ICAMPAM 2017

ICAMPAM

5th International Conference on Ambulatory Monitoring of Physical Activity and Movement

June 21-23, 2017

Pre-conference Workshops **June 20**

National Institutes of Health
Bethesda, Maryland USA

PRESENTED BY

NIH National Institutes of Health

ISMPB

NSF

Contents

Welcome!

Dear ICAMPAM participants,

Welcome to the **5th International Conference on Ambulatory Monitoring of Physical Activity and Movement** in Bethesda, Maryland. The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, is pleased to host this conference and we hope that you will enjoy your time in Bethesda, Maryland and nearby Washington, DC.

The Conference brings together leading researchers, new investigators and research students with interest in the measurement of physical behaviors including physical activity, sedentary behavior and sleep. Topics include clinical through population monitoring of youth, adults, older adults and persons with chronic disease and disabilities. Issues related to accelerometer device measures from data collection to data analysis will be addressed, as well as place-based measures, multimodal measures, and even "digital exhaust." The program includes 7 keynote speakers, 6 invited speakers, 11 pre-conference workshops, 6 symposia, 68 oral presentations and 140 poster presentations.

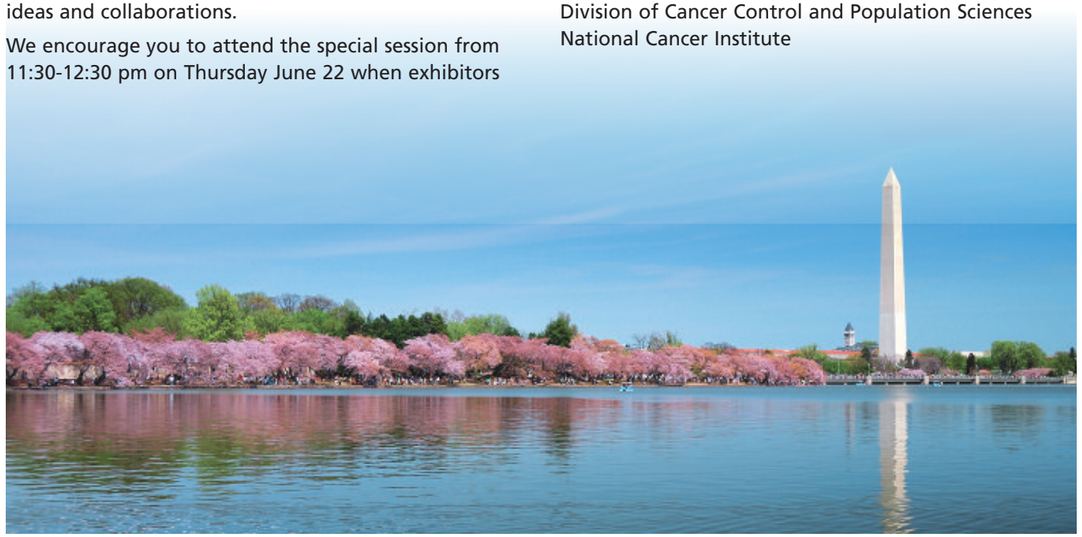
The nearly 300 participants in this international conference have traveled from more than 20 countries across Europe, North and South America, Africa, the Middle East, Asia, and Australia. The organizers hope that your participation in the conference will lead to valuable and stimulating discussions that result in new ideas and collaborations.

We encourage you to attend the special session from 11:30-12:30 pm on Thursday June 22 when exhibitors will have the opportunity to present their products. We also recommend that you attend the International Society for the Measurement of Physical Behaviours (ISMPB) general membership meeting on Wednesday evening. Social events include the opening reception on Tuesday evening at the Hyatt Regency Hotel in Bethesda, and the banquet celebration on Thursday evening also at the Hyatt Regency. Lunches and coffee breaks will provide additional opportunities for you to meet colleagues and to network.

Our hosting of the conference would not be possible without the help and efforts of many people. These include the board of directors of the ISMPB, the ICAMPAM Scientific Planning Committee, and especially the members of the Local Organizing Committee, whose work brought this conference about. Thanks are also due to the many members of the NIH Exercise Interest Group who volunteered to review abstracts for the conference. We also appreciate the expertise and professional assistance of our meeting support contractors, Podium Conference Specialists of Victoria, British Columbia and The Scientific Consulting Group of Gaithersburg, Maryland. On behalf of the Local Organizing Committee and the Scientific Committee, welcome to ICAMPAM 2017.

On behalf of the Board of the ISMPB and the NIH,

RICK TROIANO, ICAMPAM 2017 Co-Chair
Division of Cancer Control and Population Sciences
National Cancer Institute



About ISMPB

ISMPB
International Society for the Measurement of Physical Behaviour

The **International Society for the Measurement of Physical Behaviour** (ISMPB) is a non-profit scientific society which focuses on the issues related to ambulatory monitoring, wearable monitors, movement sensors, physical activity, sedentary behaviour, movement behaviour, body postures, sleep and constructs related to physical behaviours. Therefore, the Society specifically focuses on the objective measurement and quantification of physical behaviours which include:

- all free-living physical behaviours (including sleep) in its different forms (volumes and patterns which could give an indication of quality)
- measurements that are unrestricted, prolonged and unsupervised
- measurements of physiological responses (e.g. energy expenditure) that are directly related to physical behaviours
- a wide range of applications: clinical, public health, behavior sciences, end users etc.

