

Stanford



Scott L. Delp, Ph.D.

Director, Human Performance Alliance at Stanford (HPA), James H. Clark Professor in the School of Engineering, Professor of Bioengineering, of Mechanical Engineering and, by courtesy, of Orthopaedic Surgery

CONTACT INFORMATION

• Alternate Contact

Diane Bush - Executive Assistant & NMBL Coordinator

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Bio

BIO

Scott Delp is the James H. Clark Professor, Founding Chairman of the Department of Bioengineering at Stanford, and Director of the National Center for Simulation in Rehabilitation Research. Delp transformed the field of biomechanics by creating highly accurate computer models of musculoskeletal structures and providing them to researchers worldwide using a software system (OpenSim) that he and his team developed. Delp invented fundamental technology for surgical navigation that is now in wide clinical use. Together with Mark Schnitzer and their students, Delp developed novel microendoscopes that allow realtime in vivo imaging of human muscle microstructure. Together with Karl Deisseroth and their students, Delp pioneered the use of optogenetics to control activity in the peripheral nervous system leading to important inventions for treating paralysis, spasticity and pain.

ACADEMIC APPOINTMENTS

- Professor, Bioengineering
- Professor, Mechanical Engineering
- Professor (By courtesy), Orthopaedic Surgery
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Director, Mobilize Center: NIH National Center of Excellence for Big Data in Mobile Health, (2014- present)
- Director, National Center for Simulation in Rehabilitation Research (NCSRR), (2010- present)
- Chairman, Bioengineering Department, (2002-2007)
- Co-Director, NIH Center for Biomedical Computation at Stanford (Simbios), (2001- present)
- Chairman, Biomechanical Engineering Division, (2000-2002)

HONORS AND AWARDS

- Goel Award for Translational Research in Biomechanics, American Society of Biomechanics (2019)

- Member, National Academy of Engineering (2016)
- Fellow, American Society of Biomechanics (2012)
- Giovanni Borelli Award, American Society of Biomechanics (2011)
- James H. Clark Professor, Stanford University (2009-)
- Van C. Mow Medal, Am Soc. Mech. Eng (2008)
- Charles Lee Powell Professor, Stanford University (2006-2009)
- Distinguished Alumnus Award, Colorado State University (2005)
- Maurice E Muller Award, Excellence in Computer Assisted Surgery (2004)
- Fellow, American Institute of Biological and Medical Engineers (2003)
- Powell Faculty Scholar, Stanford University (2000)
- Technology Reinvestment Award, White House (1993)
- National Young Investigator Award, NSF (1992-1998)
- Baxter Faculty Fellow, Baxter Foundation (1991)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Mechanical Engineering (1990)
- M.S., Stanford University , Mechanical Engineering (1986)
- B.S., Colorado State University , Mechanical Engineering (1983)

LINKS

- Neuromuscular Biomechanics Lab: <https://web.stanford.edu/group/nmbl/>
- Google Scholar Profile: <https://scholar.google.com/citations?hl=en&user=OEivUAQAAAAJ>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Experimental and computational approaches to study human movement. Development of biomechanical models to analyze muscle function, study movement abnormalities, design new medical products, and guide surgery. Imaging technology development including MRI and microendoscopy. Biomedical technology development.

Teaching

COURSES

2020-21

- Biomechanics of Movement: BIOE 281, ME 281 (Win)

2019-20

- Biomechanics of Movement: BIOE 281, ME 281 (Win)
- Modeling and Simulation of Human Movement: ME 485 (Spr)

2018-19

- Biomechanics of Movement: BIOE 281, ME 281 (Win)

2017-18

- Biomechanics of Movement: BIOE 281, ME 281 (Win)

- Modeling and Simulation of Human Movement: BIOE 485, ME 485 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Peter Dykstra, Patrick Franks, Cara Nunez

Postdoctoral Faculty Sponsor

Ryan Alcantara, Antoine Falisse, Reed Gurchiek

Doctoral Dissertation Advisor (AC)

Nick Bianco, Melissa Boswell, Marissa Lee, Johanna O'Day, Kirsten Seagers, Jon Stingel, Kevin Thomas

