LIFE ENVIRONMENT RESEARCH CENTER OSTRAVA (LERCO)
MEETING INVITATION

LOCATION

University of Ostrava, Sport, Health and Technology Cluster
(City Campus Černá louka, 3397 Moravská Ostrava 702 00)

PROGRAM

APRIL 1
TUESDAY

Join Zoom Meeting: https://cesnet.zoom.us/j/99194058277

COFFEE BREAK

10:00–12:00 | Workshop SHIFT: Working with LERCO 4HAIE data
Room: CS 319
Presenter 1: A. Coyle, Biomechanical Engineer at HAS-Motion
Presenter 2: S. Selbie, CEO at HAS-Motion

HAS MOTION
WORKSHOP SUMMARY

Big data has emerged within the biomechanics field thanks to technologies such as markerless motion capture, inertial measurement units, and EMG sensors. The LERCO project is no stranger to this. Working with big data can be intimidating, whether it be ensuring proper data management, visualizing your data, trustworthy cleaning methods or comprehensive data analysis, and requires specific tools to simplify these processes.

This workshop will present how Sift can be used to manage LERCO 4HAIE data and be used to answer any research questions. Sift was created as an "Ultimate Biomechanics Analysis" and has been specifically designed to cater to researchers dealing with extensive motion capture data sets, offering flexibility and control over visualization and analysis of human motion data. Using the LERCO 4HAIE biomechanics data, we will go through the Knowledge Discovery Process – gather, clean, shape, analyse and report – using different features in Sift both through the interface and the command line.

GATHER

Users will learn how to either load prebuilt CMZs or how to create CMZs from raw c3d files. Using the LERCO 4HAIE data we will then learn how to query the data saved in CMZ to view important kinematic and kinetic data.

CLEAN

Once data is queried we will see how we can identify anomalous data and understand what the causes are. We will learn how to easily inspect data to identify irregularities based on animations and videos.

SHAPE

Using features such as curve registration we can learn how to properly shape our data to prepare for analysis. Using tags, events and normal databases we can learn the many ways to group our data to prepare for analysis.

ANALYSE

Sift offers a wide range of analytical and statistical tests. We will see how implemented tests such as Principal Component Analysis and Statistical Parametric Mapping can be used to answer underlying questions in our data.

REPORT

Using Sifts visualizations tools we will go through how we can easily communicate our results from our data and analysis.

LUNCH BREAK

Lunch is provided by each participant individually.

WORKSHOP 1

PREPARING A GRANT PROPOSAL US NSF FOR PREDICTING AND PREVENTING MUSCULOSKELETAL INJURIES

Room: CS 319

13:40–14:10 | Presentation of Main Objectives

- Presenters: J. Hamill, D. Jandacka, J. Freedman Silvernail
- Discussion on the importance of the research and its potential impact.
- Main objectives: predicting and preventing musculoskeletal injuries in runners using artificial intelligence.

14:10–14:30 | Presentation of the Data Set from the LERCO 4HAIE Project

- Presenters: D. Jandacka, J. Skypala, J. Plesek, J. Urbaczka
- Overview of data on 1300 participants, including biomechanical, physiological, and socio-economic data.
- Discussion on data collection methods and their significance for the project.

14:30–14:50 | Data Cleaning and Preparation for Machine Learning (Sift Program)

- Presenters: S. Selbie, A. Coyle
- Demonstration of the Sift software and its use for anomaly removal and data preparation for analysis.
- Discussion on the importance of data cleaning for model accuracy.

14:50–15:10 | Data Normalization and Scaling

- Presenters: S. Selbie, A. Coyle
- Adjusting data to ensure consistency and accuracy.
- Discussion on using curve shapes instead of discrete variables and absolute values for better comparability and applicability of data.

15:10–15:30 | Model Validation and Testing

- Presenter: P. Branco
- Methods for validating models and assessing their performance.
- Discussion on prediction calibration and statistical power of models.

COFFEE BREAK

15:40–16:00 | Collection of New Data

- Presenters: J. Hamill, D. Jandacka, J. Freedman Silvernail
- Plan for collecting new data on injured and non-injured runners.
- Discussion on integrating new data into existing models and its importance for improving predictions.

