

# Stanford

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## Scott L. Delp, Ph.D.

Director, Wu Tsai Human Performance Alliance at Stanford, 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**

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### Bio

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#### BIO

Scott L. Delp, Ph.D., is the James H. Clark Professor of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery at Stanford University. He is the Founding Chairman of the Department of Bioengineering at Stanford, and Director of the Wu Tsai Human Performance Alliance at Stanford, a university-wide research initiative focused on discovering biological principles to optimize human performance and catalyze innovations in human health for all. Dr. Delp is also the Director of the Restore Center, an NIH national center focused on measuring real world rehabilitation outcomes, and Director of the Mobilize Center, a NIH National Center of Excellence focused on Big Data and Mobile Health. Scott is focused on developing technologies to advance movement science and human health. Software tools developed in his lab, including OpenSim and Simtk.org, have become the basis of an international collaboration involving thousands of students and scientists who exchange simulations of human movement. Prior to joining the faculty at Stanford, Delp was on the faculty at Northwestern University and the Rehabilitation Institute of Chicago. He has published over 250 research articles in the field of biomechanics and has recently published a textbook from MIT Press entitled Biomechanics of Movement: The Science of Sports, Robotics, and Rehabilitation. Professor Delp has co-founded six health technology companies and is a member of the U.S. National Academy of Engineering.

### ACADEMIC APPOINTMENTS

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

### ADMINISTRATIVE APPOINTMENTS

- Director, Wu Tsai Human Performance Alliance, (2021- present)
- Director, Restore Center, (2020- present)

- 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), (2010-2021)
- Chairman, Bioengineering Department, (2002-2007)
- Co-Director, NIH Center for Biomedical Computation at Stanford (Simbios), (2001-2012)
- Chairman, Biomechanical Engineering Division, (2000-2002)

## HONORS AND AWARDS

- Test of Time Award, ACM SIGGRAPH (2023)
- Muybridge Award, International Society of Biomechanics (2021)
- 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, President of the United States (1993)
- National Young Investigator Award, National Science Foundation (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>
- Wu Tsai Human Performance Alliance Stanford University: <https://humanperformance.stanford.edu/>
- Mobilize Center: <https://mobilize.stanford.edu/>
- Restore Center: <https://restore.stanford.edu/>
- SimTK: <https://simtk.org/>
- Wu Tsai Human Performance Alliance: <https://humanperformancealliance.org/>

## Research & Scholarship

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### 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 medical products, and guide surgery. Imaging and health technology development. Discovering the principles of peak performance to advance human health. Human performance research. Wearable technologies, video motion capture, and machine learning to enable large-scale analysis.

### CLINICAL TRIALS

- Digital Knee Osteoarthritis Mindset Intervention, Not Recruiting

## Teaching

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### COURSES

#### 2023-24

- Biomechanics of Movement: BIOE 281, ME 281 (Win)
- Design Thinking in Human Performance Research: BIOE 190 (Spr)
- Form and Function: Anatomy and Biomechanics of Italian Renaissance Art: OSPFLOR 36 (Spr)

#### 2022-23

- Biomechanics of Movement: BIOE 281, ME 281 (Win)
- Design Thinking in Human Performance Research: BIOE 190 (Spr)
- Modeling and Simulation of Human Movement: BIOE 485, ME 485 (Spr)

#### 2021-22

- Biomechanics of Movement: BIOE 281, ME 281 (Win)
- Design Thinking in Human Performance Research: BIOE 190 (Spr)

#### 2020-21

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

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Ananya Goyal, Michael Hittle, Ali Kight, Delaney Miller, Michael Raitor, Kirsten Seagers, Skyler St. Pierre, Lara Weed

#### Postdoctoral Faculty Sponsor

Nicos Haralabidis, Sarah Johnson, Dawit Lee, Krithika Swaminathan

#### Doctoral Dissertation Advisor (AC)

Hannah Heigold, Michelle Joyce, Janelle Kaneda, Marissa Lee, Kirsten Seagers, Kristen Steudel, Jon Stingel

#### Doctoral Dissertation Co-Advisor (AC)

Rachel Adenekan, Mohammadmahdi Honarmand, Tiange Xiang

#### Master's Program Advisor

Tse-Yu Chen, Caeden Greene, Ashley Lowber, Isabella Pacheco, Honghao Zhen

#### Doctoral (Program)

Divya Adil, Hannah Field, Ananya Goyal, Wing-Sum Law, Katie Marusich, Sophia Shen, Jessica Towns

## GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biomedical Informatics (Phd Program)
- Neurosciences (Phd Program)