The Society aims to promote and facilitate the study and applications of objective measurement and quantification of free-living physical behavior(s) and its related constructs (e.g. energy expenditure, context) using wearable devices. The Society is characterised by:

- its multidisciplinary focus; including engineering, signal analysis, physiology, medical sciences, public health, psychology, ergonomics and sports.
- bringing together people from a wide variety of backgrounds and expertise, including researchers, clinicians, therapists, signal analysts, computational scientists and commercial companies.

ISMPB hosts a biennial International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM). The first ICAMPAM Meeting took place 21-24 May, 2008 at the Beurs-WTC Congress Center in Rotterdam, The Netherlands. The following meetings took place in Glasgow (2011), Amherst (2013) and Limerick (2015).

ISMPB Board of Directors

President

Hans Bussmann,
Department of Rehabilitation Medicine, Erasmus MC – University Medical Center, Rotterdam, The Netherlands

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University of Queensland, School of Population Health, Australia

Professor Jeff Hausdorff,
Movement Disorders Unit at the Tel-Aviv Sourasky Medical Center (TASMC), Israel

ISMPB Membership

Membership in ISMPB is open to everyone from around the world involved in the measurement of free-living physical behaviour.

Membership fees support the mission of ISMPB in creating a vibrant community bringing together people from a wide variety of backgrounds and expertise, including researchers, clinicians, therapists, signal analysts, computational scientists and commercial companies.

Member Benefits

- Register for Society Meetings at reduced registration rates
- Support a new, young and independent Society
- Become connected with leading experts in the field
- Opportunity to get involved as an ISMPB Committee member
- Vote in annual elections for the Board of Directors
- Stand for election to the Board of Directors
- Eligible for student awards at the Society Meetings (best oral and best poster)
- Access to online resources and conference proceedings
- Opportunity to post news and information on related events

Member Categories

Regular / Post Doc Members ($100)
Open to any person who is engaged in research related to areas of interest of the Society.

Student Members ($65)
Open to any student enrolled in degree granting programs at institutions of higher education

The second membership term will run from January 1, 2017 to September 30, 2018.

ISMPB
International Society for the Measurement of Physical Behaviour

Follow Us

Facebook https://www.facebook.com/ISMPB.org • **Twitter** https://twitter.com/ismpb_org

General Information

Conference Venue

National Institutes of Health
Natcher Conference Center (Building 45)
9000 Rockville Pike, Bethesda, Maryland 20892
Please review the floor plan at the back of the program for further details.

Conference Registration
Registration for the conference includes admission to all sessions, the Opening Reception, lunch on Wednesday and Thursday of the conference, tea/coffee breaks during the conference, and the Evening Banquet.

Additional Tickets
Tickets can be purchased separately for your guests and/or children for both the Opening Reception and the Evening Banquet. Purchase online or at the Registration Desk.

Name Badges
Your name badge is your admission ticket to the conference sessions, coffee breaks, meals, reception and banquet. Please wear it at all times. At the end of the conference we ask that you return your badge to the registration desk, or at one of the badge recycling stations.

ICAMPAM Board Members, Exhibitors and Staff will be identified by appropriate ribbons.

Dress Code
Dress is casual for all ICAMPAM meetings and social events.

Registration and Information Desk Hours
The Registration and Information Desk, located in the located in the Lower Level of the Natcher Conference Centre (Building 45), will be open during the following dates and times:

Tuesday	June 20	10:00 – 17:30
Wednesday	June 21	07:30 – 17:00
Thursday	June 22	07:30 – 17:00
Friday	June 23	07:30 – 13:00

Internet Access
Free wireless internet access is available in the Natcher Conference Center as well as majority of buildings on the NIH Bethesda Campus. The wireless network connection that delegates should search for on their devices is '**NIH Guest Network**' or '**NIH Wireless**.'

Conference Staff
Conference staff will be on hand to assist you with any questions or issues you may have throughout the conference. All conference staff will be easy to identify as they will be wearing staff ribbons attached to their name tags.

Lunch and Breaks
All lunches and breaks will be provided as outlined in the conference schedule. Boxed lunches will be provided on the lower level of Natcher Conference center. Tea/coffee will be served on the lower level of the Natcher Conference center throughout the scheduled meeting. It is important that your name badge is displayed for all lunch and coffee/tea breaks.

Room Allocation
All rooms are indicated on the conference schedule and will be signposted. Staff members will be able to provide directions to conference delegates.

Scientific Program
A comprehensive scientific program has been designed and prepared for ICAMPAM 2017. The program is comprised of 7 keynote speakers, 6 invited speakers, 68 oral presentations and 140 poster presentations. The conference also includes 6 symposia and 11 pre-conference workshops.