Doctoral Dissertation Co-Advisor (AC)

Abisola Kusimo, Patrick Slade, Cara Welker

Master's Program Advisor

Ashley Lowber, Man Wu

Doctoral (Program)

Melissa Boswell, Nicholas Cecchi, Peter Dykstra, Ananya Goyal, Wing-Sum Law, Cara Welker

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Assessment of Extractability and Accuracy of Electronic Health Record Data for Joint Implant Registries.** *JAMA network open*
Giori, N. J., Radin, J., Callahan, A., Fries, J. A., Halilaj, E., Re, C., Delp, S. L., Shah, N. H., Harris, A. H.
2021; 4 (3): e211728
- **A neural network to predict the knee adduction moment in patients with osteoarthritis using anatomical landmarks obtainable from 2D video analysis.** *Osteoarthritis and cartilage*
Boswell, M. A., Uhlrich, S. D., Kidzinski, L., Thomas, K., Kolesar, J. A., Gold, G. E., Beaupre, G. S., Delp, S. L.
2021
- **Transcutaneous Afferent Patterned Stimulation Therapy Reduces Hand Tremor for One Hour in Essential Tremor Patients** *FRONTIERS IN NEUROSCIENCE*
Yu, J. Y., Rajagopal, A., Syrkin-Nikolau, J., Shin, S., Rosenbluth, K. H., Khosla, D., Ross, E. K., Delp, S. L.
2020; 14: 530300
- **Prospective Home-use Study on Non-invasive Neuromodulation Therapy for Essential Tremor** *TREMOR AND OTHER HYPERKINETIC MOVEMENTS*
Isaacson, S. H., Peckham, E., Tse, W., Waln, O., Way, C., Petrossian, M. T., Dahodwala, N., Soileau, M. J., Lew, M., Dietiker, C., Luthra, N., Agarwal, P., Dhall, et al
2020; 10
- **The effects of motor modularity on performance, learning and generalizability in upper-extremity reaching: a computational analysis.** *Journal of the Royal Society, Interface*
Al Borno, M., Hicks, J. L., Delp, S. L.
2020; 17 (167): 20200011
- **Automated Classification of Radiographic Knee Osteoarthritis Severity Using Deep Neural Networks.** *Radiology. Artificial intelligence*
Thomas, K. A., Kidzinski, L., Halilaj, E., Fleming, S. L., Venkataraman, G. R., Oei, E. H., Gold, G. E., Delp, S. L.