## Publications

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### PUBLICATIONS

- **Hamstrings are stretched more and faster during accelerative running compared to speed-matched constant speed running.** *bioRxiv : the preprint server for biology*  
Gurchiek, R. D., Teplin, Z., Falisse, A., Hicks, J. L., Delp, S. L.  
2024
- **A simulation framework to determine optimal strength training and musculoskeletal geometry for sprinting and distance running.** *PLoS computational biology*  
Van Wouwe, T., Hicks, J., Delp, S., Liu, K. C.  
2024; 20 (2): e1011410
- **Muscle-driven simulations and experimental data of cycling.** *Scientific reports*  
Clancy, C. E., Gatti, A. A., Ong, C. F., Maly, M. R., Delp, S. L.  
2023; 13 (1): 21534
- **From Skin to Skeleton: Towards Biomechanically Accurate 3D Digital Humans** *ACM TRANSACTIONS ON GRAPHICS*  
Keller, M., Werling, K., Shin, S., Delp, S., Pujades, S., Liu, C., Black, M. J.  
2023; 42 (6)
- **AddBiomechanics: Automating model scaling, inverse kinematics, and inverse dynamics from human motion data through sequential optimization.** *PLoS one*  
Werling, K., Bianco, N. A., Raitor, M., Stingel, J., Hicks, J. L., Collins, S. H., Delp, S. L., Liu, C. K.  
2023; 18 (11): e0295152
- **Simulating Muscle-Level Energetic Cost Savings When Humans Run with a Passive Assistive Device.** *IEEE robotics and automation letters*  
Stingel, J. P., Hicks, J. L., Uhlrich, S. D., Delp, S. L.  
2023; 8 (10): 6267-6274
- **OpenCap: Human movement dynamics from smartphone videos.** *PLoS computational biology*  
Uhlrich, S. D., Falisse, A., Kidzi#ski, #., Muccini, J., Ko, M., Chaudhari, A. S., Hicks, J. L., Delp, S. L.  
2023; 19 (10): e1011462
- **The History and Future of Neuromusculoskeletal Biomechanics.** *Journal of applied biomechanics*  
Lloyd, D. G., Jonkers, I., Delp, S. L., Modenese, L.  
2023: 1-11
- **AddBiomechanics: Automating model scaling, inverse kinematics, and inverse dynamics from human motion data through sequential optimization.** *bioRxiv : the preprint server for biology*  
Werling, K., Bianco, N. A., Raitor, M., Stingel, J., Hicks, J. L., Collins, S. H., Delp, S. L., Liu, C. K.  
2023
- **Simulating the effect of ankle plantarflexion and inversion-eversion exoskeleton torques on center of mass kinematics during walking.** *PLoS computational biology*  
Bianco, N. A., Collins, S. H., Liu, K., Delp, S. L.  
2023; 19 (8): e1010712
- **Ten steps to becoming a musculoskeletal simulation expert: A half-century of progress and outlook for the future.** *Journal of biomechanics*  
Uhlrich, S. D., Uchida, T. K., Lee, M. R., Delp, S. L.  
2023; 154: 111623

