

The 16th International Symposium on 3D-Analysis of Human Movement

May 25-28, 2021

List of Invited Speakers, Scientific Tracks, Abstract Titles, and Authors

Herman J Woltring Memorial Lecture

(Presentation is postponed to the 2022 Symposium)

Dr. Kenton R. Kaufman, Mayo Clinic, USA

Talk title: Analysis of Human Movement in the Clinical Setting

Invited Speakers

Dr. Tishya Wren, Children's Hospital Los Angeles, USA

Talk Title: How 3D Gait Analysis Improves Patient Care

Dr. Stephen Robinovitch, Simon Fraser University, Canada

Talk Title: Quantifying Movement Profiles from Planar Video of Real-Life Falls in Older Adults

Dr. Nachiappan Chockalingam, Staffordshire University, UK

Talk Title: Patterns of Coordination, Control and Variability to Understand Human Movement: The Way Forward in Clinical Gait Analysis

Dr. Paola Contessa, Delsys Inc., USA

Talk Title: Context-Aware Sensing Solutions for Tracking Human Movement

Dr. Wendy Murray, Northwestern University, USA

Talk Title: Biomechanics, the Upper Limb, and Clinical Questions: Can We Help?

Scientific Track I: Wearable Sensors and Applications

Real-world speed estimation using single IMU: A conceptual framework

Kamiar Aminian, Abolfazl Soltani, Anisoara Paraschiv-Ionescu

Investigation on the accuracy of five sensor fusion algorithms for orientation estimation

Caruso M., Sabatini A.M., Camomilla V., Knaflitz M., Della Croce U., Cereatti A.

Estimating 3D orientation of a body segment during running using a single gyroscope

Zandbergen, M.A, Ferla, R., Buurke, J.H., Reenalda, J., Veltink, P.H.

An insight into the calculation of symmetry metrics based on accelerometer data

van Gelder L.M.A., Angelini L., Buckley E.E., Henson W.H., Mazzà C.

Sensitivity and Specificity of Using IMU measures to Detect Post-Concussion Gait Imbalance in Dual-Task Walking

Pitt W., Chen S.H., and Chou L-S.

Center of mass accelerations estimated by wearable sensor technology and motion capture system: are we measuring the same thing?

Liang, Y-P, Qu, H., and Chou, L-S

Kicking Competence in People with Down Syndrome and Typically Developing Children

Quinzi F., Vannozzi G., Wynn A., Sbriccoli P., Piacentini M.F., Camomilla V.

Initial Contact detection using heel-attached Inertial Measurement Units

Kanzaki T., Sawatome A., Tsuichihara S., Takemura H., Tada M.

Assessing Gait Balance Control in Acutely Concussed Individuals Using IMU-Based Kinematic Markers

Pitt W., Chen S.H., and Chou L-S

Scientific Track II: Balance Control and Dual-Task Gait

Look where you're going! Quantifying the effect of visual feedback on the orthogonality of balance control during gait

Brozek K., Mukherjee M.,

Gait Balance Control During Walking After Fatigue: Effects of Age and Cognitive Demand

Chen S.H. and Chou L-S

Effects of Total Knee Replacement on Balance Control During Gait in Bilateral Medial Knee Osteoarthritis

Lee P-A, Liu H-C, Lu T-W

Effect of an 8-Week Neuromuscular Training Program on Postural Stability Following Concussion: A Randomized Clinical Trial

Seehusen CN., Wingerson MJ, Smulligan KL, Magliato S, Wilson JC, Howell DR.

Balance modalities during self-paced voluntary medio-lateral and antero-posterior body sways in untreated adolescent idiopathic scoliotic girls

Stylianides G., Leteneur S., Crémoux S., Allard P., Simoneau-Buessinger É., Barbier F.

Effects of Marker Placement and Sex on Medial-Lateral Whole-body Center of Mass Kinematics Estimations During Walking: A Preliminary Study

Qu H, Liang Y-P, Chou L-S

Dynamic stability during fast walking in elderly adults: A pilot study

Hida N., Fujimoto M., Kobayashi Y.

Older Is Not Always Worse: Balance Control And Working Memory During Obstacle-Crossing After Fatigue

Chen S-H and Chou L-S

Dynamic Balance Control in Patients with Lumbar Spondylosis During Level Walking Balance Control of Lumbar Spondylosis

Huang, T-C, Huang, H-P, Lo, W-C, Lai, D-M, Lu T-W

Dual-task interference during walking: The effects of texting and gaming on gait kinematics and the likelihood of collision in healthy young adults

Tan P H M, Choi Y M J, Yeh T-T

Scientific Track III: Methodology and Imaging Analysis

Comparison of two depth cameras in identifying bony landmark locations

Liu P. L., Chang C. C., Lin J. H., Kobayashi Y.

