member, Technical Group on Computer Simulation, International Society of Biomechanics
2002-2005	NIH review committees (Surgery, Radiology, and Bioengineering IRG)
1995-2002	Ad-hoc session organizer and session chair, ASME Summer Bioengineering Conference (various years)
1998-2002	Membership Committee Chair, American Society of Biomechanics
1997	Review Panel Member, NSF/Whitaker Foundation Joint Program
1995-1997	New Initiatives Committee Member, International Society of Biomechanics
1991-1995	Membership Committee Member, American Society of Biomechanics

**Conferences and Courses Organized**

2007	Meeting Chair, American Society of Biomechanics, Stanford, CA.
2000	Program Chair, Third International Conference on Medical Image Computing and Computer Assisted Interventions, Pittsburgh, PA
2000	Program Chair, Sixth International Conference on Clinical Motion Analysis, Sacramento, CA
1999-2000	Program Committee, Fifth and Sixth International Conferences on Computer-Assisted Orthopaedic Surgery, Devos, Switzerland
1999	Scientific Committee Member, Simulation Symposium, International Society of Biomechanics Conference, Calgary, Canada
1999	Scientific Committee Member, Second International Conference on Medical Image Computing and Computer Assisted Interventions, Cambridge, England
1999	Executive Committee Member, Computer Assisted Radiology and Surgery, San Francisco, CA, 2000.
1997-2000	International Advisory Committee Member, First (2 <sup>nd</sup> , 3 <sup>rd</sup> ) Israeli Symposium on Computer-Integrated Surgery, Medical Robotics, and Medical Imaging
1997-1998	Program Committee Member, Third and Fourth International Conferences on Computer-Assisted Orthopaedic Surgery, Bern, Switzerland
1997-1998	Program Co-Chair, First International Conference on Medical Image Computing and Computer Assisted Interventions, MIT, Cambridge, MA
1997	Conference Co-Chair, First North American Conference on Computer-Assisted Orthopaedic Surgery, Pittsburgh, PA
1996	Program Committee Member, Computer Vision, Virtual Reality, and Robotics in Medicine, Grenoble, France
1995	Program Committee Member, Second International Conference on Medical Robotics and Computer-Assisted Surgery, Baltimore, MD
1994	Program Committee Member, First International Conference on Medical Robotics and Computer-Assisted Surgery, Pittsburgh, PA

**Past Postdoctoral Fellows**

Thor Besier	Assistant Professor of Bioengineering, University of Auckland
F. Clayton Anderson	Research Associate, Bioengineering Department, Stanford University
Allison Arnold	Research Scientist, Harvard University
John Hutchinson	Associate Professor of Biological Sciences, University of London
Roger Gonzalez	(with T. Buchanan). Professor of Mechanical Engineering at LaTourneau University
Ilse Jonkers	Assistant Professor at Katholieke Universiteit Leuven, Belgium
Jung-Chi Liao	Assistant Professor at Columbia University
Jeff Reinbolt	Assistant Professor at the University of Tennessee
Eran Guendelman	Computer Vision Researcher at PrimeSense
Ian Stavness	Assistant Professor of Computer Science at University of Saskatchewan
Marjolein van der Krogt,	Postdoctoral Fellow, University of Twente
Chris Towne	Senior Research Scientist, Circuit Therapeutics, Inc.
Ajay Seth	Research Associate, Bioengineering Department, Stanford University
Saikat Pal	Research Associate, Bioengineering Department, Stanford University

**Current Postdoctoral Fellows**

Tim Dorn	Postdoctoral Fellow, Bioengineering Department, Stanford University
Mathew Millard	Postdoctoral Fellow, Bioengineering Department, Stanford University
Tom Uchida	Postdoctoral Fellow, Bioengineering Department, Stanford University
Jack Wang	Postdoctoral Fellow, Computer Science Department, Stanford University
Amy Silder	Postdoctoral Fellow, Bioengineering Department, Stanford University
Chris Gorini	Postdoctoral Fellow, Bioengineering Department, Stanford University

**Past Doctoral Students Advised**

Wendy Murray	Ph.D. Awarded 1997 Dissertation: Functional capacity of muscles: anatomical studies, computer modeling, and anthropometric scaling Currently an Associate Professor of Biomedical Engineering at Northwestern University
Stephen Piazza	Ph.D. in Awarded 1998 Dissertation: Simulation-based design of total joint replacements Currently an Associate Professor of Kinesiology and Mechanical Engineering at Penn State University
Anita Vasavada	Ph.D. Awarded 1999 Dissertation: Neural control of human neck muscles Currently an Associate Professor of Bioengineering at Washington State University
Allison Arnold	Ph.D. Awarded 1999 Dissertation: Quantitative descriptions of musculoskeletal geometry in persons with cerebral palsy. Outstanding Young Scientist Award, American Society of Biomechanics Young Scientist Award, Gait and Clinical Movement Analysis Society Currently a Research Scientist at Harvard University
Scott Riewald	Ph.D. Awarded 2001 Dissertation: Abnormal neural synergies in cerebral palsy Director of Biomechanics, US Swimming, Olympic Training Center
Deanna Asakawa	Ph.D. Awarded in 2002 Dissertation: In vivo imaging of muscle contraction Lecturer at San Diego State University, Mechanical Engineering
Mark Richter	Ph.D. Awarded in 2003 Dissertation: Handrim compliance and upper limb dynamics in wheelchair propulsion (with Prof. Cutkosky) Assistant Professor of Biomedical Engineering at Vanderbilt University
Saryn Goldberg	Ph.D. Awarded in 2004 Dissertation: Dynamics of muscle stiffness in cerebral palsy Assistant Professor of Engineering at Hofstra University
Blake Ashby	Ph.D. Awarded in 2004 Dissertation: Optimal neuromuscular control Assistant Professor at Grand Valley State University
Silvia Blemker	Ph.D. Awarded in 2004 Dissertation: Three-dimensional modeling of muscle contraction Associate Professor at the University of Virginia
Robert Siston	Ph.D. Awarded in 2005 Dissertation: Computer assisted joint arthroplasty Assistant Professor at the Ohio State University

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Kate Holzbaur	Ph.D. Awarded in 2005 Dissertation Topic: Upper extremity modeling and simulation Assistant Professor at Wake Forest University
Vincent De Sapio	Ph.D. Awarded 2006 Dissertation: Task-level control of multibody biomechanical systems Staff Scientist at Sandia National Laboratories
Christie Draper	Ph.D. Awarded 2007 Dissertation: Dynamic imaging of joint motion Research Scientist at Intuitive Surgical Corp.
David Camarillo	Ph.D. Awarded 2008 (with Ken Salisbury) Dissertation: Tendon-based actuation of medical robots Assistant Professor at Stanford University
May Liu	Ph.D. Awarded 2008 Dissertation: Walking dynamics vary with speed Research Engineer at Intuitive Surgical Corp.
Sahana Kukke	Ph.D. Awarded in 2009 (with Terry Sanger) Dissertation: Mechanisms of impairment in childhood dystonia Postdoctoral Fellow at NIH
Virginia Chu	Ph.D. Awarded in 2009 (with Terry Sanger) Dissertation: The role of variability in motor learning Postdoctoral Fellow at Northwestern University
Mike Llewellyn	Ph.D. Awarded 2009 Dissertation: Multicolor optical control of muscle Resident at Stanford University
Jennifer Hicks	Ph.D. Awarded 2010 Dissertation: Predicting outcomes of treatments for crouch gait Research Associate at Stanford University
Mandy Koop	Ph.D. Awarded 2011 (with Helen Bronte-Stuart) Dissertation: Understanding hypokinesia in Parkinson's disease with quantitative measures and a computational model Research Scientist
Erin Butler	Ph.D. Awarded 2011 (with Jessica Rose) Dissertation: Analysis of Upper Limb Function in Children with Cerebral Palsy Research Scientist, Dartmouth University
Dave Parker	Ph.D. Awarded 2011 Dissertation Topic: Protein Mechanica: a system to simulate motor protein dynamics Postdoctoral Fellow, Stanford University
Katy Keenan	Ph.D. Awarded 2011 (with Garry Gold) Imaging cartilage material properties with MRI Postdoctoral Fellow, University of Colorado

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Joshua Webb	Ph.D. Awarded 2011 Dissertation Topic: 3D modeling of rotator cuff muscles Product Engineer, Zimmer Inc.
Melanie Fox	Ph.D. Awarded 2011 Dissertation Topic: Simulation-based treatment planning Currently a Research Engineer at Intuitive Surgical Corp.
Chand John	Ph.D. Awarded 2012 Dissertation Topic: Dynamic optimal control of locomotion Founder and CTO, ZoomCat Corp.
Emel Demircan	Ph.D. Awarded 2012 (with Oussama Khatib) Dissertation Topic: Robotics-based Reconstruction and Synthesis of Human Motion Postdoctoral Fellow, Stanford University
Sam Hamner	Ph.D. Awarded 2012 Dissertation Topic: Muscle Contributions to Running Dynamics Lead Engineer, D-Rev
Edith Arnold	Ph.D. Awarded 2012 Dissertation Topic: Computer Modeling of Lower Limb Muscles Research Engineer, St Jude Medical
Katherine Steele	Ph.D. Awarded 2012 Dissertation Topic: Dynamics of Crouch Gait Postdoctoral Fellow, Northwestern University
Gabriel Sanchez	Ph.D. Awarded 2012 Dissertation Topic: A Wearable Microscope for <i>In Vivo</i> Investigations of Human Sarcomere Lengths and Dynamics Lecturer, Stanford University

### **Current Doctoral Students**

Matt DeMers	Dissertation: The effects of muscle coordination on joint loading
Holly Liske	Dissertation: Optical inhibition of spastic muscle
Jenny Young	Dissertation: Dynamics of barefoot running
Kate Montgomery	Dissertation: Optogenetic modulation of motor function
Shrivats Iyre	Dissertation: Inhibiting neuropathic pain
Xuefeng Chen	Dissertation: Alterations in sarcomere lengths and contractile dynamics in subjects with spasticity measured with microendoscopy
Carmichael Ong	Dissertation: Exoskeletal devices augment human performance
Apoorva Rajagopal	Dissertation: Scaling of lower limb musculoskeletal geometry
Chris Dembia	Dissertation: Reducing metabolic cost of walking with robotic assistance

## Courses Taught at Stanford University

Quarter	Course & Units	Title	Enrollment	Responses	Course § % (#13)	Instructor§ % (#14)
Aut. 99-00	ME 381 (3)	Biomechanics of Movement	42	34	76	78
Win. 99-00	ME 282A (4)	Biomedical Device Design and Evaluation*	21	20	86	85
Spr. 99-00	ME 286 (3)	Neuromuscular Biomechanics	11	11	100	100
Spr. 99-00	ME 388 (1)	Biomedical Computation	29	17	77	72
Aut. 00-01	ME 381 (3)	Biomechanics of Movement	34	30	77	89
Win. 00-01	ME 282A (4)	Biomedical Device Design and Evaluation*	24	22	92	80
Spr. 00-01	ME382 (3)	Modeling and Simulation of Human Movement	16	16	100	96
Aut. 01-02	ME 382 (3)	Biomechanics of Movement	28	26	60	73
Win. 01-02	ME 282A (4)	Biomedical Device Design and Evaluation*	23	19	76	79
Spr. 00-01	ME 286 (3)	Neuromuscular Biomechanics	11	11	87	82
Aut. 02-03	ME 10 (4)	Italian Renaissance Art**	20	13	4.2/5.0	4.3/5.0
Win. 02-03	ME 382A (4)	Biomedical Device Design and Evaluation*	23	19	76	79
Aut. 03-04	BioE 281(3)	Movement Dynamics	54	47	83	83
Aut. 04-05	BioE 281(3)	Biomechanics	48	42	85	72
Aut. 05-06	BioE 281(3)	Biomechanics	54	50	77	80
Win. 05-06	ME 389	Biodesign Forum	36		-	-
Aut. 06-07	BioE 281(3)	Biomechanics	62	48	86	73
Spr. 06-07	BioE 80 (4)	Italian Renaissance Art**	22	21	4.5/5.0	4.6/5.0
Aut. 07-08	BioE 281(3)	Biomechanics	42	38	4.5/5.0	4.6/5.0
Spr. 07-08	ME485 (3)	Simulation of Movement	14	14	4.3/5.0	4.6/5.0

§ Students evaluate the effectiveness of instructors at the conclusion of each quarter using a standardized survey. The School of Engineering computes a percentile rating for each professor by comparison of survey scores across all courses offered during the same academic quarter. An Instructor Rating of 100 indicates that the professor was rated higher than any other professor in the School of Engineering during a particular quarter. An Instructor rating of 50 indicates that the professor was rated higher than half of the professors in the School of Engineering during a particular quarter.

\* Co-taught with T. Andriacchi

\*\* Taught at Stanford overseas campus in Florence, Italy; online evaluation with different scoring system.

### Courses Taught at Northwestern University (Engineering School)

Quarter	Course	Title	Enrollment	Instructor* Rating
Spr. 90-91	BME C95	Introduction to Biomechanics	13	4.0/4.0
Spr. 91-92	BME C95	Introduction to Biomechanics	24	3.9/4.0
Win. 92-93	BME D95	Neuromuscular Biomechanics	12	3.7/4.0
Spr. 92-93	BME C66	Biomechanics of Movement	15	3.7/4.0
Spr. 93-94	BME C66	Biomechanics of Movement	23	3.8/4.0
Win. 94-95	BME D66	Neuromuscular Biomechanics	12	4.0/4.0
Spr. 94-95	BME C66	Biomechanics of Movement	20	4.0/4.0
Spr. 95-96	BME C66	Biomechanics of Movement	23	4.0/4.0
Win. 97-98	BME D66	Neuromuscular Biomechanics	9	5.5/6.0 <sup>†</sup>
Spr. 97-98	BME C66	Biomechanics of Movement	19	5.5/6.0 <sup>†</sup>

\* Students evaluated the effectiveness of instructors at the conclusion of each quarter using a survey developed by the Northwestern University Course and Teacher Evaluation Council. Prior to 1997, each student scored the instructor on a scale from 0 to 4. To obtain an overall score of 4.0, the instructor had to receive the highest possible score from every student in the class. The average score for faculty in the engineering school was approximately 3.3. Dr. Delp's average score was 3.9.

<sup>†</sup>The scale for instructor effectiveness was changed to a range of 1-6 in 1997.