Speaker Information
For Oral Sessions, each room will be equipped with:

1 PC laptop 1 LCD projector
1 microphone 1 laser pointer

All speakers in Oral Sessions must upload their presentations at least 2 hours prior to their presentation in the Speaker Ready Room located the lower level of the Natcher Conference center.

If you have any questions, please visit the registration desk.

Poster Sessions	Mounted Between	Dedicated Session	Removed Between
Session 1 (Wed 21)	7:00 – 8:30 am	12:15 – 1:00 pm	3:45 – 6:00 pm
Session 2 (Wed 21)	7:00 – 8:30 am	1:00 – 1:45 pm	3:45 – 6:00 pm
Session 3 (Thurs 22)	7:00 – 8:30 am	12:30 – 1:30 pm	4:30 – 6:00 pm
Session 4 (Thurs 22)	7:00 – 8:30 am	1:30 – 2:30 pm	4:30 – 6:00 pm

Poster Information
There are four Poster Sessions (above) during the conference. Poster sessions will be held on the upper level of the Natcher Conference Center.

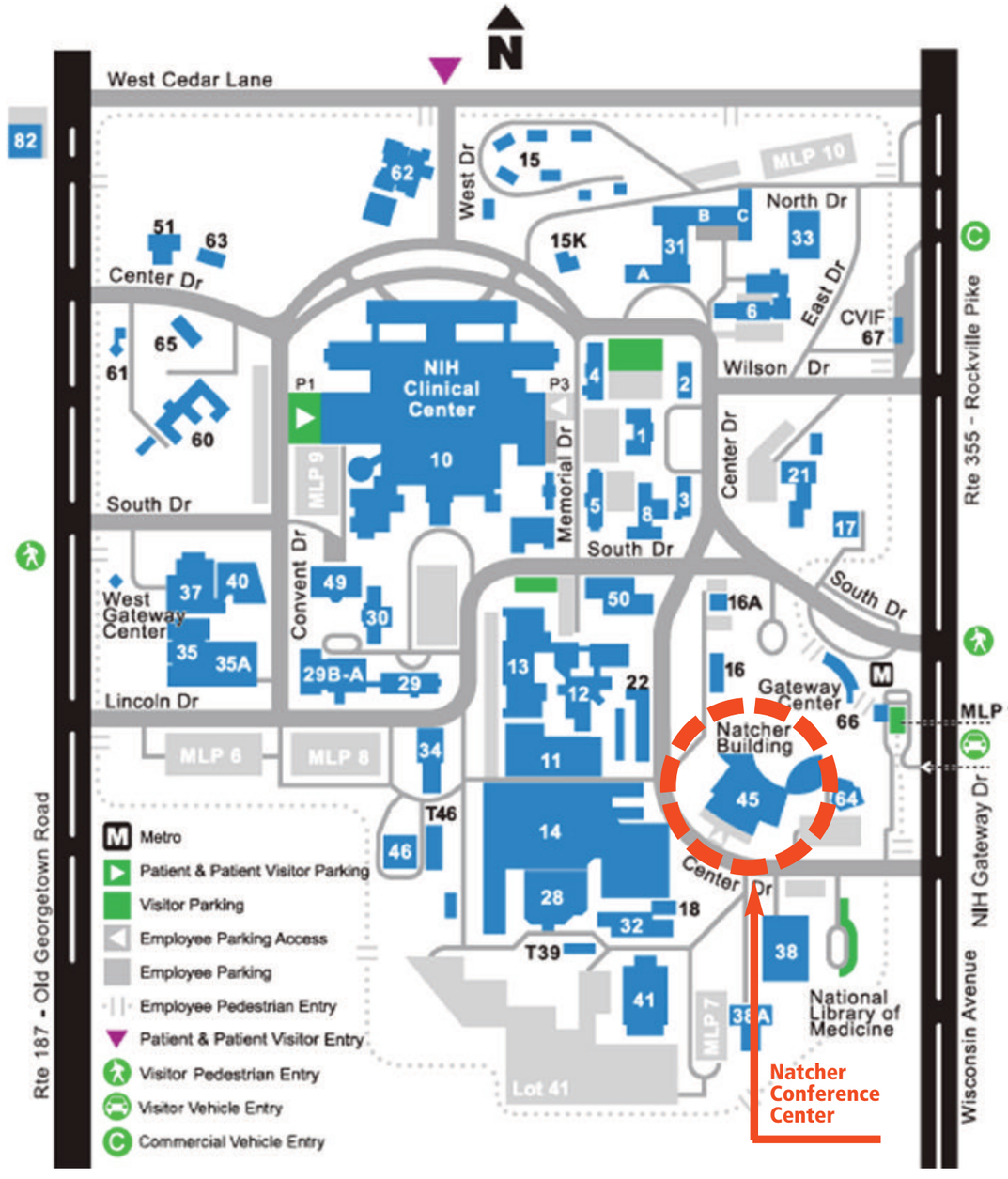
Information on poster titles, authors and numbers begins on page 33. For a complete copy of all the poster abstracts, please visit the ICAMPAM website, where you can download an electronic copy.
Easy reference Poster floor plans can be found on page 48.