Reliability and Validity of 2D Assessment of Shoulder Kinematics Using Single-Plane Fluoroscopy

Saini G., Rezvanifar S.C., Staker J.L., Abdelmessih K.M., Davis J.L., Grinvalsky L.J., Johnson B.L., McCann C.L., O'Neil L., Peters T.S., Wheatley C.L., Ludewig P.M.

Automated pose estimation from single-plane moving fluoroscope images using deep convolutional neural networks

Vogl F., Schütz P., Postolka B., List R., Taylor W. R.

Interpretation of natural tibio-femoral kinematics critically depends upon the kinematic analysis approach (A survey and comparison of methodologies)

Postolka B., Taylor W.R., Dätwyler K., Heller M.O., List R., Schütz P.

In Vivo Cervical Spine Kinematics Biomarkers of Spinal Health via Biplane Radiographic Analysis

Kage C., MacEwen M., Lawrence R., Ladd B., Ellingson A.

3D Closed Chain Knee Motion Analysis by Stereophotogrammetry and Videofluoroscopy for pre Surgery Clinical Assessment

Santos D., Ledezma R., Braidot A., Del Castillo J., Massa F., Simini F.

An analytical model to quantify the impact of uncertainty propagation in the knee joint angles

Fonseca M., Armand S., Dumas R.

Investigation of single-camera 2D pose estimation of lower limb angle during abnormal gait

Ishige Y., Yamamoto M., Takemura H.

Evaluation of a pseudo-CT model-based interleaved biplane fluoroscopy tracking method for measuring tibiofemoral and patellofemoral kinematics Pseudo CT model-based kinematics reconstruction of the knee

Lin C-C, Lu T-W, Hsu H-C, and Shih T-F

Scientific Track IV: Clinical Movement and Classification

Kinematic Changes of the Pelvis-Leg Apparatus in Patients with Developmental Dysplasia of the Hip During Level Walking Pre and Post Ganz Osteotomy

Chen C-R, Wang T-M, Wu K-W, Chen Y-C, and Lu T-W

Gait Patterns of Patients with Progressive Supranuclear Palsy

Loushin S.R., Kaufman KR, and Farwa Ali

Comparative analysis of Mechanical Power during walking in different surgical approaches of the Periacetabular Osteotomy (Analysis of mechanical power after different surgical approaches to PAO)

Stevens Jr W., Podeszwa D., De La Rocha, A., Sucato, D., Tulchin-Francis, K.

Clinical efficacy of instrumented gait analysis: 2019 update A systematic review

Wren T., Tucker C., Rethlefsen S., Gorton G., Öunpuu S.

Compromised Feedback Control in Diabetic Peripheral Neuropathy Impacts Outcomes of Stepping Over Virtual Obstacles

Huang C.K., Shivaswamy V., Thaisethawatkul P., Stergiou N., Siu K.C.

Gait changes in young onset Parkinson's disease before and after medication

Klein, S., Savica, R., Kaufman, K.

Effects of Bilateral Subthalamic Deep Brain Stimulation on Whole Body Balance Control During Level Walking in Patients with Advanced Parkinson's Disease

Kuo M-Y, Liu Y-H, Ou B-F, Fu Y-C, Kuo C-C, and Lu T-W

Patient perception of dizziness and imbalance does not correlate with gait measures in adolescent athletes acutely post-concussion

Smulligan K., Wilson J., Seehusen C., Wingerson M., Magliato S., Howell D.

Self-reported Sleep Problems After Concussion are Associated with Poor Balance and Risk of Prolonged Recovery

Magliato S., Seehusen C., Wingerson M., Smulligan K., Wilson J., Howell D.

Biomechanical differences in patients with semilunar and discoid lateral meniscus injury

Li Y, Gu D

Effects of internal fixation for mid-shaft clavicle fractures on shoulder complex kinematics during lateral arm elevation

Hung L.W., Lu H.Y., Chen T.Y., Wang T.M., and Lu T.W.

Scientific Track V: Foot and Ankle

The response of metatarsophalangeal joint mechanics and energetics to footwear of varying longitudinal bending stiffness is not speed dependent

Day E., Hahn, M.