2020; 2 (2): e190065

- **Optogenetic chronic neuromodulation of the diabetic cystopathy mouse model - histology and bladder tissue analysis**
Wallace, S., Tran, D., Briggs, M., Wen, Y., Montgomery, K., Zhuang, G., Dibberfuhr, A., Delp, S., Chen, B.
WILEY.2020: S48–S49
- **Optogenetic chronic neuromodulation of the diabetic cystopathy mouse model - functional effect**
Wallace, S., Briggs, M., Wen, Y., Tran, D., Montgomery, K., Zhuang, G., Dobberfuhr, A., Delp, S., Chen, B.
WILEY.2020: S47–S48
- **Optogenetic chronic neuromodulation of the diabetic cystopathy mouse model - study design**
Wallace, S., Wan, Y., Briggs, M., Tran, D., Montgomery, K., Zhuang, G., Dobberfuhr, A., Delp, S., Chen, B.
WILEY.2020: S44–S45
- **Microendoscopy detects altered muscular contractile dynamics in a mouse model of amyotrophic lateral sclerosis.** *Scientific reports*
Chen, X., Sanchez, G. N., Schnitzer, M. J., Delp, S. L.
2020; 10 (1): 457
- **High-fidelity musculoskeletal modeling reveals a motor planning contribution to the speed-accuracy tradeoff.** *eLife*
Al Borno, M. n., Vyas, S. n., Shenoy, K. V., Delp, S. L.
2020; 9
- **Rapid volumetric gagCEST imaging of knee articular cartilage at 3 T: evaluation of improved dynamic range and an osteoarthritic population.** *NMR in biomedicine*
Watkins, L. E., Rubin, E. B., Mazzoli, V. n., Uhlrich, S. D., Desai, A. D., Black, M. n., Ho, G. K., Delp, S. L., Levenston, M. E., Beaupré, G. S., Gold, G. E., Kogan, F. n.
2020: e4310
- **The turning and barrier course reveals gait parameters for detecting freezing of gait and measuring the efficacy of deep brain stimulation.** *PLoS one*
O'Day, J. n., Syrkin-Nikolau, J. n., Anidi, C. n., Kidzinski, L. n., Delp, S. n., Bronte-Stewart, H. n.
2020; 15 (4): e0231984
- **Prospective Home-use Study on Non-invasive Neuromodulation Therapy for Essential Tremor.** *Tremor and other hyperkinetic movements (New York, N.Y.)*
Isaacson, S. H., Peckham, E. n., Tse, W. n., Waln, O. n., Way, C. n., Petrossian, M. T., Dahodwala, N. n., Soileau, M. J., Lew, M. n., Dietiker, C. n., Luthra, N. n., Agarwal, P. n., Dhall, et al
2020; 10: 29
- **Foot strike pattern during running alters muscle-tendon dynamics of the gastrocnemius and the soleus.** *Scientific reports*
Yong, J. R., Dembia, C. L., Silder, A. n., Jackson, R. W., Fredericson, M. n., Delp, S. L.
2020; 10 (1): 5872
- **Pre-operative gastrocnemius lengths in gait predict outcomes following gastrocnemius lengthening surgery in children with cerebral palsy.** *PLoS one*
Rajagopal, A., Kidzinski, L., McGlaughlin, A. S., Hicks, J. L., Delp, S. L., Schwartz, M. H.
2020; 15 (6): e0233706
- **Deep neural networks enable quantitative movement analysis using single-camera videos.** *Nature communications*
Kidzi#ski, #. n., Yang, B. n., Hicks, J. L., Rajagopal, A. n., Delp, S. L., Schwartz, M. H.
2020; 11 (1): 4054
- **OpenSim Moco: Musculoskeletal optimal control.** *PLoS computational biology*
Dembia, C. L., Bianco, N. A., Falisse, A. n., Hicks, J. L., Delp, S. L.
2020; 16 (12): e1008493
- **OPTOGENETIC NEUROMODULATION IN THE DIABETIC CYSTOPATHY MOUSE MODEL**
Wallace, S. L., Briggs, M. A., Tran, D. T., Wen, Y., Montgomery, K., Zhuang, G., Dobberfuhr, A. D., Delp, S., Chen, B. H.
SPRINGER LONDON LTD.2019: S272
- **Connecting the legs with a spring improves human running economy.** *The Journal of experimental biology*
Simpson, C. S., Welker, C. G., Uhlrich, S. D., Sketch, S. M., Jackson, R. W., Delp, S. L., Collins, S. H., Selinger, J. C., Hawkes, E. W.
2019