Conference Exhibitors
A technical exhibition by eight international companies will take place on the upper level of Natcher Conference Center through the two full days of conference. Exhibitors will provide a presentation in the Kirschstein Auditorium from 11:30 – 12:30 pm on Thursday June 22.

Society General Membership Meeting
The International Society for the Measurement of Physical Behaviours (ISMPB) general membership meeting is scheduled from 5:00 – 6:00 pm on Wednesday June 21 in the Kirschstein Auditorium. All members of the society and prospective members are encouraged to attend and contribute to the meeting.

National Institutes of Health, Bethesda

NIH Campus



Natcher Conference Center on the National Institutes of Health campus

Detail showing showing Natcher Conference Center and Gateway Center

ICAMPAM Scientific Planning Committee

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Søren Brage
Alison Cernich
Bronwyn Clark
Theresa Cruz
Alan Donnelly
Ulrich Ebner-Priemer
Ulf Ekelund
Mary Evans
Malcolm Granat
William (Bill) Haskell
Jorunn L. Helbostad
Charles Matthews
Wendy Nilsen
Nicky Ridgers
Alex Rowlands
Rebecca Spencer
Sylvia Spengler
Rick Troiano
Stewart Trost
Catrine Tudor-Locke
Dana Wolff-Hughes

Conference Co-Chairs

Malcolm Granat
Rick Troiano

Local Conference Organizing Committee

Rick Troiano - Chair
Alison Cernich
Theresa Cruz
Mary Evans
Wendy Nilsen
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ICAMPAM Administration

Podium Conference Specialists
Marischal De Armond
Alexandra Pask

ISMPB
International Society *for the* Measurement *of* Physical Behaviour

Pre-Conference Workshops

Tuesday, June 20, 2017

09:00 – 10:45 **Room G1: Compositional Data Analysis – Hands on Demonstration**

Sebastian Chastin and Elisabeth Winkler

Glasgow Caledonian University, Glasgow, UK

Description: This will be an interactive workshop during which the participants will learn the foundation of compositional analysis and go through a set of practical examples giving then the opportunity to apply the techniques on realistic examples. Participants will be provided with quizzes, a workbook, example data and software resources. The workshop will guide the participants through a full data analysis process through a series of exercise and practical demonstrations, starting with how to prepare and process the data. This will be followed by how to analyse the day activity composition in terms of time spent in different behaviours and produce statistical and graphical summary and finally conduct linear modelling of the relationship between the activity composition, health outcomes and determinants.

09:00 – 10:45 **Gait Lab: Gait Lab Tour and Demo**

Diane Damiano and Christopher Stanley

National Institutes of Health Clinical Center, Maryland, USA

Description: The Functional & Applied Biomechanics Section in the Rehabilitation Medicine Department of the National Institutes of Health is a state-of-the-art intramural research laboratory located within the largest research hospital in the world (the NIH Clinical Center). The tour will highlight some of our research activities that focus on the quantification and remediation of functional human movements in individuals with movement disorders mainly as a result of neurological injuries such as cerebral palsy or traumatic brain injury. To this end, we combine biomechanical instrumentation including but not limited to a 10 camera passive infrared motion capture system, force plates, instrumented treadmill, wireless EMG system, and a dynamic body-weight support system with emerging mobile functional brain imaging technologies (EEG and fNIRS) to investigate the neural mechanisms of normal and abnormal motor coordination. We further design and test novel interventions to improve motor capabilities such as our pediatric wearable lower extremity exoskeleton to train children over time to improve their gait patterns and efficiency. We will also demonstrate the capability of commercially available Virtual Reality gaming systems for accurate, accessible and affordable motion tracking.

10:45 – 11:00 **Coffee Break:** Main Exhibition Hall (EG0-10)

11:00 – 12:45 **Auditorium A: Functional Data Analysis for Wearables: Methods and Applications**

Vadim Zipunnikov, Jeff Goldsmith and Ciprian Crainiceanu

Johns Hopkins Bloomberg School of Public Health, Baltimore, USA

Description: The main goal of this workshop is to present an overview of the functional data analysis methods for modeling physical activity data, review their strengths and limitations, demonstrate their implementation in R packages "refund" and "mgcv" and applications in large epidemiological studies such as Head Start Program, National Health and Nutrition Examination Survey, Baltimore Longitudinal Study of Aging, and Women's Health Initiative.

11:00 – 12:45 **Auditorium B: Sensor Methods Collaboratory**

Rick Troiano

National Cancer Institute, Maryland, USA

Description: The purpose of the SMC pre-conference workshop is to reinvigorate the efforts of the SMC and generate potential next steps in moving the SMC forward. Dr. Richard Troiano will present an overview of the SMC's mission and initial plans. Additionally, SMC group leads will provide information regarding the content and potential of individual SMC working groups. The speakers will then facilitate a discussion intended to encourage brainstorming as well as address three important issues. First, as the NHANES 2011-2014 data are prepared for public release, what is the preferred method to

Pre-Conference Workshops continued

process the data? Second, what strategies can be implemented to incentivize and facilitate data sharing and collaboration among researchers focused on ambulatory monitoring? Third, how can large, richly characterized data files be used to develop or benchmark analytical methods (algorithm development)?