**Publications in Refereed Journals** (Delp's students in **bold**)

1. Delp, S.L., Loan, J.P., Hoy, M.G., Zajac, F.E., Topp E.L., Rosen, J.M. An interactive graphics-based model of the lower extremity to study orthopaedic surgical procedures. *IEEE Transactions on Biomedical Engineering*, vol. 37, pp. 757-767, 1990.
2. Delp, S.L., Bleck E.E., Zajac, F.E., Bollini, G. Biomechanical analysis of the Chiari pelvic osteotomy: preserving hip abductor strength. *Clinical Orthopaedics and Related Research*, vol. 254, pp. 189-198, 1990.
3. Delp, S.L. and Zajac, F.E. Force- and moment-generating capacity of lower-limb muscles before and after tendon lengthening. *Clinical Orthopaedics and Related Research*, vol. 284, pp. 247-259, 1992.
4. Delp, S.L. and Maloney, W. J.: Effects of hip center location on the moment-generating capacity of muscles. *Journal of Biomechanics*, vol. 26, pp. 485-499, 1993.
5. **Vasavada**, A.N., Delp, S.L., Maloney, W.J., Schurman, D.J., Zajac, F.E. Compensating for changes in muscle length in total hip arthroplasty: effects on the moment-generating capacity of the muscles. *Clinical Orthopaedics and Related Research*, vol. 302, pp. 121-133, 1994.
6. Delp, S.L., **Ringwelski**, D., Carroll, N.C. Transfer of the rectus femoris: effects of transfer site on moment arms about the knee and hip. *Journal of Biomechanics*, vol. 27, pp. 1201-1211, 1994.
7. Delp, S.L., Komattu, A.V., Wixson, R.L. Superior displacement of the hip in total joint replacement: effects of prosthetic neck length, neck-stem angle, and anteversion angle on the moment-generating capacity of the muscles. *Journal of Orthopaedic Research*, vol. 12, pp. 860-870, 1994.
8. **Murray**, W.A., Delp, S.L., Buchanan, T.S. Variation of muscle moment arms with elbow and forearm position. *Journal of Biomechanics*, vol. 28, pp. 513-525, 1994.
9. **Kocmond**, J.H., Delp, S.L., Stern, S.H. Stability and range of motion of Insall-Burstein condylar prostheses: a computer simulation study. *Journal of Arthroplasty*, vol. 10, pp. 383-388, 1995.
10. Delp, S.L. and Loan, J.P. A software system to develop and analyze models of musculoskeletal structures. *Computers in Biology and Medicine*, vol. 25, pp. 21-34, 1995.
11. Delp, S.L., **Statler**, K., Carroll, N.C. Preserving plantarflexion strength after surgical treatment for contracture of the triceps surae: a computer simulation study. *Journal of Orthopaedic Research*, vol. 13, pp. 96-104, 1995.
12. Delp, S.L., **Kocmond**, J.H., Stern, S.H. Trade-offs between motion and stability in posterior substituting knee arthroplasty design. *Journal of Biomechanics* vol. 28, pp. 1155-1166, 1995.
13. Delp, S.L., **Arnold**, A.S., **Speers**, R.A., Moore, C. Hamstrings and psoas lengths during normal and crouch gait: implications for muscle-tendon surgery. *Journal of Orthopaedic Research*, vol. 14, pp. 144-151, 1996.
14. **Piazza**, S.J., Delp S.L. Influence of muscles on knee flexion during the swing phase of normal gait. *Journal of Biomechanics*, vol. 29, pp. 723-733, 1996.
15. **Free**, S.A., Delp, S.L. Effects of trochanteric transfer on the moment arms, lengths, and force-generating capacities of the hip abductors, *Journal of Orthopaedic Research*, vol. 14, pp. 245-250, 1996.

16. Delp, S.L., **Grierson**, A.E., Buchanan, T.S. Moments generated by the wrist muscles in flexion-extension and radial-ulnar deviation. *Journal of Biomechanics*, vol. 29, pp. 1371-1376, 1996.
17. Delp, S.L., Wixson, R.L., **Kocmond**, J.H, Komattu, A.V. How superior placement of the joint center in total hip arthroplasty affects the abductor muscles. *Clinical Orthopaedics and Related Research*, vol. 328, pp. 137-146, 1996.
18. **Riewald**, S.A., Delp, S.L. The action of the rectus femoris muscle following distal tendon transfer: Does it generate a knee flexion moment? *Developmental Medicine and Child Neurology*, vol. 39, pp. 99-105, 1997.
19. **Arnold**, A.S., Komattu, A.V., Delp, S.L. Internal rotation gait: A compensatory mechanism to restore abduction capacity decreased by bone deformity? *Developmental Medicine and Child Neurology*, vol. 39, pp. 40-44, 1997.
20. Gonzalez, R.V., Buchanan, T.S., Delp, S.L. How muscle architecture and moment arms affect wrist flexion-extension moments. *Journal of Biomechanics*, vol. 30, pp. 705-712, 1997.
21. Delp, S.L., Loan, J.P., Basdogan, C., Rosen, J.M. Surgical simulation: an emerging technology for emergency medical training. *Presence: Teleoperators and Virtual Environments*, vol. 6, pp. 147-159, 1997.
22. Keshner, E.A., Statler, K.D., Delp, S.L. Kinematics of the freely moving head and neck in the cat. *Experimental Brain Research*, vol. 115, pp. 257-366, 1997.
23. **Vasavada**, A.V., Li, S., Delp, S.L. Influence of muscle morphometry and moment arms on the moment-generating capacity of human neck muscles. *Spine*, vol. 23, pp. 412-422, 1998.
24. Buchanan, T.S., Delp, S.L., **Solbeck**, J.A. Muscular resistance to varus and valgus loads at the elbow. *ASME Journal of Biomechanical Engineering*, vol. 120, pp. 634-639, 1998.
25. **Piazza**, S.J., Delp, S.L., Stulberg, S.D., Stern, S.H. Posterior tilting of the tibial component decreases femoral rollback in posterior-substituting knee replacement. *Journal of Orthopaedic Research*, vol. 16, pp. 264-270, 1998.
26. Delp, S.L., Stulberg, S.D., Davies, B., Picard, F., Leitner, F. Computer assisted knee replacement. *Clinical Orthopaedics and Related Research*, vol. 354, pp. 49-56, 1998.
27. Delp, S.L., **Arnold**, A.S., Piazza, S.J. Graphics-based modeling and analysis of gait abnormalities. *Biomedical Materials and Engineering*, vol. 8, pp. 227-240, 1998.
28. Herrmann, A., Delp, S.L. Moment arms and force-generating capacity of the extensor carpi ulnaris after transfer to the extensor carpi radialis brevis. *Journal of Hand Surgery*, vol. 24A, pp. 1083-1090, 1999.
29. Delp, S.L., **Hess**, W. E., Hungerford, D.S., Jones, L.C. Variation of rotational moment arms with hip flexion. *Journal of Biomechanics*, vol. 23, pp. 493-501, 1999.
30. **Schmidt**, D.J., **Arnold**, A.S., Carroll, N.C., Delp, S.L. Length changes of the hamstrings and adductors resulting from derotational osteotomies of the femur. *Journal of Orthopaedic Research*, vol. 17, pp. 279-285, 1999.
31. Dhaher, Y.Y., Rymer, W. Z., Delp, S.L. The use of basis functions in modeling of joint articular surfaces: application to the knee joint. *Journal of Biomechanics*, vol. 33, pp. 901-909, 2000.

32. **Murray**, W. M., Buchanan, T.S., Delp, S.L.: The isometric functional capacity of elbow muscles. *Journal of Biomechanics*, vol. 33, pp. 943-952, 2000.
33. **Arnold**, A.S., **Asakawa**, D.J., Delp, S.L. Do the hamstrings and adductors contribute to excessive internal rotation of the hip in persons with cerebral palsy. *Gait and Posture*, Awarded Best Paper of 1999, vol. 11, pp. 181-190, 2000.
34. **Arnold**, A. S., **Salinas**, S., **Schmidt**, D.J., Delp, S.L. Accuracy of muscle moment arms estimated from MRI-based musculoskeletal models of the lower extremity. *Computer Aided Surgery*, vol. 5, pp. 108-119, 2000.
35. Delp, S. L., Loan, J. P. A computational framework for simulating and analyzing human and animal movement, *IEEE Computing in Science and Engineering*, vol. 2, pp. 46-55, 2000.
36. **Arnold**, A.S., **Blemker**, S., Delp, S.L. Evaluation of a deformable musculoskeletal model: application to planning muscle-tendon surgeries for crouch gait. *Annals of Biomedical Engineering*, vol. 29, pp. 263-274, 2001
37. Delp, S.L., Suranarayanan, S., Murray, W.M., Uhlir, J., Triolo, R.J. Architecture of the rectus abdominis, quadratus lumborum, and erector spinae. *Journal of Biomechanics*, vol. 34, pp. 371-375, 2001
38. **Arnold**, A.S., Delp, S.L. Rotational moment arms of the medial hamstrings and adductors vary with femoral geometry and limb position. *Journal of Biomechanics*, vol. 34, pp. 437-447, 2001
39. **Vasavada**, A.V., Li, S., Delp, S.L. Isometric strength of neck muscles in humans. *Spine*, vol. 26, pp. 1904-1909, 2001
40. **Piazza**, S.J., Delp, S.L. Three-dimensional dynamic simulation of total knee replacement motion during a stepup task, *ASME Journal of Biomechanical Engineering*, vol. 123, pp. 599-606, 2001
41. **Murray**, W. M., Buchanan, T.S., Delp, S.L. Scaling of peak moment arms of elbow muscles with dimensions of the upper extremity, *Journal of Biomechanics*, vol. 35, pp. 19-26, 2002
42. **Asakawa**, D.J., **Blemker**, S., Gold, G, Delp, S.L., Motion of the rectus femoris after tendon transfer surgery, *Journal of Biomechanics*, vol. 35, pp. 1029-1037, 2002
43. Pappas, G, **Asakawa**, D.J., Delp, S.L., Zajac, F.E., Drace, J.E. Non-uniform shortening in the Biceps Brachii During Active Elbow Flexion, *Journal of Applied Physiology*, vol. 92, pp 2381-2389, 2002
44. **Vasavada**, A.N., Delp, S.L. Three-dimensional spatial tuning of neck muscle activation in humans, *Experimental Brain Research*, vol. 147, 437-448, 2002
45. **Asakawa**, D.S., Pappas, G. P., Drace, J. E., Delp, S. L. Architecture of the biceps brachii characterized with ultrasound and MRI, *International Journal of Mechanics in Medicine and Biology* vol. 2, pp449-455, 2002.
46. Delp, S.L., What causes increased muscle stiffness in cerebral palsy? *Muscle & Nerve*, vol. 26, pp. 131-132, 2003
47. Thelen, D. G., Anderson, F.C., Delp, S.L., Generating dynamic simulations of movement with computed muscle control, *Journal of Biomechanics*, vol. 36, 321- 328, 2003.
48. Thelen, D. G., **Riewald**, S. A., Sanger, T., Delp, S. L., Abnormal muscular coordination in the lower extremity of cerebral palsy subjects, *Muscle & Nerve* vol. 27, pp. 486-493, 2003.

49. **Goldberg**, S. R., Ounpuu, S., Delp, S.L., The importance of swing phase initial conditions in stiff-knee gait, *Journal of Biomechanics*, vol. 36, pp. 111-116, 2003.
50. **Asakawa**, D.J., Pappas, G, **Blemker**, S.S., Zajac, F.E., Drace, J.E, Delp, S.L., Measurement of Skeletal Muscle Motion with Cine Phase Contrast Magnetic Resonance Imaging, *Musculoskeletal Radiology*, vol. 7, pp. 287-295, 2003.
51. **Saul**, K.R., Murray W. M., Hentz, V. R., Delp, S. L., Biomechanics of the Steindler flexorplasty surgery, *Journal of Hand Surgery*, vol. 28A, pp.979-986, 2003.
52. **Asakawa**, D., Nayak, K., **Blemker**, S., Nishimura, D., Pauly, J., Gold G., Delp, S. L., Real-Time Imaging of Skeletal Muscle Tissue Velocity, *Journal of Magnetic Resonance Imaging*, vol. 18, pp. 734-739, 2003.
53. Gold G., **Asakawa**, D., **Blemker**, S., Delp, S. L. Evidence of scar tissue and inflammation after tendon transfer surgery, *Skeletal Radiology*, vol. 33, pp. 34-40, 2004.
54. Anderson, F.C., **Goldberg**, S. R., Pandy, M.G., Delp, S.L., Contributions of muscle forces and toe off kinematics to peak knee flexion during the swing phase of normal gait, *Journal of Biomechanics*, vol. 37, pp. 731–737, 2004.
55. **Asakawa**, D.S., **Blemker**, S. A., Rab, G. T., Bagley, A., Delp, S.L., Three-dimensional muscle-tendon geometry after rectus femoris transfer, *Journal of Bone and Joint Surgery*, vol 86-A, pp 348-354, 2004.
56. **Goldberg**, S. R., Anderson, F.C., Pandy, M.G., Delp, S.L., Muscles that influence knee flexion velocity during double support: implications for stiff knee gait. *Journal of Biomechanics*, vol. 37, pp. 1189-1196, 2004.
57. Gold, G.E., **Besier**, T.F., **Draper**, C.E., **Asakawa**, D. S., G.E., Beaupré, G.S., Delp, S.L., Weight-bearing MRI of patellofemoral joint cartilage contact area, *Journal of Magnetic Resonance Imaging*, vol. 20, pp. 526-530, 2004.
58. Arnold, A. S., Delp S.L., Computer modeling of gait abnormalities in cerebral palsy: application to treatment planning, *Theoretical Issues in Ergonomics Science*, vol. 6, pp. 305-312, 2005.
59. Besier, T.F., **Draper**, C.E., Gold, G.E., Beaupré, G.S., Delp, S.L., Patellofemoral joint contact area increases with knee flexion and weight bearing, *Journal of Orthopaedic Research*, vol. 23, pp. 345-350, 2005.
60. **Blemker**, S.S., Pinsky, P.M., Delp, S.L., A 3D model of muscle reveals the causes of nonuniform strains in the biceps brachii. *Journal of Biomechanics*, vol. 38, pp. 657-665, 2005. **Journal of Biomechanics Award Paper.**
61. **Blemker**, S.S., Delp, S.L., Three-Dimensional Representation of Complex Muscle Architectures and Geometries. *Annals of Biomedical Engineering*, vol. 33, pp. 662–674, 2005. **Featured on issue’s cover.**
62. Arnold, A.S., Anderson, F.C., Pandy, M.G., Delp, S.L., Muscular Contributions to Hip and Knee Extension During the Single Limb Stance Phase of Normal Gait: A Framework for Investigating the Causes of Crouch Gait, *Journal of Biomechanics*, vol. 38 2181–2189, 2005
63. **Siston**, R.A., Delp, S.L., A new method to locate the hip center for computer assisted orthopaedic surgery, *Journal of Biomechanics*, Volume 39, Pages 125-130, 2006.