Evaluation of an instrumented insole for the assessment and monitoring of walking performance

Naaim A., Dumas, R., Popović Maneski, L, Popović D.

Ankle kinematics of children with idiopathic toe walking using single-segment and multi-segment foot models

Brasiliano P., Alvini M., Di Stanislao E., Vannozzi G., Camomilla V.

Transition to forefoot strike reduces patellofemoral joint stress more effectively than increased cadence

Wang B, Yang Y, Wang J, Zhang X, Fu W

Shoe cushioning reduces impact force during landings more effectively after fatigue than before fatigue

Deng L, Wang X, Zhang X, Fu W

Shoe effects on Achilles tendon loading in runners with habitual rearfoot strike patterns

Zhang X, Yang Y, Sun X, Deng L and Fu W

Changes of Leg and Joint Stiffness in Children with Flatfoot During Level Walking

Chen T-Y, Huang H-P, Wang T-M, Lu T-W

Scientific Track VI: Performance and Modeling

Externally induced soft-tissue vibration damping is associated with reduced muscle activity during drop jumps

Fu W, Yang C, Deng L

Center of Mass Variability and Alterations in Joint Kinematics after a Simulated Game in College Baseball Pitchers

Wang S-M, Huang J-H, Wu Y-R, Yang W-C, Hsu W-L

Lower limb control for walking on irregular terrains under different irregular conditions

Igarashi K, Yamada H, Koganezawa K

Interlimb coordination changes during passive exoskeleton-assisted gait is due to spring-loaded assistance but not device weight

Sado, T., Chong,S., Mace, S., Mukherjee, M.

Muscle contributions to the whole-body COM acceleration during walking in overweight individuals: a preliminary study

Kim, H K and Chou L-S

Iliotibial band strain while running around a curve

Schmitz H., Mettler J., Derrick T.

Evaluating the effects of external load, incline and walking speed on iliotibial band strain in wildland firefighters

Stacy, L., Derrick, T.

The immediate effects of dynamic and static stretch on the muscle properties and physical performance of the gastrocnemius

Huang I.T., Ho C.T., Chen C.C., Yu Z.Y., Chang Y.J., Hsieh T.H., Lien H.Y., Cheng C.H

Scientific Track VII: Novel Devices and Applications

A Novel Wearable shoe instigate double limb slips; a method used to measure slip severity & recovery specificity in young and older adults

Ouattas A, Rasmussen C., Hunt N.

Knee Simulator Assessment of Hinged Knee Replacement Extensor Mechanics Enhanced by a Computational Model

Piazza S.J., Hickox L., Mannarino A., Abbruzzese K., Townsend M., Pascale K., Servidio D

The Use of Motion Capture in a Forensic Environment

Keys B., Trepeck C., Freyder D., Morr D

Development of a Detection System to Evaluate the Mobility of Older People or the Middle-aged using Activities of Daily living

Lin and Yang B-S

In vitro testing of a novel non-contact intra-operative measurement system for guiding femoral derotation osteotomies

McCormack S. W., Walton R., Wright D. M., Bass A., Foster R. J., Eleuteri A., Shortland P. and Barton G. J.

Novel Approaches for Improving Human Movement Analysis Inside Spacesuits Using Inertial Sensors

Shen Y., Anderson A. P

Intra- and Inter-rater Reliability of a Portable Motion Capture System to Assess knee kinematics in Six Degree of Freedom for Healthy Adults

Tian F., Huang Q, Zheng Z, Wang S

***Estimation of stifle joint kinematics during gait in dogs using a pelvic-limb kinematic model
Pelvic-limb kinematic model for canine gait analysis***

Wu C-H, Lin C-C, Wang S-N, Hsu W-R, and Lu T-W

Scientific Track VIII: Data Driven Motion Analysis

AIST Gait Database Open access raw-Mocap database for the promotion of gait related studies, technologies and market

Kobayashi Y., Hida N., Fujimoto M., Mochimaru M

Implications of deep learning models and epipolar geometry in multi-camera tracking system for 3D human pose estimation of baseball players

Lu Y-Y, Hsu W-L, and Wu Y-R

Tobit Kalman Filter Assisted Deep Learning in Human Motion Enhancement

Lannan N., Zhou L., Fan G

Human Motion Enhancement by Skeleton Constrained Nonlinear Kalman Filters

Zhou L, Lannan N, Fan G.

Machine Learning-based Freezing of Gait Prediction and Preemptive Cue Effects Evaluation

Zhang Y, Gu D