- **OpenSim: a musculoskeletal modeling and simulation framework for in silico investigations and exchange.** *Procedia IUTAM*
Seth, A. n., Sherman, M. n., Reinbolt, J. A., Delp, S. L.
; 2: 212–32
- **Simbody: multibody dynamics for biomedical research.** *Procedia IUTAM*
Sherman, M. A., Seth, A. n., Delp, S. L.
; 2: 241–61
- **An Acute Randomized Controlled Trial of Noninvasive Peripheral Nerve Stimulation in Essential Tremor** *NEUROMODULATION*
Pahwa, R., Dhall, R., Ostrem, J., Gwinn, R., Lyons, K., Ro, S., Dietiker, C., Luthra, N., Chidester, P., Hamner, S., Ross, E., Delp, S.
2019; 22 (5): 537–45
- **Best practices for analyzing large-scale health data from wearables and smartphone apps** *NPJ DIGITAL MEDICINE*
Hicks, J. L., Althoff, T., Susic, R., Kuhar, P., Bostjancic, B., King, A. C., Leskovec, J., Delp, S. L.
2019; 2
- **GAIT RETRAINING AS A CONSERVATIVE TREATMENT FOR MEDIAL KNEE OSTEOARTHRITIS**
Mazzoli, V., Uhlrich, S., Rubin, E., Kogan, F., Heargraves, B., Delp, S., Beaupre, G. S., Gold, G. E.
ELSEVIER SCI LTD.2019: S349
- **GAGCEST MRI AT 3T CAN DETECT CARTILAGE DIFFERENCES BETWEEN HEALTHY AND OSTEOARTHRITIC SUBJECTS**
Rubin, E., Watkins, L., Mazzoli, V., Desai, A. D., Ho, G., Kogan, F., Ulrich, S., Kolesar, J., Delp, S., Beaupre, G., Gold, G. E.
ELSEVIER SCI LTD.2019: S355–S356
- **SIX WEEKS OF PERSONALIZED GAIT RETRAINING TO OFFLOAD THE MEDIAL COMPARTMENT OF THE KNEE REDUCES PAIN MORE THAN SHAM GAIT RETRAINING**
Uhlrich, S. D., Kolesar, J. A., Silder, A., Berkson, M. Z., Presten, B., Montague-Alamin, H. A., Edouard, N., Willoughby, D., Finlay, A. K., Gold, G. E., Delp, S. L., Beaupre, G. S.
ELSEVIER SCI LTD.2019: S28
- **A murine model of chronic sacral neuromodulation using the optogenetic technique**
Wallace, S. L., Briggs, M. A., Wen, Y., Montgomery, K., Dobberfuhr, A. D., Zhuang, G., Diaz, E. C., Delp, S., Chen, B.
WILEY.2019: S15
- **An Acute Randomized Controlled Trial of Noninvasive Peripheral Nerve Stimulation in Essential Tremor.** *Neuromodulation : journal of the International Neuromodulation Society*
Pahwa, R., Dhall, R., Ostrem, J., Gwinn, R., Lyons, K., Ro, S., Dietiker, C., Luthra, N., Chidester, P., Hamner, S., Ross, E., Delp, S.
2019
- **Patellofemoral cartilage stresses are most sensitive to variations in vastus medialis muscle forces** *COMPUTER METHODS IN BIOMECHANICS AND BIOMEDICAL ENGINEERING*
Pal, S., Besier, T. F., Gold, G. E., Fredericson, M., Delp, S. L., Beaupre, G. S.
2019; 22 (2): 206–16
- **Automatic real-time gait event detection in children using deep neural networks.** *PloS one*
Kidzinski, L., Delp, S., Schwartz, M.
2019; 14 (1): e0211466
- **The Interaction of Compliance and Activation on the Force-Length Operating Range and Force Generating Capacity of Skeletal Muscle: A Computational Study using a Guinea Fowl Musculoskeletal Model.** *Integrative organismal biology (Oxford, England)*
Cox, S. M., Easton, K. L., Lear, M. C., Marsh, R. L., Delp, S. L., Rubenson, J.
2019; 1 (1): obz022
- **Medical device surveillance with electronic health records.** *NPJ digital medicine*
Callahan, A. n., Fries, J. A., Ré, C. n., Huddleston, J. I., Giori, N. J., Delp, S. n., Shah, N. H.
2019; 2: 94
- **Learning one's genetic risk changes physiology independent of actual genetic risk** *Nature Human Behaviour*
Turnwald, B. P., Goyer, J. P., Boles, D. Z., Silder, A., Delp, S. L., Crum, A. J.
2019; 3: 48-56