- **How Connecting the Legs with a Spring Improves Human Running Economy.** *bioRxiv : the preprint server for biology*  
Stingel, J. P., Hicks, J. L., Uhlrich, S. D., Delp, S. L.  
2023
- **Can static optimization detect changes in peak medial knee contact forces induced by gait modifications?** *Journal of biomechanics*  
Kaneda, J. M., Seagers, K. A., Uhlrich, S. D., Kolesar, J. A., Thomas, K. A., Delp, S. L.  
2023; 152: 111569
- **A scoping review of portable sensing for out-of-lab anterior cruciate ligament injury prevention and rehabilitation.** *NPJ digital medicine*  
Tan, T., Gatti, A. A., Fan, B., Shea, K. G., Sherman, S. L., Uhlrich, S. D., Hicks, J. L., Delp, S. L., Shull, P. B., Chaudhari, A. S.  
2023; 6 (1): 46
- **Smartphone videos of the sit-to-stand test predict osteoarthritis and health outcomes in a nationwide study.** *NPJ digital medicine*  
Boswell, M. A., Kidzinski, #., Hicks, J. L., Uhlrich, S. D., Falisse, A., Delp, S. L.  
2023; 6 (1): 32
- **PREDICTING CHRONIC KNEE PAIN USING AN AUTOMATED MRIBASED BONE AND CARTILAGE STATISTICAL SHAPE MODEL: DATA FROM THE OSTEOARTHRITIS INITIATIVE**  
Gatti, A. A., Kogan, F., Delp, S. L., Gold, G. E., Chaudhari, A. S.  
ELSEVIER SCI LTD.2023: S78-S79
- **Effects of Wearable Fitness Trackers and Activity Adequacy Mindsets on Affect, Behavior, and Health: Longitudinal Randomized Controlled Trial.** *Journal of medical Internet research*  
Zahrt, O. H., Evans, K., Murnane, E., Santoro, E., Baiocchi, M., Landay, J., Delp, S., Crum, A.  
2023; 25: e40529
- **Digital medicine Digitising tremor** *LANCET*  
Delp, S. L., Topol, E. J.  
2023; 401 (10372): 187
- **Digitising tremor.** *Lancet (London, England)*  
Delp, S. L., Topol, E. J.  
2023; 401 (10372): 187
- **Leveraging Mobile Technology for Public Health Promotion: A Multidisciplinary Perspective.** *Annual review of public health*  
Hicks, J. L., Boswell, M. A., Althoff, T., Crum, A. J., Ku, J. P., Landay, J. A., Moya, P. M., Murnane, E. L., Snyder, M. P., King, A. C., Delp, S. L.  
2022
- **Confounds in neuroimaging: A clear case of sex as a confound in brain-based prediction.** *Frontiers in neurology*  
Weber, K. A., Teplin, Z. M., Wager, T. D., Law, C. S., Prabhakar, N. K., Ashar, Y. K., Gilam, G., Banerjee, S., Delp, S. L., Glover, G. H., Hastie, T. J., Mackey, S.  
2022; 13: 960760
- **Independently ambulatory children with spina bifida experience near-typical knee and ankle joint moments and forces during walking.** *Gait & posture*  
Lee, M. R., Hicks, J. L., Wren, T. A., Delp, S. L.  
2022; 99: 1-8
- **Personalizing exoskeleton assistance while walking in the real world.** *Nature*  
Slade, P., Kochenderfer, M. J., Delp, S. L., Collins, S. H.  
2022; 610 (7931): 277-282
- **Personalization improves the biomechanical efficacy of foot progression angle modifications in individuals with medial knee osteoarthritis.** *Journal of biomechanics*  
Uhlrich, S. D., Kolesar, J. A., Kidzinski, L., Boswell, M. A., Silder, A., Gold, G. E., Delp, S. L., Beaupre, G. S.  
2022; 144: 111312
- **Botulinum neurotoxin type A improves vasti muscle balance, patellar tracking, and pain in patients with chronic patellofemoral pain.** *Journal of orthopaedic research : official publication of the Orthopaedic Research Society*  
Pal, S., Choi, J., Delp, S. L., Fredericson, M.  
2022

- **Muscle coordination retraining inspired by musculoskeletal simulations reduces knee contact force.** *Scientific reports*  
Uhlrich, S. D., Jackson, R. W., Seth, A., Kolesar, J. A., Delp, S. L.  
2022; 12 (1): 9842
- **Changes in foot progression angle during gait reduce the knee adduction moment and do not increase hip moments in individuals with knee osteoarthritis.** *Journal of biomechanics*  
Seagers, K., Uhlrich, S. D., Kolesar, J. A., Berkson, M., Kaneda, J. M., Beaupre, G. S., Delp, S. L.  
2022; 141: 111204
- **Medical and Biomechanical Risk Factors for Incident Bone Stress Injury in Collegiate Runners: Can Plantar Pressure Predict Injury?** *Orthopaedic journal of sports medicine*  
Wilzman, A. R., Tenforde, A. S., Troy, K. L., Hunt, K., Fogel, N., Roche, M. D., Kraus, E., Trikha, R., Delp, S., Fredericson, M.  
2022; 10 (6): 23259671221104793
- **Mindset is associated with future physical activity and management strategies in individuals with knee osteoarthritis.** *Annals of physical and rehabilitation medicine*  
Boswell, M. A., Evans, K. M., Zion, S. R., Boles, D. Z., Hicks, J. L., Delp, S. L., Crum, A. J.  
2022; 65 (6): 101634
- **Running in the wild: Energetics explain ecological running speeds.** *Current biology : CB*  
Selinger, J. C., Hicks, J. L., Jackson, R. W., Wall-Scheffler, C. M., Chang, D., Delp, S. L.  
2022
- **OpenSense: An open-source toolbox for inertial-measurement-unit-based measurement of lower extremity kinematics over long durations.** *Journal of neuroengineering and rehabilitation*  
Al Borno, M., O'Day, J., Ibarra, V., Dunne, J., Seth, A., Habib, A., Ong, C., Hicks, J., Uhlrich, S., Delp, S.  
2022; 19 (1): 22
- **Non-invasive electrical stimulation of peripheral nerves for the management of tremor.** *Journal of the neurological sciences*  
Pascual-Valdunciel, A., Rajagopal, A., Pons, J. L., Delp, S.  
2022; 435: 120195
- **Assessing inertial measurement unit locations for freezing of gait detection and patient preference.** *Journal of neuroengineering and rehabilitation*  
O'Day, J., Lee, M., Seagers, K., Hoffman, S., Jih-Schiff, A., Kidzinski, L., Delp, S., Bronte-Stewart, H.  
2022; 19 (1): 20
- **Coupled exoskeleton assistance simplifies control and maintains metabolic benefits: A simulation study.** *PloS one*  
Bianco, N. A., Franks, P. W., Hicks, J. L., Delp, S. L.  
1800; 17 (1): e0261318
- **Biceps femoris long head sarcomere and fascicle length adaptations after three weeks of eccentric exercise training.** *Journal of sport and health science*  
Pincheira, P. A., Boswell, M. A., Franchi, M. V., Delp, S. L., Lichtwark, G. A.  
2021
- **Open Source Software for Automatic Subregional Assessment of Knee Cartilage Degradation Using Quantitative T2 Relaxometry and Deep Learning.** *Cartilage*  
Thomas, K. A., Krzeminski, D., Kidzinski, L., Paul, R., Rubin, E. B., Halilaj, E., Black, M. S., Chaudhari, A., Gold, G. E., Delp, S. L.  
2021; 19476035211042406
- **Deep reinforcement learning for modeling human locomotion control in neuromechanical simulation.** *Journal of neuroengineering and rehabilitation*  
Song, S., Kidzinski, L., Peng, X. B., Ong, C., Hicks, J., Levine, S., Atkeson, C. G., Delp, S. L.  
2021; 18 (1): 126
- **An open-source and wearable system for measuring 3D human motion in real-time.** *IEEE transactions on bio-medical engineering*  
Slade, P., Habib, A., Hicks, J. L., Delp, S. L.  
2021; PP
- **Wearable sensors enable personalized predictions of clinical laboratory measurements.** *Nature medicine*  
Dunn, J., Kidzinski, L., Runge, R., Witt, D., Hicks, J. L., Schussler-Fiorenza Rose, S. M., Li, X., Bahmani, A., Delp, S. L., Hastie, T., Snyder, M. P.  
2021