64. Higginson, J.S., Zajac, F.E., Kautz, S. A., Neptune, R.R., Burgar, C.G., Delp, S.L., Musculoskeletal response to equinus foot placement, *Gait and Posture*, vol. 23, pp. 32-36, 2006.
65. Arnold, A.S., Liu, M., Ounpuu, S., Swartz, M., Dias, L., Delp., S.L., Do hamstrings operate at greater muscle-tendon lengths and velocities after surgical lengthening, *Journal of Biomechanics*, **Clinical Biomechanics Award Paper**, vol. 38, pp. 2181-2189, 2005
66. **Hutchinson**, J. R., Anderson, F.C., **Blemker**, S. S., Delp, S. L., Musculoskeletal geometry and running ability of the Tyrannosaurus, *Paleobiology*, vol. 31, pp. 676-701, 2005.
67. **Ashby**, B.M., Delp, S.L., Optimal control simulations reveal mechanisms by which arm movement improves standing long jump performance, *Journal of Biomechanics*, vol. 39, pp. 1726-1734, 2006. **James Hay Award Paper.**
68. **Holzbaun**, K.R., Murray W. M., Delp, S., A model of the upper extremity for simulating musculoskeletal surgery and analyzing neuromuscular control, *Annals of Biomedical Engineering*, vol. 3, pp. 829-840, 2005. **Featured on Issue's Cover.**
69. **Siston**, R.A., Patel, J.J, Goodman, S.B., Delp, S.L., and Giori, N.J. The Variability of Femoral Rotational Alignment in Total Knee Arthroplasty. *Journal of Bone and Joint Surgery*, vol 87, pp 2276-2280, 2005.
70. **Siston**, R.A., Daub, A. C., Giori , N.J., Goodman, S. B., Delp, S.L., Evaluation of a methods that locate the center of the ankle for computer-assisted knee arthroplasty, *Clinical Orthopaedics and Related Research*, vol 439, pp 129–135, 2005.
71. **Besier**, T.F., Gold, G.E., Beaupré, G.S., Delp, S.L., Subject specific modeling to estimate patellofemoral joint contact stress, *Medicine and Science in Sport and Exercise* vol 37, pp. 1924-1930, 2005.
72. **Goldberg**, S, R., Ounpuu, S., Arnold, A. S., Gage, J., Delp, S.L., Kinematic and kinetic factors that correlate with improved knee flexion following treatment for stiff-knee gait, *Journal of Biomechanics*, vol. 39, pp. 689-698, 2006.
73. **Blemker**, S.S., Delp, S.L., Rectus femoris and vastus intermedius fiber excursions predicted by three-dimensional muscle models. *Journal of Biomechanics*, 39:1383-1391, 2006.
74. Arnold, A.S., Liu, M., Ounpuu, S., Swartz, M., Delp, S.L., The role of estimating hamstrings lengths and velocities in planning treatments for crouch gait, *Gait and Posture*, vol. 23, pp.273-281, 2006.
75. **De Sapio**, V., Warren J., Khatib, O., Delp, S.L., Simulating the task level control of human motion: a methodology and framework for implementation, *The Visual Computer*, vol 21, pp 289-30, 2006.
76. **Higginson**, J.S., Zajac, F.E., Neptune, R.R., Kautz, S.A. & Delp, S.L. Muscle contributions to support during gait in an individual with post-stroke hemiparesis. *Journal of Biomechanics*. vol. 39. pp. 1769-1777, 2006.
77. **Liu**, M., Anderson, F.C., Pandy M.G., Delp, S.L., Muscles that Support the Body Also Modulate Forward Progression During Walking. *Journal of Biomechanics*, vol. 39, pp. 2623-2630, 2006.
78. **Siston** RA, Giori NJ, Goodman SB, Delp S.L., Intraoperative passive kinematics of osteoarthritic knees before and after total knee arthroplasty. *Journal of Orthopaedic Research*, vol 24, pp 1607-1614, 2006.

79. **Asakawa** D.S., **Blemker** S.S., Gold G.E., Delp S.L., Dynamic magnetic resonance imaging of muscle function after surgery. *Skeletal Radiology*, vol. 35, pp. 885-886, 2006.
80. **De Sapio**, V., Khatib, O., Delp, S. Task-level approaches for the control of constrained multibody systems. *Multibody System Dynamics*, vol. 16, pp. 73-102, 2006.
81. **Draper**, C.E., Besier, T.F., Gold, G.E., Fredericson, M., Fiene, A., Beaupre, G.S., Delp, S.L. Is cartilage thickness different in young subjects with and without patellofemoral pain? *Osteoarthritis and Cartilage*, vol. 14. pp. 931-937, 2006.
82. **Siston**, R.A., Goodman, S. B, Patel, J., Giori , N.J., Delp, S.L., The high variability of tibial rotational alignment in total knee arthroplasty, *Clinical Orthopaedics and Related Research*, vol. 452, pp. 1607-1614, 2006.
83. **Siston**, R.A., Goodman, J., Giori, N.J., Delp, S.L., Surgical navigation for total knee arthroplasty: a perspective, *Journal of Biomechanics*, vol. 40, pp 728-735, 2007. **Clinical Biomechanics Award Paper.**
84. **Blemker**, S., **Asakawa**, D., Gold G., Delp, S. L MR Imaging and Computational Modeling of the Musculoskeletal System: Applications, Advances, and Future Opportunities. *Journal of Magnetic Resonance Imaging*, vol. 25, pp 441-451, 2007.
85. **Holzbaur**, K.R., Murray W. M., Delp, S., Moment-generating capacity of upper limb muscles. *Journal of Biomechanics*, vol. 40, pp. 2442-2249, 2007.
86. **Liao**, J.C., Spudich, J.A., **Parker**, D., Delp, S.L., The extended absorbing boundary method to fit dwell-time distributions of molecular motors with cyclic, branching, and reverse kinetic pathways, *Proceedings of the National Academy of Sciences*, vol. 104, pp 3171-3176, 2007.
87. Delp, S.L., Anderson, F.C., Arnold, A. S., Loan, P., Habib, A., John, C., Thelen, D.G. OpenSim: Open-source software to create and analyze dynamic simulations of movement. *IEEE Transactions on Biomedical Engineering*, vol. 54, pp. 1940-1950, 2007.
88. **Holzbaur**, K.R., Murray W. M., Gold, G., Delp, S., Upper limb muscle volumes, *Journal of Biomechanics*, vol. 40, pp. 742-749, 2007. **Award Paper, American Society of Biomechanics.**
89. **Hicks**, J., Arnold, A.S., Anderson, F.C., Schwartz, M., and Delp' S.L., The effect of excessive tibial torsion on the capacity of muscles to extend the hip and knee during single limb stance. *Gait and Posture*, vol. 26, pp. 546-552, 2007.
90. Arnold, A.S., Thelen, D.T., Schwartz, M.H., Anderson, F.C., Delp, S.L., Muscular coordination of knee motion during the terminal swing phase of gait. *Journal of Biomechanics*. Vol, 40, pp. 3314-3324, 2007.
91. Arnold, A.S., Thelen, D.T., Schwartz, M.H., Delp, S.L Contributions of Muscles to Terminal-Swing Knee Motions Vary with Walking Speed. *Journal of Biomechanics*, vol. 40, pp. 3660-3671, 2007.
92. **Higginson**, J. S., Zajac, F. E., Neptune, R.R., Kautz, S.A., Delp, S.L., Muscle coordination and contributions to support in slow gait *Journal of Biomechanics*, 2007.
93. **Siston**, R.A., Goodman, J., Giori , N.J., Delp, S.L., Coronal Plane Stability Before and After Total Knee Arthroplasty, *Clinical Orthopaedics and Related Research*, vol 463, pp 43-49, 2007.

94. **Draper**, C. E., Santos, J., Kourtis, L., Besier, T., Beaupré, G., Gold, G.E., Delp, S.L., Feasibility of using real-time MRI to measure joint kinematics in 1.5T and open-bore 0.5T systems, *Journal of Magnetic Resonance Imaging*, vol. 28, pp. 158-166, 2008.
95. **De Sapio**, V., Warren J., Khatib, O., Delp, Least action principles and their application to constrained and task-level problems in robotics and biomechanics, *Multibody System Dynamics*, vol. 19, pp. 303-322, 2008.
96. Besier, T.F., Gold G.E., Delp, S.L., Fredericson, M., Beaupré, G.S., The influence of femoral internal and external rotation on cartilage stresses within the patellofemoral joint, *Journal of Orthopaedic Research*, vol. 26, pp. 1627-1635, 2008.
97. Schmidt, J.P, Delp, S.L., Sherman, M., Taylor, C.A., Altman, R.B., Systems Biology in Motion, *IEEE Transactions*, vol 98, pp 1266- 1280, 2008.
98. **Hicks**, J., Schwartz, M., Arnold, A., and Delp, S.L.: Crouched postures reduce the capacity of muscles to extend the hip and knee during single limb stance, *Journal of Biomechanics*, vol .41, pp. 960-967, 2008.
99. **Siston**, R.A., Cromie, M.J., Gold, G.E., Goodman, S.B., Maloney, W.J., Delp, S.L., and Giori, N.J.: Averaging different alignment techniques improves femoral rotational alignment in total knee arthroplasty. *The Journal of Bone and Joint Surgery AM*, vol. 90, pp. 2098-2104, 2008.
100. Reinbolt, J.A., **Fox**, M.D., Öunpuu' S., Delp, S.L Importance of Preswing Rectus Femoris Activity in Stiff-Knee Gait, *Journal of Biomechanics*, vol. 41, pp. 2362-2369. 2008.
101. **Llewellyn**, M.E., Barretto, R.P., Delp, S.L., Schnitzer, M. J., Minimally invasive high-speed imaging of sarcomere contractile dynamics in mice and humans, *Nature*, vol. 454, pp. 784 – 788, 2008.
102. Jonkers I., Delp, S.L., Patten, C., Capacity to increase walking speed is limited by impaired hip and ankle power generation in lower functioning persons post-stroke. *Gait and Posture*, vol. 29, pp. 129-137, 2009.
103. **Cromie**, M.J., **Siston**, R. A., Giori, N.J., Delp, S.L.: Posterior Cruciate Ligament Removal Contributes To Abnormal Knee Motion During Posterior Stabilized Total Knee Arthroplasty, *Journal of Orthopaedic Research*, vol. 26, pp. 1494-1499, 2008.
104. **Liu**, M.Q., Anderson, F.C., Schwartz, M.H., Delp, S.L., Muscle contributions to support and progression over a range of walking speeds. *Journal of Biomechanics*, vol. 41, pp. 3243-325, 2008.
105. **Fox**, M.D., Reinbolt, J.A., Öunpuu' S., Delp, S.L., Mechanisms of improved knee flexion after rectus femoris transfer surgery. *Journal of Biomechanics*, vol. 42, pp. 614-619, 2009.
106. **Draper**, C.E., Besier, T.F., Santos, J.M., Jennings, F., Fredericson, M., Gold, G.E., Beaupre, G.S., and Delp, S.L. Using real-time MRI to quantify altered joint kinematics in subjects with patellofemoral pain and to evaluate the effects of a patellar brace or sleeve on joint motion. *Journal of Orthopaedic Research*, vol. 27, pp. 571-577, 2009.
107. Reinbolt, J.A., **Fox**, M.D., Schwartz, M., Delp, S.L., Predicting outcomes of rectus femoris transfer surgery. *Gait and Posture*, vol 30, pp 100-105, 2009.
108. Besier, T.F., Gold G.E., Fredericson, M., Beaupré, G.S, Delp, S.L., Knee muscle forces during walking and running in patellofemoral pain patients and pain-free controls, *Journal of Biomechanics*, vol. 42, pp. 898-905, 2009.

109. **Keenan**, K. E., Kourtis, L. C., Besier, T. F., Lindsey, D. P., Gold, G. E., Delp, S. L. & Beaupré G., Web-based resource for the computation of cartilage biphasic material properties with the interpolant response surface method. *Computer Methods in Biomechanics and Biomedical Engineering*, vol. 12, pp 415-422, 2009
110. **Liao**, J. C., Elting, M.W., Delp, S.L., Spudich, J.A., Bryant, Z., Engineered myosin VI motors reveal minimal structural determinants of directionality and processivity, *Journal of Molecular Biology.*, vol 392, pp 863-867, 2009.
111. Chen CA, Lu W, **John** CT, Hargreaves BA, Reeder SB, Delp SL, Siston RA, Gold GE., Multiecho IDEAL Gradient-Echo Water-Fat Separation for Rapid Assessment of Cartilage Volume at 1.5 T *Radiology*, vol. 252, pp. 561-567, 2009.
112. **Parker**, D., Bryant, Z., Delp, S.L., Coarse-Grained Simulations of Molecular Motors with Multibody Dynamics, *Cell and Molecular Bioengineering*, vol. 2, pp. 366-374, 2010
113. Khatib, O, Demircan, E., Desapio, V, Besier, T., Delp, S.L., Robotics based synthesis of human motion, *Journal of Physiology*, vol. 103, pp 211-219, 2009
114. Damiano, D.L., Arnold, A.S., **Steele**, K., Delp, S.L., Can Strength Training Predictably Improve Gait Kinematics in Cerebral Palsy? *Physical Therapy*, vol, 90, pp. 269-279, 2010
115. **Fox**, M.D., Delp, S.L. Contributions of muscles and passive dynamics to swing initiation over a range of walking speeds, *Journal of Biomechanics*, vol 43, pp 1450-1455, 2010
116. Seth, A., Sherman, M., Eastman, P., and Delp, S. Minimal formulation of joint motion for biomechanisms, *Nonlinear Dynamics*, vol. 62, pp 291-303, 2010
117. **Llewellyn**, M.E., Thompson, K., Diesseroth, K., Delp, S.L., Orderly recruitment of motor units under optical control in vivo, *Nature Medicine*, vol. 16, pp. 1161–1165, 2010.
118. **Hamner**, S.R., Seth, A., Delp, S.L. Muscle contributions to propulsion and support during running, *Journal of Biomechanics*, vol 43, pp. 2709-2716., 2010
119. **Steele**, K.M., Seth, A., **Hicks**, J.L., Schwartz, M.S., Delp, S.L. Muscle contributions to support and progression during single-limb stance in crouch gait. *Journal of Biomechanics*, vol 43, pp 2099-2105, 2010.
120. **Agarwal-Harding**, K.J., Schwartz, M.H., Delp, S.L. Variations of hamstrings lengths and velocities with walking speed, *Journal of Biomechanics*, vol 43, pp 1522-1526, 2010.
121. **Arnold**, E.M., Ward, S.R., Lieber, R.L., Delp, S.L. A model of the lower limb for analysis of human movement, *Annals of Biomedical Engineering*, vol 38, pp 269-279. 2010.
122. **Keenan** K. E, Besier T.F., Pauly J.M., Han E, Rosenberg J., Smith R.L., Delp S.L., Beaupre G.S., Gold G.E., *Osteoarthritis Cartilage* 2010, 2010.
123. C.A. Chen, S.B. Goodman, B.A. Hargreaves, K.M. Koch, W. Lu, C.E. **Draper**, S.L. Delp G.E. Gold' New MR Imaging Methods for Metallic Implants in the Knee: Artifact Correction and Clinical Impact, *Journal of Magnetic Resonance Imaging*, 2010.
124. Pal, S., **Draper**, C.E., Fredericson, M., Gold, G.E., Delp, S.L., Beaupre, G.S., and Besier, T.F. Patellar maltracking correlates with vastus medialis activation delay in patellofemoral pain patients. *American Journal of Sports Medicine*, in press, 2010.