- **Learning one's genetic risk changes physiology independent of actual genetic risk.** *Nature human behaviour*
Turnwald, B. P., Goyer, J. P., Boles, D. Z., Silder, A. n., Delp, S. L., Crum, A. J.
2019; 3 (1): 48–56
- **Predicting gait adaptations due to ankle plantarflexor muscle weakness and contracture using physics-based musculoskeletal simulations.** *PLoS computational biology*
Ong, C. F., Geijtenbeek, T. n., Hicks, J. L., Delp, S. L.
2019; 15 (10): e1006993
- **Rapid energy expenditure estimation for ankle assisted and inclined loaded walking.** *Journal of neuroengineering and rehabilitation*
Slade, P. n., Troutman, R. n., Kochenderfer, M. J., Collins, S. H., Delp, S. L.
2019; 16 (1): 67
- **Best practices for analyzing large-scale health data from wearables and smartphone apps.** *NPJ digital medicine*
Hicks, J. L., Althoff, T. n., Sosic, R. n., Kuhar, P. n., Bostjancic, B. n., King, A. C., Leskovec, J. n., Delp, S. L.
2019; 2: 45
- **Muscle Contributions to Upper-Extremity Movement and Work From a Musculoskeletal Model of the Human Shoulder.** *Frontiers in neurorobotics*
Seth, A. n., Dong, M. n., Matias, R. n., Delp, S. n.
2019; 13: 90
- **Weakly supervised classification of rare aortic valve malformations using unlabeled cardiac MRI sequences** *Nature Communications*
Fries, J. A., Varma, P., Chen, V. S., Xiao, K., Tejada, H., Saha, P., Dunmon, J., Chubb, H., Maskatia, S., Fiterau, M., Delp, S., Ashley, E., Ré, et al
2019; 10
- **Patellofemoral cartilage stresses are most sensitive to variations in vastus medialis muscle forces.** *Computer methods in biomechanics and biomedical engineering*
Pal, S., Besier, T. F., Gold, G. E., Fredericson, M., Delp, S. L., Beaupre, G. S.
2018: 1–11
- **Robust Physics-based Motion Retargeting with Realistic Body Shapes** *COMPUTER GRAPHICS FORUM*
Al Borno, M., Righetti, L., Black, M. J., Delp, S. L., Fiume, E., Romero, J.
2018; 37 (8): 81–92
- **Microendoscopy reveals positive correlation in multiscale length changes and variable sarcomere lengths across different regions of human muscle** *JOURNAL OF APPLIED PHYSIOLOGY*
Lichtwark, G. A., Farris, D. J., Chen, X., Hodges, P. W., Delp, S. L.
2018; 125 (6): 1812–20
- **Machine learning in human movement biomechanics: Best practices, common pitfalls, and new opportunities** *JOURNAL OF BIOMECHANICS*
Halilaj, E., Rajagopal, A., Fiterau, M., Hicks, J. L., Hastie, T. J., Delp, S. L.
2018; 81: 1–11
- **Estimating the effect size of surgery to improve walking in children with cerebral palsy from retrospective observational clinical data.** *Scientific reports*
Rajagopal, A., Kidzinski, L., McGlaughlin, A. S., Hicks, J. L., Delp, S. L., Schwartz, M. H.
2018; 8 (1): 16344
- **Machine learning in human movement biomechanics: Best practices, common pitfalls, and new opportunities.** *Journal of biomechanics*
Halilaj, E., Rajagopal, A., Fiterau, M., Hicks, J. L., Hastie, T. J., Delp, S. L.
2018
- **Modeling and Predicting Osteoarthritis Progression: Data from the Osteoarthritis Initiative.** *Osteoarthritis and cartilage*
Halilaj, E., Le, Y., Hicks, J. L., Hastie, T. J., Delp, S. L.
2018
- **OpenSim: Simulating musculoskeletal dynamics and neuromuscular control to study human and animal movement.** *PLoS computational biology*
Seth, A., Hicks, J. L., Uchida, T. K., Habib, A., Dembia, C. L., Dunne, J. J., Ong, C. F., DeMers, M. S., Rajagopal, A., Millard, M., Hamner, S. R., Arnold, E. M., Yong, et al
2018; 14 (7): e1006223