• IDENTIFYING CONCERNS OF YOUNG ADULTS WITH OSTEOARTHRITIS ON REDDIT

Song, A. J., Boswell, M. A., Hicks, J. L., Delp, S. L.  
ELSEVIER SCI LTD.2021: S227-S229

• MINDSETS PREDICT PHYSICAL ACTIVITY AND MANAGEMENT STRATEGIES IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS

Boswell, M. A., Hicks, J. L., Evans, K. M., Zion, S. R., Boles, D. Z., Delp, S. L., Crum, A. J.  
ELSEVIER SCI LTD.2021: S222-S224

• OPEN SOURCE AND AUTOMATIC SUBREGIONAL ASSESSMENT OF KNEE CARTILAGE DEGRADATION USING QUANTITATIVE T2 RELAXOMETRY AND DEEP LEARNING

Thomas, K. A., Krzeminski, D., Kidzinski, L., Paul, R., Rubin, E. B., Halilaj, E., Black, M. S., Chaudhari, A., Gold, G. E., Delp, S. L.  
ELSEVIER SCI LTD.2021: S43-S44

• 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

• Sensing leg movement enhances wearable monitoring of energy expenditure. *Nature communications*

Slade, P., Kochenderfer, M. J., Delp, S. L., Collins, S. H.  
2021; 12 (1): 4312

• A marker registration method to improve joint angles computed by constrained inverse kinematics. *PloS one*

Dunne, J. J., Uchida, T. K., Besier, T. F., Delp, S. L., Seth, A.  
2021; 16 (5): e0252425

• 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

• Brain Strength: Multi-Modal Brain MRI Predicts Grip Strength

Weber, K. A., Wager, T. D., Upadhyayula, P. A., Law, C. S., Ashar, Y. K., Prabhakar, N. K., Zhu, S., Gilam, G., Banerjee, S., Delp, S. L., Glover, G. H., Hastie, T. J., Mackey, et al  
WILEY.2020: S223–S224

• 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

• 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., 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: 29

• 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., Dibberfuhl, 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., Dobberfuhl, 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., Dobberfuhl, 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

● **Testing Simulated Assistance Strategies on a Hip-Knee-Ankle Exoskeleton: a Case Study**

Franks, P. W., Bianco, N. A., Bryan, G. M., Hicks, J. L., Delp, S. L., Collins, S. H., IEEE  
IEEE.2020: 700-707

● **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

● **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., Dobberfuhl, 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

● **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., Sosic, R., Kuhar, P., Bostjancic, B., King, A. C., Leskovec, J., Delp, S. L.  
2019; 2: 45

- **Best practices for analyzing large-scale health data from wearables and smartphone apps** *NPJ DIGITAL MEDICINE*  
Hicks, J. L., Althoff, T., Sosic, 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**

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