11:00 – 12:45 **Room G1: Enhancing the Ambulatory Assessment Tool Box**

Ulrich Ebner-Priemer, Karlsruhe Institute of Technology, Germany

Hans Bussmann, Erasmus MC – University Medical Center, Rotterdam, The Netherlands

Description: To better understand Physical Behaviour in daily life, information about the context of the performed physical behaviour is sometimes essential. In this sense, it is helpful to define context as broad as possible, covering nature and the built environment, the social environment including social interactions, as well as affective and motivational states. Fortunately, the advent of mobile smartphone technology enables an effortless monitoring of a variety of context information in daily life. Combining the assessment of Physical Behaviour with location via GPS, physiological effort via ECG, social interactions via tracking communication behaviour of the smartphone, and motivational states via e-diaries, might lead to an increased insight into everyday life Physical Behaviour.

In this workshop we will exemplarily report studies combining the assessment of Physical Behaviour and context information. We will report on how to assess a multitude of parameters, including location, green space, electrocardiogram, communication behaviour, online behaviour, cognitive status, affective and motivational. In addition, we will introduce the concept of "triggered" diaries. E-diaries are triggered by physical activity, physiology, location or urban context to get additional context information during episodes of interest. All in all, we will work on expanding our tool-boxes to get insight into daily life behaviour.

11:00 – 12:45 **Room G2: Grasping Physical Activity: Using 3D Printers to Visualize Physical Activity**

Melitta McNarry, Applied Sports, Technology, Exercise and Medicine Research Centre, Swansea University, UK

Kelly Mackintosh, College of Engineering, Swansea University, UK

Description: Current physical activity (PA) guidelines recommend that children should engage in at least 60 minutes moderate-to-vigorous physical activity (MVPA) every day, yet few children meet these guidelines. A frequently cited barrier leading to this short-fall in PA is that guidelines are difficult to measure, interpret and apply. Recent research has not only developed a novel device to accurately measure PA, but allows real-time visualisation. Moreover, the integration of 3D printing facilitates the creation of a tangible output, which provides children with a novel and exciting way to conceptualise their PA levels in accordance with government guidelines. However, it goes far beyond just PA; a 3D printed model can provide a wealth of information regarding numerous specific movements and how well executed they are.

We will conduct an interactive session to present the real-time monitoring and visualisation aspects of our work. This session will involve participants wearing the monitors to collect live data that is simultaneously displayed on the screen and subsequently printed in the form of a 3D shape. The greater the range of movements, the more interesting the shape! This will then be used to discuss key public health messages regarding PA and our current research. Furthermore, the process that went into developing the coding for the models and the choice of model shapes will be discussed. This is a contemporary issue that everyone has an opinion on; the innovative approach will capture the imagination of the participants as they try to generate unique personalised 3D shapes that can be kept as a souvenir. Those interested in Engineering, Physiology, Physical Activity, Health, Psychology and Computer Science will be intrigued by this holistic approach.

12:45 – 1:45 **Lunch Break**

1:45 – 3:30 **Auditorium A: Data Privacy - From Ethics to Compiance and Trust**

Joss Langford, Technical Director, Activinsights, Kimbolton, UK

Mark Lizar, CEO, Open Consent Group

Tom Torkar, Partner, Michelmores

Description: The process of running free-living intervention studies, the expanding reach of European data privacy law and the desire to make more use of consumer wearables are driving us beyond the remit of ethics alone into the areas of compliance and trust.

We increasingly need a deep technical understanding of how personal data is being collect-ed and stored in order to be compliant with the consumer regulatory regimes and to talk sensitively with subjects about how their data is being used. The aims of the workshop are:

- To develop a forum for the discussion of commercial/consumer privacy, security and identity issues within ISMPB.
- To establish the current state of understanding and appetite for learning on the topic of data privacy.
- To inform ISMPB members, workshop and conference attendees of the current status of the law and industry practice in the area of global data protection with particular focus on Europe and US.
- To inform ISMPB members, workshop and conference attendees of the upcoming changes in European law (General Data Protection Regulations, May 2018) and the likely impacts for them. For example: consent, processing notices, privacy-by-design, privacy impact assessments, right to be forgotten, data portability and system architecture design.
- To discuss the changing subject/consumer attitudes to the collection and use of their data in research, products and services.

1:45 – 3:30 **Auditorium B: AlphaBET: Consensus Meeting on the Development of a Taxonomy of 24 Hour Activity Cycle Data (PART 1)**

Jorunn Helbostad, NTNU

Sebastien Chastin, Glasgow Caledonian University, Ghent University

Malcolm Granat, Salford University

Richard Troiano, NIH

Mark Tremblay, CHEO

Description: The AIPHABET project aims to develop a consensus common taxonomy (naming and cataloging) for classification, harmonisation and storage of the 24 hour activity cycle data recorded with objective sensors. It is an open science project hosted on the Open Science Framework (https://osf.io/vsauf/) and initiated by a steering committee of 12 experts representing different fields of research dealing with sensor data and researchers in scientific ontology in an attempt to pull together multiple initiatives aiming at the same goal (Sebastien Chastin, Jorunn Helbostad, Mark Stephen Tremblay, Barbara Ainsworth, Paul Jarle Mork, Lynn Rochester, Ulf Schwarz, Johannes Bussmann, Malcolm Granat, Rick Troiano, Neville Owen, Jacqueline Kerr)

The steering committee established a protocol and initial framework.