125. **Draper**, C.E., Besier, T.F., Santos, J.M., F., Fredericson, M., Gold, G.E., Beaupre, G.S., and Delp, S., Differences in patellofemoral kinematics between upright, weight-bearing and supine, non-weight-bearing conditions in patients with patellofemoral pain, *Journal of Orthopaedic Research*, 2010
126. Sacco A., Choi J., **Llewellyn** M., Kraft P., Shkreli M., Delp S.L., Blau, H., Dystrophin deficiency and diminished muscle stem cell function cooperate to cause muscular dystrophy, *Cell*, 2011.
127. **Arnold** EM, and Delp SL. Fibre operating lengths of human lower limb muscles during walking. *Philosophical Transactions of the Royal Society B: Biological Sciences* 366: 1530-1539, 2011.
128. Chen CA, Chen W, Goodman SB, Hargreaves BA, Koch KM, Lu W, Brau AC, Draper CE, Delp SL, and Gold GE. New MR imaging methods for metallic implants in the knee: artifact correction and clinical impact. *Journal of Magnetic Resonance Imaging* 33: 1121-1127, 2011.
129. **Draper** CE, Besier TF, Fredericson M, Santos JM, Beaupre GS, Delp SL, and Gold GE. Differences in patellofemoral kinematics between weight bearing and nonweight bearing conditions in patients with patellofemoral pain. *Journal of Orthopaedic Research* 29: 312-317, 2011.
130. **Draper** CE, Fredericson M, Gold GE, Besier TF, Delp SL, Beaupre GS, and Quon A. Patients with patellofemoral pain exhibit elevated bone metabolic activity at the patellofemoral joint. *Journal of Orthopaedic Research* 30: 209-213, 2011.
131. **Hicks** JL, Delp SL, and Schwartz MH. Can biomechanical variables predict improvement in crouch gait? *Gait & posture* 34: 197-201, 2011.
132. Higham TE, Biewener AA, and Delp SL. Mechanics, modulation and modelling: how muscles actuate and control movement. *Philosophical Transactions of the Royal Society B: Biological Sciences* 366: 1463-1465, 2011.
133. **Keenan** KE, Besier TF, Pauly JM, Han E, Rosenberg J, Smith RL, Delp SL, Beaupre GS, and Gold GE. Prediction of glycosaminoglycan content in human cartilage by age, T1 $\rho$  and T2 MRI. *Osteoarthritis and Cartilage* 19: 171-179, 2011.
134. Pal S, **Draper** CE, Fredericson M, Gold GE, Delp SL, Beaupre GS, and Besier TF. Patellar maltracking correlates with vastus medialis activation delay in patellofemoral pain patients. *The American journal of sports medicine* 39: 590-598, 2011.
135. Reinbolt JA, Seth A, and Delp SL. Simulation of human movement: applications using OpenSim. *Procedia IUTAM* 2: 186-198, 2011.
136. Seth A, Sherman M, Reinbolt JA, and Delp SL. OpenSim: a musculoskeletal modeling and simulation framework for in silico investigations and exchange. *Procedia IUTAM* 2: 212-232, 2011.
137. Sherman MA, Seth A, and Delp SL. Simbody: Multibody dynamics for biomedical research. *Procedia IUTAM* 2: 241-261, 2011.
138. **Steele** KM, **DeMers** MS, Schwartz MH, and Delp SL. Compressive tibiofemoral force during crouch gait. *Gait & Posture* 2011.
139. **Cromie** MJ, **Sanchez** GN, Schnitzer MJ, and Delp SL. Sarcomere lengths in human extensor carpi radialis brevis measured by microendoscopy. *Muscle & Nerve* 2012.

140. Delp SL, Ku JP, Pande VS, Sherman MA, and Altman RB. Simbios: an NIH national center for physics-based simulation of biological structures. *Journal of the American Medical Informatics Association* 19: 186-189, 2012.
141. **Draper** CE, Quon A, Fredericson M, Besier TF, Delp SL, Beaupre GS, and Gold GE. Comparison of MRI and  $^{18}\text{F}$ - $^{\text{NaF}}$  PET/CT in patients with patellofemoral pain. *Journal of Magnetic Resonance Imaging* 2012.
142. Fregly BJ, Besier TF, Lloyd DG, Delp SL, Banks SA, Pandy MG, and D'Lima DD. Grand challenge competition to predict in vivo knee loads. *Journal of Orthopaedic Research* 2012.
143. Hamner SR, and Delp SL. Muscle contributions to fore-aft and vertical body mass center accelerations over a range of running speeds. *Journal of biomechanics* 2012.
144. **John** CT, Anderson FC, Higginson JS, and Delp SL. Stabilisation of walking by intrinsic muscle properties revealed in a three-dimensional muscle-driven simulation. 2012.
145. **John** CT, Seth A, Schwartz MH, and Delp SL. Contributions of muscles to mediolateral ground reaction force over a range of walking speeds. *Journal of Biomechanics* 2012.
146. Pal S, Besier TF, **Draper** CE, Fredericson M, Gold GE, Beaupre GS, and Delp SL. Patellar tilt correlates with vastus lateralis: Vastus medialis activation ratio in maltracking patellofemoral pain patients. *Journal of Orthopaedic Research* 2012.
147. **Shull** PB, Shultz R, Silder A, Dragoo JL, Besier TF, Cutkosky MR, and Delp SL. Toe-in gait reduces the first peak knee adduction moment in patients with medial compartment knee osteoarthritis. *Journal of biomechanics* 2012.
148. Silder A, Besier T, and Delp SL. Predicting the metabolic cost of incline walking from muscle activity and walking mechanics. *Journal of biomechanics* 2012.
149. **Steele** K, Damiano D, Eek M, Unger M, and Delp S. Characteristics associated with improved knee extension after strength training for individuals with cerebral palsy and crouch gait. *Journal of Pediatric Rehabilitation Medicine* 5: 99-106, 2012.
150. **Steele** KM, Seth A, Hicks JL, Schwartz MH, and Delp SL. Muscle contributions to vertical and fore-aft accelerations are altered in subjects with crouch gait. *Gait & posture* 2012.
151. **Steele** KM, van der Krogt MM, Schwartz MH, and Delp SL. How much muscle strength is required to walk in a crouch gait? *Journal of Biomechanics* 2012.
152. van der Krogt MM, Delp SL, and Schwartz MH. How robust is human gait to muscle weakness? *Gait & Posture* 2012.
153. Wang JM, Hamner SR, Delp SL, and Koltun V. Optimizing locomotion controllers using biologically-based actuators and objectives. *ACM Transactions on Graphics (TOG)* 31: 25, 2012.
154. **Webb** JD, Blemker SS, and Delp SL. 3D finite element models of shoulder muscles for computing lines of actions and moment arms. 2012.
155. Kinney AL, Besier TF, Silder A, Delp SL, D'Lima DD, and Fregly BJ. Changes in in vivo knee contact forces through gait modification. *Journal of Orthopaedic Research* 31: 434-440, 2013.

156. Pal S, Besier TF, Beaupre GS, Fredericson M, Delp SL, and Gold GE. Patellar maltracking is prevalent among patellofemoral pain subjects with patella alta: An upright, weightbearing MRI study. *Journal of Orthopaedic Research* 31: 448-457, 2013.

### Books, Review Articles, Theses, and Book Chapters

1. Delp, S.L. Surgery simulation: A computer graphics system to analyze and design musculoskeletal reconstructions of the lower limb, Ph.D. Dissertation, Stanford University, 1990.
2. Delp, D.B. and Delp, S.L. Understanding human movement with computer graphics. *Soma: Engineering for the Human Body*, vol. 3, pp. 17-25, 1990.
3. Delp, S.L. Creating computer models of the human body for use in virtual reality surgical simulations. *Virtual Reality Systems*, vol. 1, no. 3, pp. 14-16, 1994.
4. Delp, S. L., Loan, J. P., Basdogan, C., Buchanan, T. S., Rosen, J. M. Surgical simulation: An emerging technology for military medical training. *Military Telemedicine On-Line Today*, IEEE Press, pp. 29-34, 1995.
5. Delp, S.L. Computer modeling and analysis of movement disabilities and their surgical corrections. *Human Motion Analysis: Current Applications and Future Directions*, Edited by G. F. Harris and P. A. Smith, IEEE Press, NJ, pp. 114-132, 1996.
6. Delp, S. L., Loan, J. P., Wong, A.Y, Rosen, J. M. Surgical simulation: Practicing trauma management techniques for emergency medicine. *Medical Simulation and Training*, vol. 1, pp. 22-30, 1996.
7. Medical Image Computing and Computer-Assisted Intervention, Lecture Notes in Computer Science, Springer-Verlag, New York, Edited by W. M. Wells, A. Colchester, and S. Delp, (1256 pages), 1998.
8. Delp, S. L., **Arnold**, A. S., **Piazza**, S. J. Clinical applications of musculoskeletal models in orthopaedics and rehabilitation, In Biomechanics and Neural Control of Movement, Edited by J. M. Winters and P.E. Crago, Springer-Verlag, New York, pp. 477-488, 2000.
9. Medical Image Computing and Computer-Assisted Intervention, Lecture Notes in Computer Science, Springer-Verlag, New York, Edited by S. Delp and T. DiGioia, (1250 pages), 2000.
10. Arnold, A.S., Delp, S. L., The role of musculoskeletal models in patient assessment and treatment, In Management of Movement Abnormalities in Cerebral Palsy, In Treatment of Gait Problems in Cerebral Palsy, Edited by J.R. Gage, Cambridge Press, 2004.
11. Jaramaz, B, Delp, S. L., Software Infrastructure for Computer Assisted Orthopaedic Surgery, In Hip and Knee Surgery: Navigation, Robotics and Computer Assisted Surgical Tools, pp. 63-68, 2004.
12. **Vasavada**, A.N., Delp, S. L., Lieber, R. L., Architectural Design and Function of Human Back Muscles, In *The Spine*, Edited by Rothman and Simeone, 5<sup>th</sup> Edition, (2006)
13. Anderson, F.C., Arnold, A.S., Pandy, M. G., **Goldberg**, S. R., Delp, S.L., Simulation of Walking, In Human Walking, Williams and Wilkins, 3<sup>rd</sup> Edition, pp. 193-208, 2006.
14. **Hicks**, J., Schwartz, M., Delp, S. L., Modeling and Simulation of Walking, In Diagnosis and Management of Movement Abnormalities in Cerebral Palsy, Edited by J.R. Gage, Cambridge Press, 2009.

15. Strang, K. A., Kroo, I., Gerritsen M., and Delp, S., Efficient Flight of Pterosaurs - an Aerodynamic Approach, AIAA-2009-1301, pp. 1-35, 2009.
16. Vasavada, A.N., Delp, S. L., Ward, S., and Lieber, R. L., Architectural Design and Function of Human Back and Neck Muscles, In *The Spine*, Edited by Rothman and Simeone, 2010
17. Saul KR, Delp SL, Gold GE, and Murray WM. Upper Limb Muscle Volumes in Adults. *Handbook of Anthropometry: Physical Measures of Human Form in Health and Disease* 355, 2012.

#### Conference Proceedings (Delp's students in bold)

1. Delp, S.L., Nielsen G., and Wood R.C. Design, development, and evaluation of a new body-powered arm prosthesis. *Proceedings, Ninth Annual Conference on Rehabilitation Engineering (RESNA)*, Minneapolis, MN, pp. 123-125, 1986.
2. Delp, S.L., Bollini G., and Bleck E.E. Biomechanical analysis of the Chiari hip osteotomy. *Proceedings, Eleventh Annual Meeting, American Society of Biomechanics*, Davis, CA, pp. 81-82, 1987.
3. Delp, S.L., Bollini G., and Bleck E.E. Biomechanical modeling of the Chiari hip osteotomy. *Proceedings, Tenth Annual Conference on Rehabilitation Engineering (RESNA)*, San Jose, CA, pp. 832-834, 1987.
4. Delp, S.L., Zajac F.E., Delp, D.B., Loan, J.P. A computer graphic system to study human movement. *Proceedings, Twelfth International Congress of Biomechanics*, Los Angeles, CA, pp. 169-170, 1989.
5. Delp, S.L., Loan, J.P., Hoy, M.G., Zajac, F.E., Topp E.L. An interactive graphics-based model of the lower extremity to simulate tendon transfer surgeries. *ASME :Advances in Bioengineering*, San Francisco, CA, pp. 167-168, 1989.
6. Delp, S.L., Loan, J.P., Hoy, M.G., Rosen, J.M. Computer simulation of lower extremity tendon transfers. *Proceedings, 36th Annual Meeting, Orthopaedic Research Society*, New Orleans, LA, p. 537, 1990.
7. Delp, S.L., Loan, J.P., Hoy, M.G., Zajac, F.E. Sensitivity of isometric muscle force to changes in tendon length. *Proceedings, First World Congress of Biomechanics*, La Jolla, California, p. 211, 1990.
8. Pieper, S.D., Delp S.L, Rosen, J.M., Fisher, S.S. A virtual environment system for simulation of leg surgery. *Stereoscopic Displays and Applications II*, SPIE vol. 1457, Bellingham, WA, pp. 188-197, 1991
9. Delp, S.L. Effect of hip center location on hip muscle strength, *Proceedings, Fifteenth Annual Meeting, American Society of Biomechanics*, Tempe, AZ, pp. 22-23, 1991.
10. Delp, S.L. Computer graphics applications in movement analysis. *Proceedings, Seventh Annual East Coast Gait Laboratory Conference*, Richmond, VA, pp. 1-4, 1991.
11. Pieper, S.D., Chen, D.C., Delp S.L, McKenna, M., Zeltzer, D., Rosen, J.M. Surgical simulation: from computer-aided design to computer-aided surgery, *Proceedings, Imagina , Conference on Computer Graphics*, Nice, France, pp. 57-65, 1991.
12. **Murray**, W.A., Delp, S. L., Buchanan, T. S. Development of a graphics-based model of the human elbow: moment arm calculation issues. *Proceedings, Second North American Congress on Biomechanics*, Chicago, IL, pp. 439-440, 1992.