16:00–17:00 | Discussion with Marek Brabec from Academy of Sciences

- Running Injuries and Their Reports Over Time

APRIL 2
WEDNESDAY

Join Zoom Meeting: https://cesnet.zoom.us/j/95085977735

Room: CS 207

COFFEE BREAK

9:00–10:30 | Aging and gender, physical activity, and health – Results of LERCO 4HAIE (Chairs: Steriani Elavsky, PhD. and Julia Freedman Silvernail, PhD.)

- J. Freedman Silvernail et al. Declines in running begin in the third decade of life
- H. Zadoń, K. Nowakowska-Lipiec, P. Szaflik et al.: Age, gender and physical activity differences in the knee joint loadings during gait
- P. Kutac et al. – The Effect of Running on Bone Mineral Density in Women During Ageing
- V. Casula et al. – MRI T2 Radiomics Reveals Key Determinants of Joint Health

10:30–12:00 | Running and other injuries - Results of LERCO 4HAIE (Chair – Joe Hamill, PhD.)

- D. Jandacka et al. – Biomechanical Insights into Achilles Tendon Injury Risk and Protection in Runners: A Prospective Study LERCO 4HAIE
- L. Cipryan et al. – The associations of running related injuries with biochemical markers of inflammation and HRV
- J. Plesek – SPM Prospective study of PF
- M. Sebera et al. – Psychosocial Correlates of Running-related Injuries: Findings from a Large-Scale One-Year Follow-Up

12:00–14:00 | COFFEE & SNACK BREAK
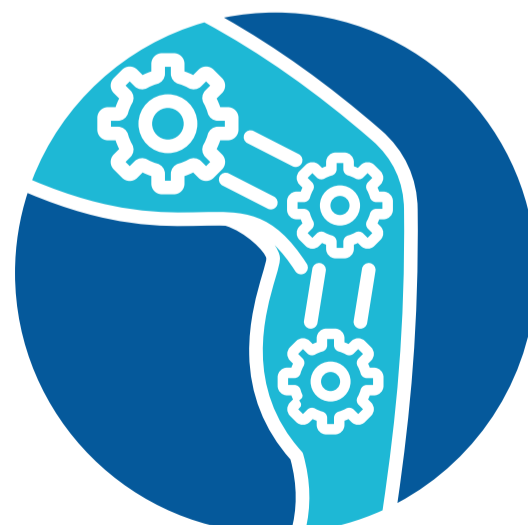
THE FOLLOWING SEGMENT WILL FEATURE PRESENTATIONS FROM
THE DIGIWELL PROJECT

14:00–15:15 | Obesity, nutrition, physical activity, and health – Results of LERCO 4HAIE with potential application for projects focused on randomized studies for intervention in individuals with obesity with the aim of personalized treatment for obesity (Chair – Steriani Elavsky, PhD.)

- D. Jandacka et al. – Comparative Analysis of Biomechanical Load on Medial Knee Cartilage in Obese Active vs. Inactive Individuals during gait
- L. Slovak et al. – Comparison of T2 Relaxation Times in Knee Cartilage Among Obese, Physically Active, and Inactive Individuals: Results from the 4HAIE Study
- L. Knapova – Behavioral Lab – Comparison of Wellbeing Indicators Among Obese, Physically Active, and Inactive Individuals: Results from the 4HAIE Study
- M. Brabec et al. – Analysis of long-term and feedback effects in individual physical activity patterns
- A. Monte et al. – Effect of glycated haemoglobin on musculoskeletal tissues: insights from the 4HAIE study

COFFEE BREAK

15:30–17:00 | Methodological studies (FITBIT, Biomechanics, MRI, etc.) – (Chair – Steriani Elavsky, PhD.)

- J. Urbaczka – FitBit data overview – running/walking related parameters
- R. Liskovec – Spatial and Environmental Data in 4HAIE and LERCO: Opportunities and Synergies
- M. Tucicova et al. – Nomaly detection in a multivariate gaussian random sample with application to HAIE data
- D. Hartman – Complex patterns in mobility and sleep quality
- V. Sladek et al – Connecting living with past humans: Agreement between CT and MRI scanning technique in reconstruction of bone health
- M. Hora et al. – Body mass estimation from skeletal features: the effect of activity and body composition

APRIL 3
THURSDAY

Join Zoom Meeting: https://cesnet.zoom.us/j/92591028220

9:00–10:30 | PhD Board Meeting

Room: CS 319

COFFEE BREAK

10:45–11:45 | PhD Board Meeting – Presentation of students of the first-year of doctoral studies