The goals of this workshop are:

1. to present this initial work to the wider community
2. to engage the wider community in an informed and structured discussion
3. to give a voice to the wider community and benefit from the wider expertise
4. to advance the development and produce a consensus taxonomy through a concept mapping exercise with the ICAMPAM community

The workshop will follow a set protocol, combining live consensus making via electronic concept mapping with discussions around short expert statement.

1:45 – 3:30 **Room G2: Objective Measures of Free-Living Physical Behavior. What Can They Tell Us About Physical Capacity in Persons With Mobility Limiting Conditions?**

Douglas Maxwell, Founder and CEO, PAL Technologies, Glasgow, UK

Andy Kerr, Biomedical Engineering Department, PAL Technologies

Nicholas Smith, Associate, Biomedical Engineering Department, PAL Technologies

David Loudon, Software Engineer and Data Visualisation Expert, PAL Technologies

Pre-Conference Workshops continued

Description: The main goal of this workshop is to discuss how we can best derive person-centred outcomes that reflect physical capacity from body-worn senor data. From our study of physical behaviours we know people have basic free-living physical demands. We can look at these in terms of ability (for example rising from a chair) and connect this with participation (how often a person stands up). In terms of mobility, we know people make short duration stepping bouts around the house for self-care and domestic activities but community activities require longer bouts of stepping. We have calculated a Walking Breaks Index (WBI) to compare upright periods with short and long stepping bouts and have used this index to quantify impairment in persons with mobility limiting conditions. Similarly, we have demonstrated how the time from standing up to stepping varies in clinical populations. We will look at how measure like the WBI and time to first step can be used as a measure of physical capacity and how they can be generated from wearable sensors in a range of clinical populations including people with stroke and vascular disease (claudication) We will explore the advantages of combining sensor signals (accelerometers, gyroscopes, magnetometers and barometers) to provide contextual information about behaviours. We will also explore novel ways of visualising physical behaviour information can both complement and inform analysis for both clinician and patient.

Participants will take away an appreciation of how the measurement of physical behaviour can provide objective outcomes related to physical capacity from patients in a free-living environment and how appropriate visualisation of these measures can provide an insight into and record of a patient's recovery profile.

3:30 – 3:45 **Break**

3:45 – 5:30 **Auditorium A: Novel Analytics, Signal Processing and Exercise Science**

Gareth Stratton, A-STEM Research Centre Swansea University, UK
Huw Summers, Swansea University, UK
Rowan Brown, Associate Professor, Swansea University, UK
Michael Rosenberg, Associate Professor, Swansea University, UK

Description: In this workshop delegates will be exposed to novel analytics hitherto used in cell biology and animal behaviour both individually and in groups. Further insight into how these analytics can be integrated into hand held devices and apps

While accelerometry is the de facto standard for objectively measuring physical activity, emerging analytical approaches used in other disciplines may offer new insight into traditional analyses. The number of sensors and analytics in physical activity measurement in humans has grown significantly. Yet the approaches used to analyse and characterise the range of signals has lagged behind. There are rich data available from the signals captured by sensors that can be used to quantify and qualify physical activity. The problem is creating manageable outputs from large amounts of data. This workshop will demonstrate how analytics hitherto used in animal and cell behaviour can be used to process physical activity data for individuals and cluster these analyses to gain insight into group behaviour.

3:45 – 5:30 **Auditorium B: AlphaBET: Development of a Taxonomy of 24 Hour Activity Cycle Data (PART 2)**

Jorunn Helbostad, NTNU
Sebastien Chastin, Glasgow Caledonian University, Ghent University
Malcolm Granat, Salford University
Richard Troiano, NIH
Mark Tremblay, CHEO

Description: The AlPHABET project aims to develop a consensus common taxonomy (naming and cataloging) for classification, harmonisation and storage of the 24 hour activity cycle data recorded with objective sensors. It is an open science project hosted on the Open Science Framework (https://osf.io/vsauf/) and initiated by a steering committee of 12 experts representing different fields of research dealing with sensor data and researchers in scientific ontology in an attempt to pull together multiple initiatives aiming at the same goal (Sebastien Chastin, Jorunn Helbostad, Mark Stephen Tremblay, Barbara Ainsworth, Paul Jarle Mork, Lynn Rochester, Ulf Schwarz, Johannes Bussmann, Malcolm Granat, Rick Troiano, Neville Owen, Jacqueline Kerr)

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3:45 – 5:30 **Room G1: Pooling of Daily Activity Data Across Borders and Culture**