13. **Ringwelski**, D., Delp, S. L., Carroll, N. C. Knee flexion moment arms of the rectus femoris after tendon transfer. *Proceedings Second North American Congress on Biomechanics*, Chicago, IL, pp., 91-92, 1992.
14. Delp, S. L., Komattu, A. V., Wixson, R. L. Superior displacement of the hip center in total hip arthroplasty: effects of trochanteric advancement and increasing prosthetic neck length. *Proceedings, 39th Annual Meeting, Orthopaedic Research Society*, San Francisco, CA, p. 435, 1993.
15. Delp, S.L and Carroll, N. C. Moment arms of the rectus femoris after tendon transfer. *Proceedings, Pediatric Orthopaedic Society of North America*, Memphis TN, 1993.
16. **Speers**, R., Delp, S. L., Moore, C. Length of hamstrings and psoas in crouch gait, *Proceedings Eighth East Coast Clinical Gait Conference*, Mayo Clinic, Rochester, MN, pp. 5-6, 1993.
17. Delp, S.L. and Loan, J.P. A software system to develop and analyze models of musculoskeletal structures. *Proceedings, Fourth International Conference on Computer Simulation in Biomechanics*, Paris, France, 1993.
18. Delp, S. L., **Statler**, K. Moment-generating characteristics of the triceps surae after lengthening of the Achilles tendon and the gastrocnemius aponeurosis. *Proceedings, Fourteenth International Society of Biomechanics Congress*, Paris, France, 1993.
19. Delp, S.L., **Riewald**, S. A. Function of the rectus femoris after tendon transfer. *Proceedings, American Academy of Cerebral Palsy and Developmental Medicine*, New Orleans, LA, 1994.
20. **Piazza**, S. J., and Delp, S.L. Factors affecting knee flexion during the swing phase of gait. *ASME: Advances in Bioengineering*, Chicago, IL, pp. 113-114, 1994.
21. Hurwitz, D. E., Andriacchi, T. P., Delp, S.L. The role of muscles in generating rotatory torques about the implant stem axis. *Proceedings, Eighteenth Annual Meeting, American Society of Biomechanics*, Columbus, OH, pp. 101-102, 1994.
22. **Statler**, K.D., Peterson, B.W., Delp, S.L., Keshner, E. Control of free head-neck movements in cats analyzed using a three-dimensional musculoskeletal model. *Proceedings, IEEE Engineering in Medicine and Biology Meeting*, Portland, OR, 1994.
23. Hurwitz, D. E., Andriacchi, T. P., Delp, S.L., Rosenberg, A. G., Galante, J. O. The relationship between gait adaptations and loading of the femoral stem in subjects with total hip replacements. *Proceedings, 41st Annual Meeting, Orthopaedic Research Society*, Orlando, FL, 1994.
24. Delp, S.L., **Riewald**, S. A. Function of the rectus femoris after tendon transfer. *Developmental Medicine and Child Neurology*, vol. 36, suppl. 70, p. 9, 1994.
25. **Riewald**, S., Piazza, S. , Delp, S.L. Actions of the rectus femoris muscle during stiff-knee gait. *Proceedings, Biomedical Engineering Society*, Tempe, AZ, October, 1994.
26. Peterson, B., Delp, S., Hain, T., Keshner, E., Li, S., Peng, G. Stabilization of the head during pitch and yaw rotations. *Proceedings, Association for Research in Otolaryngology*, February, 1995.
27. Delp, S.L. Computer modeling of movement disorders, *Proceedings, Second Annual North American Clinical Gait Laboratory Conference*, Waterloo, Ontario, Canada, 1995.
28. Buchanan, T.S., Delp, S.L., **Solbeck**, J.A. Muscular resistance to varus and valgus loads at the elbow, *Proceedings, Eighteenth Annual Meeting, American Society of Biomechanics*, Stanford, CA, 1995.

29. **Hess**, W.E., Delp, S.L. Variation of hip rotation moment arms with hip flexion. *Proceedings of the Eighteenth Annual Meeting, American Society of Biomechanics*, Stanford, CA, 1995.
30. Gonzalez, R. V., Delp, S. L., **Grierson**, A. E., Buchanan, T. S. Interplay of musculoskeletal geometry and muscle architecture in the human wrist, *Proceedings of the Eighteenth Annual Meeting, American Society of Biomechanics*, Stanford, CA, 1995.
31. Delp. S.L., Stern. S, Wixson, R. L. Total Joint Replacement: using musculoskeletal simulations to evaluate design alternatives. *Proceedings, ASME Summer Bioengineering Conference*, Beaver Creek, CO, July, 1995.
32. **Murray**, W.A., **Wyles**, D.L., Buchanan, T. S., Delp, S. L. Elbow muscle architecture and moment arms in differently sized specimens, *Proceedings, Engineering Foundation Conference*, Cleveland, OH, June, 1996.
33. **Statler**, K.D., Peterson, B.W., Delp, S.L. Building a model of the cat neck. *Proceedings, Third International Symposium of the Head-Neck System*, Vail, CO, July, 1995.
34. Li, S., **Vasavada**, A. N., Delp, S. L., Peterson, B.W. A biomechanical model of the head and neck musculoskeletal system. *Proceedings, Third International Symposium of the Head-Neck System*, Vail, CO, July, 1995.
35. **Vasavada**, A, Li, S., Delp, S.L.: Variation in neck muscle fascicle lengths with head position, *Proceedings, Nineteenth Annual Meeting, American Society of Biomechanics*, Atlanta, GA, 1996.
36. **Murray**, W.A., Buchanan, T. S., Delp, S. L. Variation of sarcomere lengths with elbow flexion angle, *Proceedings, Nineteenth Annual Meeting, American Society of Biomechanics*, Atlanta, GA, 1996.
37. Rosen J.M., Laub D.R., Pieper S.D., Mecinski A., Soltanian H., McKenna M., Chen D., Delp S.L., Loan P., Basdogan C. Virtual reality and medicine: from training systems to performance machines. *Proceedings, IEEE Annual Virtual Reality International Symposium*, San Jose, CA, 1996.
38. **Arnold**, A. S., Komattu, A. V., Delp, S. L. Internal rotation gait: A compensatory mechanism to restore abduction capacity decreased by bone deformity? *Proceedings, ASME Winter Annual Meeting*, Atlanta GA, 1996.
39. Delp. S.L., Stulberg, S.D., Robinson, C. B., **Piazza**, S. J., Wong, A. Y., Loan, J. P., Computer-based instrumentation for total knee replacement, *Proceedings, International Symposium on Computer-Assisted Orthopaedic Surgery*, Bern, Switzerland, 1996.
40. Basdogan C., Loan J.P., Rosen J.M., Delp S.L. An interactive model of the human lower limb for simulation of surgical procedures in virtual environments. *Proceedings, ASME Winter Annual Meeting*, Atlanta GA, 1996.
41. Li, S., **Vasavada**, A., Delp, S. L. Quantification of moment arms and Isometric strength of neck muscles in the neutral head position. *Proceedings, ASME Winter Annual Meeting*, Atlanta GA, 1996.
42. **Schmidt**, D. J., **Arnold**, A.S., Suryanarayanan, Delp, S.L. A computer simulation of derotational osteotomies, *Proceedings, North American Congress of Clinical Motion Analysis*, Chicago, IL 1997.
43. Li, S. **Vasavada**, A. N., Delp, S. L. Effect of cervical spine position on moment-generating potentials of neck muscles. *Proceedings, ASME Winter Annual Meeting*, Dallas, TX, 1997.
44. **Piazza**, S. J., Delp, S. L., Stulberg, S. D., Stern, S. H. Anterior placement of the femoral component in total knee replacement produces collateral ligament laxity, *Proceedings, 44th Annual Meeting, Orthopaedic Research Society*, New Orleans, LA, 1998.

45. **Piazza**, S. J., Delp, S. L., Stulberg, S. D., Stern, S. H. Posterior tilting of the tibial component decreases femoral rollback in posterior-substituting knee replacement, *Proceedings, 44th Annual Meeting, Orthopaedic Research Society*, New Orleans, LA, 1998.
46. Zhao, W., Kirsh, R., Triolo, R., Delp, S.L. A bipedal, closed-chain dynamic model of the human lower extremities and pelvis for simulation based development of standing and mobility neuroprostheses. *Proceedings, 20th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Vol. 20, pp. 2605-2608, 1998.
47. **Arnold**, A. S., Delp, S. L. Do the hamstrings and adductors cause excessive internal rotation of the hip in persons with cerebral palsy, *Proceedings, Third North American Congress on Biomechanics*, Waterloo, Ontario, Canada, 1998. Recipient of the **Young Scientist Award**, American Society of Biomechanics.
48. **Murray**, W., **Arnold**, A. S., **Salinas**, S., Durbhakula, M., Buchanan, T. S., Delp, S. L. Building Biomechanical Models Based on Medical Image Data: An Assessment of Model Accuracy, *Proceedings, First International Conference on Medical Image Computing and Computer Assisted Interventions*, Boston, MA, 1998.
49. **Piazza**, S. J., Delp, S. L. Forward-dynamic musculoskeletal simulation of total knee replacement motion. *Proceedings, ORS Symposium on Computational Methods in Biomechanics*, New Orleans, LA, 1998.
50. Zhao, W., Triolo, R., Kirsh, R., Delp, S.L. Three-dimensional dynamic modeling of unassisted standing by functional neuromuscular stimulation in individuals with paraplegia. *Proceedings, Fifth International Symposium on 3D Analysis of Human Movement*, pp. 73-76, Chattanooga, TN, 1998.
51. **Piazza**, S. J., Delp, S. L. Computer simulation of anteroposterior laxity test in total knee replacement, *Proceedings, 45th Annual Meeting, Orthopaedic Research Society*, Anaheim, CA, 1999.
52. Li, S., **Vasavada**, A., Delp, S. L. Isometric strength and electromyographic activities of neck muscles, *Proceedings, 45th Annual Meeting, Orthopaedic Research Society*, Anaheim, CA, 1999.
53. **Piazza**, S. J., Delp, S. L. Three dimensional dynamic simulation of total knee replacement motion during a stepup task. *Proceedings, ASME Summer Bioengineering Conference*, Big Sky, MT, June, 1999
54. **Piazza**, S. J., Cotton, A., Delp, S. L. Several factors contribute to stiff knee gait: a dynamic simulation on an individual subject, *Proceedings, North American Congress of Clinical Motion Analysis*, Dallas, TX, 1999.
55. **Piazza**, S. J., Delp, S. L. Conforming tibial inserts reduce condylar sliding during stepup: A Computer Simulation Study, *Proceedings, North American Congress of Clinical Motion Analysis*, Dallas, TX, 1999.
56. **Arnold**, A. S., Schmidt, D., King E., Delp, S. L. Do the hamstrings and adductors contribute to excessive internal rotation of the hip in persons with cerebral palsy, *Proceedings, North American Congress of Clinical Motion Analysis*, Dallas, TX, 1999. Recipient of the **Young Scientist Award**, Gait and Clinical Movement Analysis Society.
57. Witka, J., Khawly, R., **Arnold**, A. S., Delp, S.L. Dependence of estimated peak psoas and hamstring lengths on walking speed, *Proceedings, North American Congress of Clinical Motion Analysis*, Dallas, TX, 1999.
58. **Arnold**, A., **Salinas**, S., **Schmidt**, D., Delp, S. L. Evaluation of subject-specific musculoskeletal models derived from MR images, *Proceedings, North American Congress of Clinical Motion Analysis*, Dallas, TX, 1999.

59. Delp, S.L., **Piazza**, S. J. Dynamic Simulation of Stiff Knee Gait, *Proceedings, International Society of Biomechanics*, Calgary, Canada, 1999.
60. Delp, S.L., **Murray**, W.M., Buchanan, T.S. The functional capacity of elbow muscles, *Proceedings, International Society of Biomechanics*, Calgary, Canada, 1999.
61. **Vasavada**, A.N., Li, S., Delp, S.L. Three-dimensional spatial tuning of neck muscle activations, *Proceedings, International Society of Biomechanics*, Calgary, Canada, 1999.
62. **Salinas**, S., **Arnold**, A., **Schmidt**, D., Delp, S. L. Accuracy of subject-specific musculoskeletal models derived from magnetic resonance images, *Proceedings, Seventh International Symposium of Computer Simulation in Biomechanics*, Calgary, Canada, pp. 18-21, 1999.
63. **Arnold**, A, Delp, S. L. Deformation and scaling of musculoskeletal models: application to surgical planning, *Proceedings, American Society of Biomechanics*, Chicago, IL, 2000.
64. Triolo, R. J., Suryanarayanan, S., Delp, S. L., Kukke, S., Uhlir, J., **Murray**, W. Bhadra, N., Kirsch, R., Davis, J. A. A biomechanical model of the spine and trunk for simulation and control of posture and balance. *Proceedings, Twenty-third Annual Conference on Rehabilitation Engineering (RESNA)*, Long Beach, CA, pp. 1-3, 2000.
65. Pappas, G, **Asakawa**, D.J., Delp, S.L., Zajac, F.E., Drace, J.E. Anterior and Centerline Strains differ in the Biceps Brachii During Active Elbow Flexion, *Proceedings, American Society of Biomechanics*, Chicago, IL, 2000.
66. **Asakawa**, D.J., Pappas, G, Delp, S.L., Drace, J.E. Architecture of the Biceps Brachii Characterized with Ultrasound and MRI, *Proceedings, American Society of Biomechanics*, Chicago, IL, 2000.
67. **Asakawa**, D.J., Nayak, K., Delp, S.L., Nishimura, D., Pauly, J., Gold, G. Real-time MR imaging to study skeletal muscle motion, *Proceedings, 47th Annual Meeting, Orthopaedic Research Society*, San Francisco, CA, 2001.
68. **Goldberg**, S., Piazza, S., Delp, S. L., The importance of swing phase initial conditions in stiff knee gait: a case study, *Proceedings, North American Congress of Clinical Motion Analysis*, Sacramento, CA, 2001.
69. **Arnold**, A.S., **Blemker**, S. S., Delp, S. L., Accuracy of hamstrings and psoas lengths estimated with a deformable model: *Proceedings, North American Congress of Clinical Motion Analysis*, Sacramento, CA, 2001.
70. **Asakawa**, D.J., Gold, G., **Blemker**, S., Nayak, K., Nishimura, D., Pauly, J., Delp, S., Measurement of Skeletal Muscle Velocities Using Real-Time MR Imaging, *Proceedings, International Society of Magnetic Resonance Medicine*, Glasgow, Scotland 2001.
71. Thelen, D. G., **Riewald**, S. A., Delp, S. L., Abnormal muscular coordination in the lower extremity of cerebral palsy subjects, *Proceedings, American Society of Biomechanics*, San Deigo, CA, 2001.
72. **Asakawa**, D. J., **Blemker**, S. S., Gold, G, Delp, S. L., Relative motion of the rectus femoris and vastus intermedius during knee extension, *Proceedings, American Society of Biomechanics*, San Deigo, CA, 2001.
73. Anderson, F. C., Arnold, A. S., Pandy, M. G., Delp, S. L., Muscular control of stance phase knee extension during normal walking: a step toward identifying the causes of crouch gait, *Proceedings, American Society of Biomechanics*, San Deigo, CA, 2001.