Room: CS 207

- R. Filo – Relationship Between Physical Activity, Sleep, and Subjective Wellbeing in Young Adults
- O. Zach – Study 1 Consumption of unprocessed, processed and ultra-processed foods and its impact on body composition, chronic disease development and other health related factors: Systematic review; Study 2 Assessing the associations between the consumption of unprocessed, processed and ultra-processed food, body composition and other health related factors; Study 3 Assessing the effect of the changes in dietary intervention in overweight and obese subjects
- M. Zhanelova – Effect of AI-supported planning in physical education on teachers' self-efficacy and their students' active habits
- M. Cocca – Quality of Physical Education: the role of teachers´self-efficacy and support for autonomy on students' motivation towards physical education, social skill development, and physical activity habits in Primary schools from the Czech Republic
- K. Kahankova – Quality of physical education and physical literacy of primary school pupils
- N. Hanak – Impact of an innovative approach to physical education on motor development, physical activity, and emotional intelligence
- V. Uhrova – Emotional Well-being in Children from Disadvantages Regions – The Role of Physical Activity and Quality of Physical Education with Insights into Biological Mechanisms

LUNCH BREAK

Lunch is provided by each participant individually.

RESEARCH RESULTS AND OUTPUTS
LERCO 4HAIE

13:00–14:30 | Air pollution, physical activity, and health – Results of LERCO 4HAIE (Chair – Kristyna Jandackova, PhD.)

- V. Cibulcova et al. – Hair Cortisol as a Marker of Environmental and Physical Stress: The Role of Air Pollution and Physical Activity
- S. Elavsky et al. – The temporal dynamics of the physical activity and life satisfaction relationship
- V. Jandackova et al. – Heart rate variability and lifetime exposure to air pollution: Does physical fitness modify the association?
- V. Jandackova et al. – Grey matter volume, cognitive function and lifetime exposure to air pollution: May physical fitness modify the association?
- L. Knapova et al. – Daily relationship between air pollution, weather, and objectively measured physical activity in industrial regions
- T. Dostal et al. – Association between cardiac autonomic regulation, visceral adipose tissue, cardiorespiratory fitness and ambient air pollution: 4HAIE Study

14:30–15:00 | Estimating the Impact of Aerobic Fitness on Annual Inhalation Volume and Resilience to Air Pollution: A Study Based on 4HAIE Data (Chairs – Peter Hofmann, PhD. and Daniel Jandacka, PhD.)

Joint Discussion on Possibilities: We will engage in a collaborative discussion to explore the potential for obtaining annual estimates of inhalation rates. This will include examining sample data from Fitbit (J. Urbaczka) and VO2max, which provide second-by-second data that could be useful for these estimates. Additionally, R. Liskovec will present annual air pollution data, and we will discuss how to integrate this with fitness data. J. Šustek will contribute insights on mathematical models for these estimates. Finally, we will consider the feasibility of a joint article with Peter Hofman, discussing potential contributions and collaboration strategies.

COFFEE BREAK

WORKSHOP 2

**PROJECT PREPARATION WORKSHOP PROGRAM
(HYBRID – PRESENCE AND ONLINE)**

**Call: The impact of pollution on the development and progression of brain
diseases and disorders**

Room: CS 207

15:30–16:00 | Overview of the HORIZON-HLTH-2025-01-ENVHLTH-01 Call (Veronika Krizanicova)

- Detailed presentation of the call, objectives, expected impacts, and requirements.

16:00–16:30 | Discussion on the main goals of the project and research questions

PARALLEL SECTION

Room: at Coffee Zone

15:30–16:30 | Individual Meetings of Lab Teams – As Needed Throughout the Section

SOCIAL EVENT – SNACK AND MUSIC IN THE DESPERADO BAR

Time: 18:00–22:00

We are delighted to invite you to a special social event that will take place in the Desperado Bar. This evening is dedicated to fostering connections and relaxing after a day filled with intellectual engagement.

Join us for an evening of delightful food, enchanting music, and wonderful company. It's the perfect opportunity to unwind, network, and celebrate the spirit of collaboration and community.

We look forward to seeing you there!

APRIL 4 FRIDAY

12:00–13:30 | LERCO 4HAIE Meeting – Project management and guests

Room: CS 319

Individual Meetings of Lab Teams – As Needed Throughout the Event at Coffee Zone