Tamara Harris, National Institute on Aging, Intramural Program
Eric Shiroma, National Institute on Aging, Intramrual Research Program
Charles Matthews, National Cancer Institute, Intramural Research Program
Annemarie Koster, Maastricht University, Dept. of Social Medicine
Sari Stenholm, Dept of Preventive Medicine, Tempe University

Description: Accelerometer data may be a strong candidate for pooled research projects. However, difference in devices used, wear location and data collection and cleaning methods present challenges to combining data across studies. This workshop is an exploration of a novel method for pooling accelerometry data, using daily activity patterns. The first goal is to ring researchers from a variety of population studies in Europe, Asia, and the U.S. to compare data on daily activity arrayed as total counts by hour. These data will be generated prior to the workshop and submitted to the organizers for further analysis. Individual study data will be reviewed at the workshop. The second goal is to discuss statistical and analytical challenges to combining data across these studies to assess the consistency of the pattern of daily activity. The third goal is to present these methods and share them with the attendees of the workshop. This workshop is designed to be interactive. There will be dedicated time for discussion about submitted data, analytical approaches and future projects.

Workshops Schedule • June 20

TUESDAY, JUNE 20					
	Auditorium A (100)	Auditorium B (100)	Room G1 (15 classroom style)	Room G2 (20 theatre style)	Gait Lab - Bldg 10 (max 20)
9:00 - 10:45 AM			Compositional Data Analysis - Hands on Demonstration		Gait Lab Tour and Demo
10:45 - 11:00 AM	Break				
11:00-12:45 PM	Functional Data Analysis for Wearables: Methods and Applications	Sensor Methods Collaboratory	Enhancing the Ambulatory Assessment Toolbox	Grasping Physical Activity: Using 3D Printers to Visualise Physical Activity	
12:45 - 1:45	Lunch Break				
1:45 - 3:30 PM	Data Privacy - From Ethics to Compliance and Trust	AlphaBET		Objective Measures in Persons with Mobility Limitations	
3:30 - 3:45	Break				
3:45 - 5:30 PM	Novel Analytics, Signal Processing and Exercise Science	AlphaBET	Pooling of Daily Activity Data Across Borders and Cultures		
5:30 - 6:00 PM	Break				
6:00 - 8:00 PM	Welcome Reception at Hyatt Bethesda				

Symposia

Wednesday, June 21, 2017

1:45 – 2:45 **Auditorium A: The Clinical Utility of Accelerometers in Clinical Populations**

Joanne McVeigh[1], Leon Straker[1], Rebecca Meiring[2], Antonia Wadley, Carolyn McIntyre[3]

[1]Curtin University, [2]University of Witwatersrand, [3]Edith Cowan University

Chair: Joanne McVeigh, Curtin University

Description: This symposium will introduce novel data about activity accumulation patterns in clinical populations. Pain and other symptoms limit the ability of people with chronic conditions such as Human Immuno-Deficiency Virus (HIV), cancer or a musculoskeletal disorder to move normally, and as a result everyday physical activity (PA) levels are reduced. Information about the activity behaviours in these populations has been gathered from self-report or physician assessed measures. Detailed information about the daily, spontaneous PA patterns in people with chronic conditions is limited. Accelerometry can aid the measurement of debilitating effects of chronic conditions and can detect effects of physical, surgical, or pharmacological interventions outside the laboratory or hospital setting, in community dwelling people.

1:45 – 2:45 **Kirschstein Auditorium: Statistical Modeling Of Circadian Rhythms of Physical Activity**

Jacek Urbanek[1], Vadim Zipunnikov[1], Jiawei Bai[1], Kathleen Merikangas[2]

[1]Johns Hopkins Bloomberg School of Public Health, [2]National Institute of Mental Health

Chair: Jacek Urbanek, Johns Hopkins Bloomberg School of Public Health

Description: This symposium will introduce novel and intuitive statistical methods for modeling the human circadian rhythm based on data collected using body-worn physical activity monitors. All methods are motivated by and applied to large observational studies. Rationale: Biological rhythms have been under intense methodological development across all disciplines of health research. Data obtained from body-worn physical activity monitors provide a much more complete view of human activity than was previously available. The intensity of human activity combined with its within- and between-day chronotype provide new possibilities for scientific research and raise a host of new challenges for statistical analysis.

Friday, June 23, 2017

9:30 – 11:00 **Auditorium B: Application of Accelerometry to Identify Clinical Trajectories**

Tamara Harris[1], Jennifer Schrack[2], Paolo Caserotti[3], Todd Manini[4]

[1]National Institute on Aging, NIH, [2]Johns Hopkins Bloomberg School of Public Health, [3]University of Southern Denmark, [4]University of Florida, Gainesville

Chair: Tamara Harris, National Institute on Aging, NIH

Description: The purpose of this symposium is to identify new opportunities for using accelerometry in the assessment of clinical populations. These presentations will provide an overview of novel applications of accelerometry to capture the trajectory of physical activity and sedentary behavior preceding the onset of clinical illness as well as the trajectory of physical activity most beneficial for recovery from illness. Mobility is paramount to recovery from illness, but the current clinical method of assessing mobility via self-report is neither granular nor complete. Accelerometers provide a comprehensive picture of daily movements and are widely used in clinical research, but their clinical utility in the acute care/hospital setting as well as post hospital discharge are not well-defined. The symposium will focus on the use of accelerometry for tracking health and functional status in clinically ill patients, and highlight the benefit of using acceleromters to better understand recovery, reduce hospital length of stay, and adverse events including readmission.