74. **Blemker S., Asakawa, D.,** Gold, G., Delp S.L., Evaluation of rectus femoris transfer surgery using cine-PC MRI *Proceedings, International Society of Magnetic Resonance Medicine*, Honolulu, Hawaii, 2002.
75. Anderson, F. C., Thelen, D.G., Delp, S. L., Generating dynamic simulations of movement using computed muscle control, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
76. **Asakawa, D. J., Blemker, S. S.,** Gold, G, Delp, S. L., Velocity of the rectus femoris after tendon transfer surgery, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
77. **Goldberg, S.R.,** Anderson, F. C., Pandy, M.G., Delp, S. L., Factors that contribute to peak knee flexion in normal swing: implications for stiff knee gait., *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
78. Delp, S.L., **Piazza, S.J.,** Simulation-based design of knee replacement surgery, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
79. Delp S.L. and Herrman, A. M., Computer simulation of tendon transfer surgeries, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
80. Anderson, F.C., Goldberg, S. R., Pandy, M.G., Delp, S.L., Induced positions: intuitive quantities for characterizing muscle function, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
81. Anderson, F.C., Arnold, A. S., Delp, S.L., Reaction forces induced by muscles in the presence of compliant contact, *Proceedings, World Congress of Biomechanics*, Calgary, Canada, 2002
82. Delp, Asakawa, Pappas, Blemker, Zajac, and Drace. Measurement of muscle motion in vivo challenges common assumptions made in musculoskeletal models. *Proceedings, 12th Intl Conf Mechanics in Medicine and Biology*, Lemnos, Greece, 2002
83. Andriacchi, T.P., Delp, S.L., Yock, P., A project based approach to learning biomedical device design, *Proceedings, ASME Annual meeting*, 2002
84. JS Higginson, J.S., Zajac, F.E., Kautz, S.A., Neptune, R.R., Delp, S.L., Burgar, C.G., Can intrinsic mechanics of equinus result in knee extension? *Proceedings, Gait and Clinical Movement Analysis Society, 2003.*
85. Arnold, A. S., Anderson, F. C., Pandy, M. G., Delp, S. L., Muscle Actions during the Stance Phase of Normal Gait: Implications for the Treatment of Crouch Gait, *Proceedings, Gait and Clinical Movement Analysis Society, 2003.*
86. **Asakawa, D. J., Blemker, S. S.,** Rab, G., Bagley, A, Delp, S. L., Three-dimensional muscle-tendon geometry after rectus femoris transfer, *Proceedings, Gait and Clinical Movement Analysis Society, 2003.*
87. Anderson F.C., Hutchinson J.R., Delp S.L., Capacity of *Tyrannosaurus rex* to generate vertical ground reaction force. Annual Meeting of the Society for Experimental Biology. Southampton, England. 2003.
88. **Liu, M.,** Anderson, F.C., Delp S.L., Potential of muscles to influence forward progression during the single-support phase of normal gait. *Proceedings, ASME Summer Bioengineering Meeting, 2003.*
89. **Blemker, S.,** Delp, S.L., A 3D model of muscle reveals the causes of nonuniform strains in the biceps brachii, *Proceedings, American Society of Biomechanics, 2003.* Winner of the **Journal of Biomechanics Award.**

90. **Goldberg** S.R., Anderson F.C., Delp S.L., The muscles that influence peak knee flexion velocity during double support: Implications for stiff-knee gait. XIX<sup>th</sup> Congress of the International Society of Biomechanics, Dunedin, New Zealand, 2003.
91. G. E. Gold, T. F. Besier, C. E. **Draper**, D. S. **Asakawa**, S. L. Delp, G. S. Beaupre, Weight-bearing MRI of Patellofemoral Joint Cartilage, Proceedings, ISMRM, 2003
92. **Besier**, T, **Draper**, C., Gold, G. **Asakawa**, D., Beaupre, G., Delp S.L., Joint loading and knee flexion increase patellofemoral contact area, Proceedings, Orthopaedic Research Society, 2004.
93. **Siston**, R.A. and Delp S.L., A new functional determination of the hip joint center for computer-assisted total knee replacement. *Proceedings, Fourth International Conference on Computer Assisted Orthopaedic Surgery, 2004.*
94. **Siston**, RA., AC Daub, NJ Giori, SB Goodman, and SL Delp, Evaluation of methods for determining the center of the ankle for computer-assisted total knee replacement, *Proceedings, Fourth International Conference on Computer Assisted Orthopaedic Surgery, 2004*
95. **Ashby**, B.M., Delp, S.L., Optimal control simulations of standing long jumps, Proceedings, American Society of Biomechanics, 2004.
96. **Blemker**, S., Delp, S.L., Rectus femoris fiber excursions predicted by a 3D model of muscle, Proceedings, American Society of Biomechanics, 2004.
97. Arnold, A., **Liu**, M., Schwartz, M., Ounpuu, S., Dias, L., Delp, S.L., Muscle-tendon lengths and velocities of the hamstrings after surgical lengthening to correct crouch gait, Proceedings, American Society of Biomechanics, 2004. Recipient of the **Clinical Biomechanics Award**, American Society of Biomechanics.
98. Besier, T. F. Beaupré G. S. & Delp, S. L., Subject specific modeling to estimate patellofemoral joint contact stress. *Proceedings, American Congress of Science and Medicine in Sport*, Indianapolis, 2004.
99. **Holzbaur**, K., Murray, W., Delp, S.L., A musculoskeletal model of the upper extremity for surgical simulation and neurocontrol applications, *Proceedings, American Society of Biomechanics*, 2004.
100. Besier, T., Gold, G., **Draper**, C., Powers, C., Delp S.L., Beaupré, G., Methods to determine in vivo cartilage stress in the patellofemoral joint from weight bearing MRI, *Proceedings, American Society of Biomechanics*, 2004.
101. **Blemker** and Delp. 3D modeling of complex muscle geometry. *Proceedings, 12<sup>th</sup> Annual Symposium on Computational Methods in Orthopaedic Biomechanics*, San Francisco, CA, 2004.
102. Besier, T.F., Draper, C.E, Gold, G.E., Asakawa, D.E., Delp, S.L., Beaupré, G.S. Joint Loading and Knee Flexion Increase Patellofemoral Joint Contact Area. *Proceedings, Orthopaedic Research Society 50th Annual Meeting*, San Francisco, CA, 2004.
103. **Liu**, M., Anderson F.C., Pandy, M.G., Delp, S.L., Muscle contributions to forward progression during walking, *Proceedings, American Society of Biomechanics*, 2004.
104. **Blemker** and Delp. Rectus femoris fiber excursions predicted by a 3D model of muscle. *Proceedings, American Society of Biomechanics Meeting, Portland, OR*. 2004. **Outstanding Young Scientist Award.**
105. **Liu**, Arnold, Schwartz, Ounpuu, and Delp. Are treatments for crouch gait more likely to produce improved knee extension when hamstrings lengthenings are consistent with muscle-tendon lengths

- and velocities? *Proceedings, 9th Annual Meeting of the Gait and Clinical Movement Analysis Society*, Lexington, KY, 2004.
106. Gold, G.E., Besier, T.F., **Draper**, C.E., **Asakawa**, D.E., Delp, S.L., Beaupré, G.S. Weight-bearing MRI of Patellofemoral Joint Cartilage. *Proceedings, International Society for Magnetic Resonance in Medicine 12th Scientific Meeting*, Kyoto, Japan, 2004.
  107. **Saul** KR, Murray WM, Hentz VR, Delp SL. Biomechanics of the Steindler flexorplasty surgery: A computer simulation study. *Proceedings, 8<sup>th</sup> International Conference on Upper Limb Surgery for Tetraplegia*, Christchurch, New Zealand, 2004.
  108. **Siston**, R.A., Patel, J.P., Goodman, S.B., Delp, S.L., and Giori, N.J.: High Variability of Femoral Rotational Alignment in Total Knee Arthroplasty. *Proceedings, 51st Annual Meeting of the Orthopaedic Research Society*, 2005, Washington, DC, 2005.
  109. **Goldberg**, S., Öunpuu, S., Arnold, A., Gage, J., Delp, S.L., Improvements in stiff-knee gait are associated with decreases in stance-phase knee extension moments, *Proceedings, Gait and Clinical Movement Analysis Society*, 2005.
  110. **Blemker**, S., Sherbondy, A., Akers, D., Bammer, R., Delp, S., Gold, G., Characterization of skeletal muscle fascicle arrangements using diffusion tensor tractography, *Proceedings, International Society for Magnetic Resonance in Medicine*, 2005.
  111. Santos, J. M., Gold, T. F. Besier, B. A. Hargreaves, C. E. **Draper**, G. S. Beaupre, Delp, S.L., Full-Flexion Patellofemoral Joint Kinematics with Real-Time MRI at 0.5T, *Proceedings, International Society for Magnetic Resonance in Medicine*, 2005.
  112. Delp, S.L., **Asakawa**, D., **Blemker**, S., Pappas, G., Gold, G., Measurement of skeletal muscle motion with MRI improves the accuracy of biomechanical models, *Proceedings, International Society for Magnetic Resonance in Medicine*, 2005.
  113. **Jonkers**, I., Pattin, C., Arnold, A, Delp, S.L., Does dynamic reflex threshold of knee extensors predict musculotendon lengthening velocity during hemiparetic gait? *Proceedings, Gait and Clinical Movement Analysis Society*, 2005.
  114. **Liu**, M., Arnold, A., Goldberg, S., Thelen, D., Ounpuu, S, Anderson, C., Delp, S.L., Quadriceps force in stance limits knee flexion in swing: Insight from a subject-specific simulation of stiff-knee gait', *Proceedings, Gait and Clinical Movement Analysis Society*, 2005.
  115. Arnold, A., Anderson, F., **Liu**, M., **Goldberg**, S., Thelen, D., Ounpuu, S., Delp, S.L., Biomechanical efficacy of treatments for stiff-knee gait: a simulation based case study, *Proceedings, Gait and Clinical Movement Analysis Society*, 2005.
  116. Higginson, J., Zajac, F.E., Neptune, R.R., Kautz, S., Delp, S.L., Differences in muscle contributions to support in slow gait, *Proceedings, Gait and Clinical Movement Analysis Society*, 2005.
  117. **Goldberg**, S., Anderson, F.C., Delp, S.L., The influence of gastrocnemius geometry on its action at the knee during stance, *Proceedings, International Society of Biomechanics*, 2005.
  118. Higginson, J., Zajac, F.E., Neptune, R.R., Kautz, S., Delp, S.L., Reduced plantar flexor contributions to support in post-stroke hemiparetic gait, *Proceedings, International Society of Biomechanics*, 2005.
  119. Delp, S.L., **Liu**, M., Arnold, A., Anderson, F.C., Ounpuu, S., Goldberg, S., Thelen, D.G., Simulation-based treatment planning for stiff-knee gait, *Proceedings, ASME summer bioengineering meeting*, 2005.

120. Arnold, A., Anderson, F.C., Liu, M., Jonkers, I., Thelen, D., Delp, S.L., Simulation-based treatment planning for gait abnormalities: vision and challenges, Proceedings, International Society of Biomechanics, 2005
121. Anderson, F.C., Thelen, D., Arnold, A. **Liu**, M., Chumanov, E., Habib, A., Delp, S.L., Rapid generation of muscle actuated simulations of movement: application of computed muscle control to running and pathological gait, Proceedings, International Society of Biomechanics, 2005.
122. **Jonkers** I., Patten C., Arnold A., Delp S.L., Is the reflex threshold during the pendulum test related to the onset of vastus excitation during hemiparetic gait, Proceedings, International Society of Biomechanics, 2005.
123. Besier, T. F., Gold, G. E., Draper, C., Delp, S. L. & Beaupré G. S. (2005). A modeling framework to estimate patellofemoral joint cartilage stress in vivo. *Biomedical Engineering Society*, Baltimore, USA.
124. **Blemker**, Teran, Sifakis, Fedkiw, and Delp, Fast 3D Muscle Simulations using a new quasistatic invertible finite-element algorithm, *10th International Symposium on Computer Simulation in Biomechanics, Cleveland, OH, July, 2005*
125. **Draper**, Besier, Santos, Blemker, Pauly, Beaupré, Delp, and Gold. Estimation of Patellar Tendon Strain In Vivo During Static and Dynamic Loaded Knee Flexion. *Proceedings, International Society of Magnetic Resonance in Medicine Meeting, Miami Beach, FL, May, 2005.*
126. **Draper**, C., Fiene, A., Besier, T., Gold, G., Beaupré, G., Delp, S. Is Patellar Cartilage Thickness Reduced in Individuals with Patellofemoral Pain? International Society of Biomechanics XXth Congress, Cleveland, OH, 2005.
127. **Holzbaaur** KRS, Murray WM, Gold GE, Delp SL. Scaling of muscle volumes in the upper extremity. Proceedings, International Society of Biomechanics, Cleveland, Ohio, 2005.
128. Sherman, Schmidt, Paik, Blemker, Anderson, Delp, and Altman. The SimTK Framework for physics-based simulation of biological structures: preliminary design. *Proceedings of the Workshop on Component Models and Frameworks in High Performance Computing, Atlanta, GA, 2005*
129. **Siston**, R.A., Giori, N.J., Goodman, S.B., and Delp, S.L.: In-vivo Passive Kinematics of Osteoarthritic Knees. The XXth Congress of the International Society of Biomechanics, July 31-August 5, 2005, Cleveland, OH.
130. **Siston**, R.A., Goodman, S.B., Patel, J.P., Delp, S.L., and Giori, N.J.: The High Variability of Tibial Rotational Alignment in Total Knee Arthroplasty. Proceedings of The 2005 Knee Society Interim Meeting, Sept. 8-10, 2005, New York, NY.
131. Anderson F.C., Arnold A.S., Thelen D.G., **Liu** M.Q., Delp S.L. (2006). Using Subject-Specific Simulations to Understand Muscle Function during Walking. Symposium on Dynamic Walking, Ann Arbor, Michigan.
132. Besier, T. F., Gold, G. E., Delp, S. L. & Beaupré G. S. (2006). Patellofemoral cartilage stress is increased by femoral internal rotation. *Orthopaedic Research Society Annual Meeting*, Chicago, IL.
133. **Draper**, C., Kourtis, L., Santos, J., Besier, T., Gold, G., Beaupré G. & Delp, S. (2006). Feasibility of using real-time MRI to measure joint kinematics. *Proceedings, World Congress of Biomechanics*, Munich, Germany.
134. Epstein N.J., Besier T.F., **Draper** C.E., Yoon K., Fredericson M., Beaupré G.S., Delp S.L., Gold GE. MRI Analysis of Patellar and Femoral Rotation During Upright, Weight-Bearing Knee Flexion. *Proceedings, ARRS*, 2006.