- **Noninvasive Neuromodulation in Essential Tremor Demonstrates Relief in a Sham-Controlled Pilot Trial** *MOVEMENT DISORDERS*
Lin, P. T., Ross, E. K., Chidester, P., Rosenbluth, K. H., Hamner, S. R., Wong, S. H., Sanger, T. D., Hallett, M., Delp, S. L.
2018; 33 (7): 1182–83
- **Physical activity is associated with changes in knee cartilage microstructure** *OSTEOARTHRITIS AND CARTILAGE*
Halilaj, E., Hastie, T. J., Gold, G. E., Delp, S. L.
2018; 26 (6): 770–74
- **Acute changes in foot strike pattern and cadence affect running parameters associated with tibial stress fractures.** *Journal of biomechanics*
Yong, J. R., Silder, A., Montgomery, K. L., Fredericson, M., Delp, S. L.
2018
- **AUTOMATED STAGING OF KNEE OSTEOARTHRITIS SEVERITY USING DEEP NEURAL NETWORKS**
Suresha, S., Kidzinski, L., Halilaj, E., Gold, G. E., Delp, S. L.
ELSEVIER SCI LTD.2018: S441
- **Age Influences Biomechanical Changes After Participation in an Anterior Cruciate Ligament Injury Prevention Program** *AMERICAN JOURNAL OF SPORTS MEDICINE*
Thompson-Kolesar, J. A., Gatewood, C. T., Tran, A. A., Silder, A., Shultz, R., Delp, S. L., Dragoo, J. L.
2018; 46 (3): 598–606
- **Perspectives on Sharing Models and Related Resources in Computational Biomechanics Research** *JOURNAL OF BIOMECHANICAL ENGINEERING-TRANSACTIONS OF THE ASME*
Erdemir, A., Hunter, P. J., Holzapfel, G. A., Loew, L. M., Middleton, J., Jacobs, C. R., Nithiarasu, P., Lohner, R., Wei, G., Winkelstein, B. A., Barocas, V. H., Guilak, F., Ku, et al
2018; 140 (2)
- **Subject-specific toe-in or toe-out gait modifications reduce the larger knee adduction moment peak more than a non-personalized approach** *JOURNAL OF BIOMECHANICS*
Uhlrich, S. D., Slider, A., Beaupre, G. S., Shull, P. B., Delp, S. L.
2018; 66: 103–10
- **Large-scale physical activity data reveal worldwide activity inequality** *NATURE*
Althoff, T., Sosic, R., Hicks, J. L., King, A. C., Delp, S. L., Leskovec, J.
2017; 547 (7663): 336+
- **Muscle-tendon mechanics explain unexpected effects of exoskeleton assistance on metabolic rate during walking.** *journal of experimental biology*
Jackson, R. W., Dembia, C. L., Delp, S. L., Collins, S. H.
2017; 220: 2082-2095
- **A Brainstem-Spinal Cord Inhibitory Circuit for Mechanical Pain Modulation by GABA and Enkephalins.** *Neuron*
François, A., Low, S. A., Sypek, E. I., Christensen, A. J., Sotoudeh, C., Beier, K. T., Ramakrishnan, C., Ritola, K. D., Sharif-Naeini, R., Deisseroth, K., Delp, S. L., Malenka, R. C., Luo, et al
2017; 93 (4): 822-839 e6
- **Preparatory co-activation of the ankle muscles may prevent ankle inversion injuries.** *Journal of biomechanics*
Demers, M. S., Hicks, J. L., Delp, S. L.
2017; 52: 17-23
- **Sanativo Wound Healing Product Does Not Accelerate Reepithelialization in a Mouse Cutaneous Wound Healing Model.** *Plastic and reconstructive surgery*
Marshall, C. D., Hu, M. S., Leavitt, T., Barnes, L. A., Cheung, A. T., Malhotra, S., Lorenz, H. P., Delp, S. L., Quake, S. R., Longaker, M. T.
2017; 139 (2): 343-352
- **Biomechanical Effects of an Injury Prevention Program in Preadolescent Female Soccer Athletes** *AMERICAN JOURNAL OF SPORTS MEDICINE*
Thompson, J. A., Tran, A. A., Gatewood, C. T., Shultz, R., Silder, A., Delp, S. L., Dragoo, J. L.
2017; 45 (2): 294-301
- **ShortFuse: Biomedical Time Series Representations in the Presence of Structured Information.** *Proceedings of machine learning research*
Fiterau, M. n., Bhooshan, S. n., Fries, J. n., Bournhonesque, C. n., Hicks, J. n., Halilaj, E. n., Ré, C. n., Delp, S. n.
2017; 68: 59–74