135. Gold, G. E., Besier, T. F., **Draper**, C. E., Santos, J. M., Fredericson, M., Butts, K., Pauly, J., Beaupré G. S. and Delp, S. L. Patellofemoral Pain: Analysis with Upright Real-Time MRI and 3D Finite Element Modeling. *Proceedings, Society of Computed Body Tomography and Magnetic Resonance*, Arizona, 2006.
136. **Holzbaur** KRS, Delp SL, Murray WM. Moment-generating capacity of upper limb muscles. *Proceedings, World Congress of Biomechanics*. Munich, Germany, 2006
137. Liao, J.-C., **Parker**, D., Purcell, T.J., Spudich, J.A., Delp, S.L., Identifying the power stroke step of myosin V using computational dwell-time distribution analysis. Biophysical Society, Molecular Motors, Asilomar, California, 2006.
138. Liao, J.-C., **Parker**, D., Purcell, T.J., Spudich, J.A., Delp, S.L., Computational dwell-time distributions for single molecule experiments of molecular motors. Gordon Research Conference on Single Molecule Approaches to Biology, New London, New Hampshire, 2006.
139. Liao, J.-C., **Parker**, D., Spudich, J.A., Delp, S.L., A computational equivalent of single molecule dwell-time distributions. Biophysical Society 50th Annual Meeting, Salt Lake City, Utah, 2006.
140. Liao, J.-C., Purcell, T.J., Delp, S.L., Spudich, J.A., Identifying the power stroke step of myosin V using a novel dwell-time distribution analysis. Biophysical Society 50th Annual Meeting, Salt Lake City, Utah, 2006.
141. **Siston**, R.A., Giori, N.J., Goodman, S.B., and Delp, S.L.: Abnormal Passive Kinematics After TKA: In-vivo Analysis with Computer Navigation. Proceedings, 52nd Annual Meeting of the Orthopaedic Research Society, Chicago, IL, 2006
142. **Siston**, R.A., Goodman, S.B., Patel, J.P., Delp, S.L., and Giori, N.J.: The High Variability of Tibial Rotational Alignment in Total Knee Arthroplasty. Proceedings, Meeting of the American Academy of Orthopaedic Surgeons, Chicago, IL., 2006
143. **Draper**, C., Besier, T., Beaupré, G., Delp, S.L., Males have Thicker Load-bearing Patellofemoral Joint Cartilage than Females. Proceedings, International Society for Magnetic Resonance in Medicine, 2006.
144. Delp, S.L., Anderson, F.C., Arnold, A.S., **Liu**, M., Thelen, D.G., Simulation-based treatment planning for stiff-knee gait, Proceedings, American Society of Biomechanics, 2006.
145. Arnold, Schwartz, Thelen, Anderson, Jonkers, and Delp (2006). Muscle-actuated simulation and analysis of swing-phase knee motion during normal gait: implications for the treatment of crouch gait. Proceedings. *World Congress of Biomechanics*, Munich, Germany.
146. Jonkers, **Liu**, Arnold, Thelen, Anderson, Patten, and Delp (2006). Factors that impede forward progression during hemiparetic gait: a simulation-based case study. Proceedings. *World Congress of Biomechanics*, Munich, Germany.
147. Jonkers, **Liu**, Arnold, Anderson, Thelen, Patten, and Delp (2006). Muscle contributions to forward progression in hemiparetic gait at self-selected and fast speeds. Proceedings from the 1<sup>st</sup> Joint ESMAC-GCMAS Meeting, Amsterdam, The Netherlands.
148. Delp, Arnold, Liu, Anderson, and Thelen (2006). Simulation-based treatment planning for stiff-knee gait. Proceedings from the 29<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Blacksburg, VA.

149. **Hicks**, Arnold, Anderson, Schwartz, and Delp (2006). Tibial torsion reduces the capacity of muscles to extend the hip and knee during single limb stance. Proceedings from the *1<sup>st</sup> Joint ESMAC-GCMAS Meeting*, Amsterdam, The Netherlands.
150. **Liu**, Jonkers, Arnold, Schwartz, Thelen, Anderson, and Delp (2006). Dynamic simulations of slow, free, and fast walking: how do muscles modulate forward progression? Proceedings from the *1<sup>st</sup> Joint ESMAC-GCMAS Meeting*, Amsterdam, The Netherlands.
151. Anderson, John, Guendelman, Arnold, and Delp (2006). SimTrack: software for rapidly generating muscle-actuated simulations of long-duration movements. Proceedings from the *International Symposium on Biomedical Engineering*, Taipei, Taiwan.
152. Arnold, Thelen, Schwartz, Anderson, and Delp (2007). Preparing for heel strike: how muscles control knee extension during the terminal swing phase of gait. Proceedings from the *12<sup>th</sup> Annual Meeting of the Gait and Clinical Movement Analysis Society*, Springfield, MA.
153. Anderson, Guendelman, Loan, Habib, John, Arnold, Thelen, and Delp (2007). OpenSim: an open-source platform for simulating and analyzing musculoskeletal dynamics. Proceedings from the *30<sup>th</sup> Annual Meeting of the American Society of Biomechanics*, Palo Alto, CA.
154. **Fox**, Reinbolt, Arnold, Ounpuu and Delp (2007). Importance of preswing rectus femoris activity in stiff-knee gait: simulation-based analysis. Proceedings from the *30<sup>th</sup> Annual Meeting of the American Society of Biomechanics*, Palo Alto, CA.
155. Arnold, EM, Ward, SR, Lieber, RL, & Delp, SL (2007). Functional implications of optimal muscle fiber lengths of the ankle plantarflexors. American Society of Biomechanics Conference, Stanford, CA.
156. Besier, T. F., Beaupré G. S., Gold, G. E. Fredericson, M. & Delp, S. L. (2007). Muscle forces at the knee during walking and running in patients with patellofemoral pain. *American Society of Biomechanics*, Stanford, CA.
157. Besier, T. F., Delp, S. L., Gold, G. E. & Beaupré G. S. (2007). Influence of quadriceps muscle force distributions on cartilage stresses at the patellofemoral joint during running. *American Society of Biomechanics*, Stanford, CA.
158. Chen, C.A., **John**, C.T., Hargreaves, B.A., Reeder, S.B., Delp, S.L., Siston, R.A., and Gold, G.E.: Multi-Echo IDEAL-GRE Water-Fat Separation for Rapid Assessment of Cartilage Morphology. Proceedings of The 2007 International Society for Magnetic Resonance in Medicine Conference, 2007.
159. **Cromie**, **Siston**, Giori, Delp. Cruciate ligament removal contributes to abnormal knee motion during posterior stabilized total knee arthroplasty. American Society of Biomechanics Conference 2007, Stanford CA
160. **Draper**, C., Besier, T., Santos, J., Gold, G., Beaupré G. & Delp, S. (2007). Measurements of in vivo patellofemoral joint kinematics with real-time MRI. *American Society of Biomechanics*, Stanford, CA.
161. **Draper**, C.E., Santos, J.M., Kourtis, L., Besier, T.F., Beaupré, G.S., Delp, S.L., Gold, G.E. Accuracy of using real-time MRI for joint motion measurements: A phantom study. ISMRM 15th Scientific Meeting, Berlin, Germany, 2007.

162. **Hicks**, J., Arnold, A., Ounpuu, S., Schwartz, M., and Delp, S. Improved knee extension capacity following derotation of the tibia in a subject with crouch gait. Proceedings, Annual Meeting of the Gait and Clinical Movement Analysis Society, Springfield, MA, 2007.
163. **Hicks**, J.L., Schwartz, M.H., and Delp, S.L. Crouched gait postures reduce the capacity of uni-articular muscles to extend the hip and knee joints. In the Proceedings of the American Society of Biomechanics Annual Meeting, Stanford, CA, 2007.
164. **John**, F. C. Anderson, E. Guendelman, J. S. Higginson, S. L. Delp. Long-Duration Muscle-Actuated Simulations of Walking at Multiple Speeds. American Society of Biomechanics 2007, Stanford, California, 2007.
165. Keenan, K. E., Kourtis, L. C., Besier, T. F., Lindsey, D. P., Gold, G. E., Delp, S. L. & Beaupré G. S. (2007). Web-based resource for the computation of cartilage biphasic material properties with the interpolant response surface method. *Orthopaedic Research Society Annual Meeting*, San Diego, CA.
166. Liao, J.-C., Bryant Z., Delp S.L., Spudich, J.A., Computer-aided engineering of molecular motors to move toward opposite directions. 9th US National Congress on Computational Mechanics, San Francisco, California, 2007.
167. Liao, J.-C., Bryant Z., Delp S.L., Spudich, J.A., Dissecting the reverse power stroke of myosin VI. American Chemical Society Single Molecule Symposium, Boston, Massachusetts, 2007.
168. **Llewellyn** ME, Barretto RPJ, Schnitzer MJ, Delp SL. "*In vivo* sarcomere length measurement by minimally invasive microendoscopy." American Society of Biomechanics 2007, Microstrain **Award Paper**.
169. Sherbondy, Blemker, Arnold, Napel, Delp, and Gold. Measuring human gastrocnemius pennation angle utilizing most likely pathway distributions in diffusion tensor imaging, *International Society of Magnetic Resonance in Medicine Meeting, Berlin, Germany, May, 2007*.
170. **Webb**, J., Blemker, S.S., and Delp, S.L., Three-dimensional model of the supraspinatus muscle. Proceedings, *American Society of Biomechanics, Stanford, CA, 2007*.
171. **Strang**, K. A., Kroo, I., Gerritsen M., and Delp, S., Efficient flight of pterosaurs - an aerodynamic approach, 47th AIAA Aerospace Sciences Meeting, Orlando, Florida, January 5-8, 2009.

## Major Invited Presentations

1. Future health care technology: using computer graphics in medical decision making. Presented to President Clinton's Health Care Task Force, C. Everett Koop Institute, Hanover, NH, June 1993.
2. Computer-assisted surgical design. Robert Patterson Memorial Lecture, The Hospital for Special Surgery, Cornell Medical School, New York, NY, May, 1995.
3. Simulation of movement abnormalities. Keynote Lecture, International Society of Movement Analysis, Nagoya Japan, October, 1996.
4. Surgical simulation: opportunities and challenges. Keynote Lecture, Simulation Interoperability Standards Organization Annual Meeting, Orlando, FL, September, 1997.
5. Computer modeling of human movement. Keynote Lecture, European Society of Motion Analysis, Belfast, Ireland, September, 1998.
6. Digital Humans: from biomechanical models to simulated surgery, Keynote Lecture, Japan Society of Computer Assisted Surgery, Tokyo, Japan, March 2001.
7. Visiting Professor, Children's Memorial Hospital in Chicago, 2001
8. Simulation of movement disorders in children, keynote address at SIMOC (Societa' Italiana di Analisi del Movimento in Clinica), Bologna, Italy, 2002
9. Visiting Professor Pro Tempore of Biomedical Engineering, Cleveland Clinic Foundation, 2003
10. Keynote lecture, SIGGRAPH, ACM, Grenoble France, 2004
11. Gayle Arnold Keynote lecture, American Academy of Cerebral Palsy and Developmental Medicine, Los Angeles, CA 2004
12. Keynote address, World Congress of Rehabilitation, Hong Kong, 2006
13. Keynote address, Digital Human Symposium, Tokyo Japan, 2010

## Selected Invited Presentations (these do not include presentations given at conferences as a result of submission of proceedings)

1. Computer-aided design of orthopaedic surgical procedures. Presented at Orthopaedic Grand Rounds, University of California, Davis, Sacramento CA, 1989.
2. Design and analysis of musculoskeletal reconstructions. Presented to the Biomedical Engineering Department, Clemson University, Clemson, SC, 1989.
3. A graphics-based model of the lower limb to study human movement. Presented at Northwestern University, Evanston, IL, 1990.
4. Computer modeling of the human musculoskeletal system: applications to sports and rehabilitation, Presented at University of California, Berkeley, CA, 1990.
5. Computer graphics applications in movement analysis. Keynote lecture at the Sixth Annual Motion Laboratory Conference, Richmond, VA, 1991.
6. Creating virtual worlds for simulating surgery. Presented at the Annual meeting of the American College of Surgeons, Chicago, IL, 1991.

7. Optimization in hip replacement design. Presented to the Department of Orthopaedics, Rush Presbyterian Medical Center, Chicago, IL, 1992.
8. A biomechanical basis for the design of reconstructive surgeries. Presented at the Annual Meeting of the Plastic Surgery Research Council, Toronto, Canada, 1992.
9. Experience with virtual surgery. SIGGRAPH, International Conference on Computer Graphics, Chicago, IL, 1992.
10. Pathomechanics and correction of crouch gait. Presented at the Rehabilitation R&D Center, VA Medical Center, Palo Alto, CA, 1992.
11. Simulation of human body dynamics: a core technology for future biomedical research and development. Presented at the JASONS meeting, San Diego, CA, 1993.
12. Solving clinical problems with surgery simulation. Presented at the first NSF Workshop on Computer Assisted Surgery, Washington, DC, 1993.
13. Mechanics of human and animal locomotion. Presented at The University of Chicago, Chicago, IL, 1993.
14. Musculoskeletal biomechanics and injury prevention. Presented at General Motors Research Laboratories, Warren, MI, 1993.
15. Trauma care: a graphics-based system to evaluate the consequences of musculoskeletal injuries. Presented at the Images Conference, Tucson AZ, 1993.
16. Computer based analysis of pediatric movement disorders. Presented at the Gillette Children's Hospital, Minneapolis MN, 1993.
17. Modeling and simulation of human movement: applications in rehabilitation. Presented at the University of Minnesota, Minneapolis MN, 1993.
18. Simulation of movement disorders, Presented at the IEEE Conference on Engineering in Medicine and Biology, San Diego, CA, October, 1993.
19. The role of dynamical simulation in designing prosthetics and orthotics, Presented at the Meeting of the Midwest Society of Prosthetics and Orthotics, Chicago, IL, 1993.
20. Effects of musculoskeletal geometry on muscle function, Presented in the special session on New Advances in Muscle Research, Orthopaedic Research Society, New Orleans, LA, 1994.
21. Surgical simulations: applications to limb trauma. Presented at the Workshop on Advanced Technology Applications in Combat Casualty Care, Washington, DC, 1994.
22. Modeling the action of the rectus femoris muscle after tendon transfer, Presented at the Symposium on Modeling the Neuromuscular System, Second World Congress of Biomechanics, Amsterdam, The Netherlands, 1994.
23. Effects of musculoskeletal geometry on multi-joint muscles in normal and crouch gait. Presented at the Symposium on Muscle Function in Moving Animals, Second World Congress of Biomechanics, Amsterdam, The Netherlands, 1994.
24. Graphics-based design and analysis of total joint replacements. Presented at the Sixth Annual Conference on Techniques and Science for Successful Joint Arthroplasty, Burlington, VT, 1994.
25. Biomechanical analysis and simulation of posterior stabilized knees. Presented to the Department of Orthopaedic Surgery, Johns Hopkins University, Baltimore, MD, 1994.

26. Creation of the "virtual human." Presented at the Government Microcircuit Application Conference (GOMAC) , San Diego, CA, 1994.
27. Computer simulation of battlefield trauma. Presented at the Medicine Meets Virtual Reality Conference, San Diego, CA, 1995.
28. Simulation of traumatic injuries: a virtual environment for medical training. Presented at the National Forum on Telemedicine, Washington, DC, 1995.
29. Dynamic simulation of multi-joint movement. Presented to the Department of Mechanical and Aerospace Engineering, Cornell University, Ithaca NY, 1995.
30. Simulation of traumatic injuries: a tool for medical training. Presented to the Naval Medical Research and Development Command, Bethesda, MD, 1995.
31. Computer modeling of movement disorders. Keynote Presentation at the Second Annual North American Clinical Gait Laboratory Conference, Waterloo, CA, 1995.
32. Total joint replacement: using musculoskeletal simulations to evaluate design alternatives. Presented at ASME Summer Bioengineering Conference, Beaver Creek, CO, 1995.
33. Graphics-based analysis of pediatric deformities. Presented at the Departments of Biomedical Engineering and Orthopaedics, University of Virginia, Charlottesville, VA, 1995.
34. Analysis of multijoint movement abnormalities. Presented at the Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, 1995.
35. Biomechanical analysis of movement abnormalities, Presented at the Department of Mechanical Engineering, University of Illinois, Chicago, IL, 1995.
36. Computer-aided design of lower limb prosthetics. Presented at the Sandia National Laboratories, Albuquerque, NM, 1995.
37. Analyzing outcomes of gait-correcting surgeries. Presented at the Department Orthopaedics, University of Virginia, Charlottesville, VA, 1995.
38. Muscle function in normal, deformed, and surgically altered limbs. Presented at the Symposium on Applications of Basic Science to Rehabilitation, Marionjoy Rehabilitation Center, Weaton IL, 1995.
39. A virtual environment for training of emergency medical procedures. Presented at Medicine Meets Virtual Reality Conference, San Diego, CA, 1996.
40. Computer assisted surgery: from musculoskeletal models to image-guided surgery. Presented at the Symposium on Medical Robotics, Orthopaedic Research Society, Atlanta, GA, 1996.
41. Neuromechanical models: clinical applications in rehabilitation and orthopaedics. Presented at the Engineering Foundation Conference, Columbus, OH, 1996.
42. Computer modeling of musculoskeletal deformities and their surgical corrections, Presented at Columbia University, New York, NY, 1996.
43. Computer-based instrumentation for total knee arthroplasty. Presented at the International Symposium on Computer- Assisted Orthopaedic Surgery, Bern, Switzerland, 1996.
44. Computer simulation of movement disorders and their treatments. Presented at Stanford University, Mechanical Engineering Department, Stanford, CA, 1997.
45. Simulation-based design of joint replacement surgery. Presented at Stanford University, Department of Orthopaedics, Stanford, CA, 1997.

46. Principals of computer-assisted orthopaedic surgery. Presented at the First Annual Conference on Computer-Assisted Orthopaedic Surgery, Pittsburgh, PA, 1997.
47. Distance learning: simulation-based medical training on the internet. Presented at IEEE International Meeting on Engineering in Medicine and Biology, Chicago, IL, 1997.
48. Medical imaging for preoperative planning. Presented at the International Symposium on Computer-Assisted Orthopaedic Surgery, Bern, Switzerland, 1997.
49. Computer simulation of movement disorders and their treatments. Presented at the University of Michigan, Center for Ergonomics, Ann Arbor, MI, 1997.
50. Computer-assisted surgery: from medical imaging to image-guided surgery. Presented at Medicine Meets Virtual Reality Conference, San Diego, CA, 1998.
51. Surgery simulation: from musculoskeletal modeling to image guided surgery. Presented to the Department of Mechanical Engineering, Stanford University, Stanford, CA, 1998.
52. Analysis of pediatric movement deformities. Presented at the Shriners' Hospital for Children, Chicago, IL, 1998.
53. Integration of 3D motion data with musculoskeletal models. Presented at Rush Presbyterian Medical Center, Chicago, IL, 1998.
54. Surgery simulation: from musculoskeletal modeling to image guided surgery. Presented at the Johns Hopkins University, Department of Orthopaedic Surgery, Baltimore, MD, 1998.
55. Simulation-based design of joint replacement surgery. Presented at the Second Annual Conference on Computer-Assisted Orthopaedic Surgery, Pittsburgh, PA, 1998.
56. Computer graphics and animation in biomechanics. Presented at the Third North American Congress on Biomechanics, Waterloo, Canada, 1998.
57. Simulation of emergency medical procedures: state of the art and challenges for the future. Regents Lecture, American College of Surgeons, Orlando, FL, 1998.
58. Simulation-based surgical training. Presented at the American College of Surgeons Vascular Surgery Section, San Francisco, CA, 1999.
59. Dynamic simulation of stiff knee gait. Presented at the International Society of Biomechanics, Calgary, Canada, 1999.
60. Modeling normal and arthritic joints. Presented at the University of Washington, Seattle WA, 2000.
61. Planning for image guided surgery. Presented at Carnegie Melon University, Pittsburgh, PA, 2000.
62. Simulation-based design of musculoskeletal surgery. Presented at CARS 2000: Computer Assisted Radiology and Surgery, San Francisco, CA, 2000.
63. Dynamic simulation of human movement. Presented at the University of Colorado, Boulder, CA, 2000.
64. Surgery simulation: from biomechanical models to computer assisted surgery. Presented at the University of California, San Francisco, CA, 2000.
65. Managing motor impairments in cerebral palsy. Presented at the University of Virginia, Charlottesville, VA, 2000.
66. Dynamic simulation of movement disorders. Presented at NIH, Bethesda, MD, 2001.

67. Digital Humans: from biomechanical models to simulated surgery. Presented at the University of Utah, Salt Lake City, UT, 2001.
68. Digital Humans for Surgical Design. Presented at Osaka University, Osaka, Japan, 2001.
69. Dynamic simulation of movement disorders. Presented at National Institutes of Child Health and Human Development, Bethesda, MD, 2002.
70. Simulation-based design of knee replacement surgery, Presented at the World Congress of Biomechanics, Calgary, Canada, 2002
71. Computer simulation of tendon transfer surgeries, Presented at the World Congress of Biomechanics, Calgary, Canada, 2002
72. Measurements of muscle motion challenge assumptions made in musculoskeletal models, Invited presentation at International Congress of Mechanics in Medicine and Biology, Lemnos, Greece, 2002
73. Computer assisted orthopaedic surgery, Instituti Ortopedici Rizzoli , Bologna, Italy 2002
74. Visiting professor – Bioengineering Department, Istituto Politecnico, Milano, Italy, 2002.
75. Measurement of Skeletal Muscle Motion with MRI Improves the Accuracy of Biomechanical Models, ISMRM, Miami Beach, FL, 2005

## Patents

Delp, S.L., Loan, J. P., Robinson, C. B., Stulberg, S.D., Wong, A. Y.: Computer Assisted Surgical System  
US patent No. 5,682,886, 1997.

Delp, S.L., Loan, J. P., Robinson, C. B., Stulberg, S.D., Wong, A. Y.: Computer Assisted Surgical Method  
US patent No. 5,871,018, 1999.

(Note: the two patents above were licensed to Medtronic as a platform for their products in image-guided surgery)

Delp, S.L., Giori, N., Siston, R.L.: Method for Improved Rotational Alignment in Joint Arthroplasty,  
US patent No. 6,090,911 (pending)

Delp, S.L., Llewellyn, M., Barretto, R., Schnitzer, M., Minimally Invasive Microendoscopy to  
Image Skeletal and Cardiac Muscle US patent No. 5,871,018, 2011

Sanchez, G., Delp, S.L., Llewellyn, M., Barretto, R., Schnitzer, M., SYSTEM AND METHOD  
USEFUL FOR SARCOMERE IMAGING VIA OBJECTIVE-BASED MICROSCOPY  
(pending)

Delp, S.L., Llewellyn, M., Diesseroth, K., Materials and Approaches for Optical Stimulation of the  
Peripheral Nervous System (pending)

(Note: the patent above was licensed to Circuit Therapeutics Corp. to enable optogenetic control of neural activity in the peripheral nervous system)

**Sponsored Research (current support in bold)****Principal Investigator**

Title: A Program for Computer Modeling in Rehabilitation Research

Role: Principal Investigator

Dates: 1/91-1/97

Funding: \$250,000

Source of support: The Baxter Foundation

Title: Computer-Assisted Analysis and Design of Hip Replacements

Role: Principal Investigator

Dates: 10/1/91-2/28/94

Funding: \$70,000

Source of support: NSF

Title: Surgical Simulation: Computer Graphics Models of the Human Musculoskeletal System

Role: Principal Investigator

Dates: 3/1/92-2/28/95

Funding: \$180,000

Source of support: Whitaker Foundation

Title: Surgical simulation for limb trauma management

Role: Principal Investigator

Dates: 7/1/94-6/30/96

Funding: \$650,000

Source of support: ARPA (Advanced Research Project Agency).

Title: Scaling in Musculoskeletal Structures

Role: Principal Investigator

Dates: 10/1/92-9/30/98

Funding: \$325,000

Source of support: NSF National Young Investigator Award

Title: Kinematic Analysis of Posterior Stabilized Knees

Role: Principal Investigator

Dates: 7/1/95-12/31/95

Funding: \$15,000

Source of support: Implex Corporation

Title: Muscle Lengths in Crouch Gait

Role: Principal Investigator

Dates: 6/1/96-5/30/98

Funding: \$98,000

Source of support: United Cerebral Palsy Foundation

Title: A Graphics Supercomputer to Link NIH Investigators

Role: Principal Investigator

Dates: 12/1/96-11/30/97

Funding: \$161,600

Source of support: NIH

Title: Standing by Functional Neuromuscular Stimulation

Role: Principal Investigator

Dates: 10/1/96-9/31/99

Funding: \$148,000

Source of support: NIH  
Title: Trauma Management Simulation and Training  
Role: Principal Investigator  
Dates: 10/1/96-6/30/98  
Funding: \$1,548,000  
Source of support: DARPA (Defense Advanced Research Project Agency).

Title: Powell Faculty Research Award  
Role: Principal Investigator  
Dates: 3/1/99-12/31/01  
Funding: \$150,000  
Source of support: Powell Foundation

Title: Internet2: A Platform for Computer Assisted Orthopaedic Surgery  
Role: Principal Investigator  
Dates: 7/1/01-6/30/02  
Funding: \$20,000  
Source of support: Information Technology Systems

Title: Muscle Function in Deformed and Surgically Altered Limbs  
Role: Principal Investigator  
Dates: 7/1/96-6/30/06  
Funding: \$806,000  
Source of support: NIH (R01)

Title: Muscle Function after Tendon Transfer Surgery  
Role: Principal Investigator  
Dates: 7/1/99-6/30/04  
Funding: \$1,219,000  
Source of support: NIH (R01)

Title: Muscle Function in Deformed and Surgically Altered Limbs  
Role: Principal Investigator  
Dates: 7/1/01-6/30/08  
Funding: \$1,440,000  
Source of support: NIH

Title: How Myosin V Walks: 3D Simulation Brings Life to Atomic Structures of Motor Proteins  
Role: Principal Investigator  
Dates: 1/1/03-12/31/08  
Funding: \$140,000  
Source of support: BioX Interdisciplinary Initiatives Program

Title: Interdisciplinary Training in Regenerative Medicine  
Role: Program Co-Director (with Michael Longaker)  
Dates: 10/1/04-9/30/09  
Funding: \$2,600,000  
Source of support: NIH

Title: Biomedical Computation Training at Stanford  
Role: Program co-director with Russ Altman  
Dates: 3/1/01-2/28/010  
Funding: \$2,455,651  
Source of support: NIH

Title: Simulation-based treatment planning for gait disorders  
Role: Principal Investigator  
Dates: 4/1/04-3/31/09  
Funding: \$1,580,000  
Source of support: NIH

Title: Multicolor Optical Control of Skeletal Muscle  
Role: Principal Investigator  
Dates: 1/1/09-12/31/11  
Funding: \$140,000  
Source of support: Bio-X

Title: Translational Research Partnership in Biomedical Engineering  
Role: Principal Investigator  
Dates: 10/1/05-9/31/11  
Funding: \$5,000,000  
Source of support: Coulter Foundation

**Title: Physics-based simulation of biologic structures**  
**Role: Principal Investigator with Russ Altman**  
**Dates: 9/1/04-8/30/14**  
**Funding: \$29,876,000**  
**Source of support: NIH**

**Title: Tools to Develop the NeuroMusculoSkeletal Physiome**  
**Role: Principal Investigator**  
**Dates: 1/1/09-12/31/13**  
**Funding: \$729,000**  
**Source of support: European Union**

**Title: Biomechanics and Correction of Crouch gait**  
**Role: Principal Investigator**  
**Dates: 9/1/09-8/30/13**  
**Funding: \$825,000**  
**Source of support: NIH**

**Title: National Center for Simulation in Rehabilitation Research**  
**Role: Principal Investigator**  
**Dates: 9/1/10-8/30/15**  
**Funding: \$4,440,000**  
**Source of support: NIH**

**Title: Mechanisms and Treatment of Neuropathic Pain**  
**Role: Principal Investigator**  
**Dates: 9/1/10-8/30/15**  
**Funding: \$350,000**  
**Source of support: Neuroventures Program**

**Title: OPENSIM: Biologically Accurate Simulation of Warrior Web Effectiveness**

**Role: Principal Investigator**

**Dates: 9/1/10-8/30/15**

**Funding: \$1,800,000**

**Source of support: DARPA**

**Title: Optogenetic inhibition of motor neuron and muscle activity in vivo**

**Role: Principal Investigator**

**Dates: 9/1/10-8/30/17**

**Funding: \$1,563,000**

**Source of support: NIH**