- **Prostaglandin E2 is essential for efficacious skeletal muscle stem-cell function, augmenting regeneration and strength.** *Proceedings of the National Academy of Sciences of the United States of America*
Ho, A. T., Palla, A. R., Blake, M. R., Yucel, N. D., Wang, Y. X., Magnusson, K. E., Holbrook, C. A., Kraft, P. E., Delp, S. L., Blau, H. M.
2017; 114 (26): 6675–84
- **Simulating ideal assistive devices to reduce the metabolic cost of walking with heavy loads.** *PloS one*
Dembia, C. L., Silder, A. n., Uchida, T. K., Hicks, J. L., Delp, S. L.
2017; 12 (7): e0180320
- **Human soleus sarcomere lengths measured using in vivo microendoscopy at two ankle flexion angles** *JOURNAL OF BIOMECHANICS*
Chen, X., Delp, S. L.
2016; 49 (16): 4164-4167
- **In Vivo Interrogation of Spinal Mechanosensory Circuits.** *Cell reports*
Christensen, A. J., Iyer, S. M., François, A., Vyas, S., Ramakrishnan, C., Vesuna, S., Deisseroth, K., Scherrer, G., Delp, S. L.
2016; 17 (6): 1699-1710
- **Biomechanical Effects of an Injury Prevention Program in Preadolescent Female Soccer Athletes.** *American journal of sports medicine*
Thompson, J. A., Tran, A. A., Gatewood, C. T., Shultz, R., Silder, A., Delp, S. L., Drago, J. L.
2016
- **Gait biomechanics in the era of data science.** *Journal of biomechanics*
Ferber, R., Osis, S. T., Hicks, J. L., Delp, S. L.
2016
- **Full-Body Musculoskeletal Model for Muscle-Driven Simulation of Human Gait** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Rajagopal, A., Dembia, C. L., Demers, M. S., Delp, D. D., Hicks, J. L., Delp, S. L.
2016; 63 (10): 2068-2079
- **Simulating Ideal Assistive Devices to Reduce the Metabolic Cost of Running** *PLOS ONE*
Uchida, T. K., Seth, A., Pouya, S., Dembia, C. L., Hicks, J. L., Delp, S. L.
2016; 11 (9)
- **Changes in sarcomere lengths of the human vastus lateralis muscle with knee flexion measured using in vivo microendoscopy** *JOURNAL OF BIOMECHANICS*
Chen, X., Sanchez, G. N., Schnitzer, M. J., Delp, S. L.
2016; 49 (13): 2989-2994
- **Beyond the brain: Optogenetic control in the spinal cord and peripheral nervous system** *SCIENCE TRANSLATIONAL MEDICINE*
Montgomery, K. L., Iyer, S. M., Christensen, A. J., Deisseroth, K., Delp, S. L.
2016; 8 (337)
- **Simulation-Based Design for Wearable Robotic Systems: An Optimization Framework for Enhancing a Standing Long Jump** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Ong, C. F., Hicks, J. L., Delp, S. L.
2016; 63 (5): 894-903
- **Evaluation of an Algorithm to Detect the First Ventilatory Threshold from Heart Rate: 2450 June 3, 10: 30 AM - 10: 45 AM.** *Medicine and science in sports and exercise*
Silder, A., Gold, G. E., Bae, S., Ko, B., Jang, D., Delp, S. L.
2016; 48 (5): 672-673
- **Optogenetic approaches addressing extracellular modulation of neural excitability** *SCIENTIFIC REPORTS*
Ferenczi, E. A., Vierock, J., Atsuta-Tsunoda, K., Tsunoda, S. P., Ramakrishnan, C., Gorini, C., Thompson, K., Lee, S. Y., Berndt, A., Perry, C., Minniberger, S., Vogt, A., Mattis, et al
2016; 6
- **A fast multi-obstacle muscle wrapping method using natural geodesic variations** *MULTIBODY SYSTEM DYNAMICS*
Scholz, A., Sherman, M., Stavness, I., Delp, S., Kecskemethy, A.
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