9:30 – 11:00 **Auditorium C: Technology Assisted Physical Activity Measurement Among Children: Attractions and Pitfalls**

Amy Lu[1], Tom Baranowski[2], Stephen Intille[1], Jungyun Hwang[1], Eldin Dzubur[3]

[1]Northeastern University, [2]Baylor College of Medicine, [3]University of Southern California

Chair: Amy Lu, Northeastern University

Description: Recent years saw a plethora of personal wearable sensor technologies and the adoption of ecological momentary assessment (EMA) for physical activity (PA) among children. While their emergence and prevalence offer advantages such as portability, elongated measurement duration, and engagement, the multitude of procedures in data analysis and interpretation, cut-points, measurement environment, and participants' weight status limits their reliability, validity, and comparability. This symposium addresses the need for converging methods to enhance PA measurement among children.

11:15 – 12:15 **Auditorium B: Using Activity Monitors to Develop, Evaluate and Refine Whole-Day Interventions**

Genevieve Healy[1], Sjaan Gommersall[1], Elisabeth Winkler[1], Matthew Buman[2]

[1]The University of Queensland, [2]The University of Arizona

Chair: Matthew Buman, The University of Arizona

Description: Beyond the advantages of better measurement, the plethora of rich data collected via activity monitors offers exciting possibilities for conducting, evaluating, and refining interventions. Rationale: ICAMPAM?s focus on free-living monitoring makes it ideal for a dialogue on how to make the most of activity monitors in interventions. Some of the methods covered have been used to a limited extent; others not at all in the intervention context, such as compositional data analysis.

Detailed Daily Program

The 5th International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM)

June 21-23, 2017 | National Institutes of Health (NIH) | Bethesda, Maryland

Wednesday, June 21, 2017

8:30 – 9:00 **Welcome**

9:00 – 10:00 **Keynote Presentation**

Bjoern Eskofier, Friedrich-Alexander Univeristat Erlangen- Nürnberg, Germany

Smart Shoes Reach the Clinic: Wearable Sensor-Based instrumented Gait Analysis for Movement Disorders

10:00 – 11:00 **Speakers and Abstracts**

Kirschstein Auditorium: Incorporating Place-Based Data

Session Chair: Sylvia Spengler (National Science Foundation)

Activity-Aware Smart Homes for Health Assessment and Intervention
Diane Cook (Invited Speaker) Washington State University, USA

Combining GPS and Activity Monitoring to Understand the Context, Location, Volume and Intensity of Physical Activity
Danny Rafferty[1], Catriona Dolan[1], Malcolm Granat[2]
[1]Glasgow Caledonian University, [2]University of Salford

Home Based Measuring of Physical Activity and Sleep in the eWALL Platform
Harm op den Akker[1], Miriam Cabrita[2], Hermie Hermens[1]
[1]Roessingh Research and Development, [2]University of Twente

10:00 – 11:00 **Auditorium A: Analytic Approaches for 24 Hour Data**

Session Chair: Chuck Matthews (National Institute of Health)

Multilevel Functional Methods for Modeling Actigraphy Data and its Application to Predicting Mortality in the US Population
Vadim Zipunnikov[1]
[1]Johns Hopkins Bloomberg School of Public Health

The Isotemporal Substitution Paradigm: Opportunities and Limitations for Estimating 'Replacement' Effects in 24 Hour Sensor Data
Matthew Buman

Compositional Analysis for 24 Hour Activity Data: Potential and Limitations
Sebastien Chastin[1], Javier Palarea[2]
[1]Glasgow Caledonian University, [2]BioSS

Isotemporal Substitution Modeling versus Compositional Data Analysis
John Staudenmayer (Invited Speaker)

10:00 – 11:00 **Auditorium B: Physical Activity and Associated Outcomes**

Session Chair: Catrine Tudor-Locke (University of Massachusetts Amherst)

Combining Accelerometry and Magnetic Resonance Imaging Data; Associations between Non-Exercise Activity and Brain Grey Matter Volume
Markus Reichert[1], Heike Tost[2], Urs Braun[2], Hans-Joachim Salize[2], Alexander Zipf[3], Andreas Meyer-Lindenberg[2], Ulrich Ebner-Priemer
[1]Central Institute of Mental Health (CIMH) / Karlsruhe Institute of Technology (KIT), [2]Central Institute of Mental Health (CIMH), [3]Heidelberg University, [4]Karlsruhe Institute of Technology (KIT)

Sedentary Time and High Intensity Physical Activity Versus Cardio-Respiratory Fitness: What is More Important for Cardio-Metabolic Health for Adults Aged 40-75?
Annemarie Koster[1], Jeroen van der Velde[1], Coen Stehouwer[1], Carla van der Kallen[1], Pieter Dagnelie[1], Miranda Schram[1], Ronald Henry[1], Simone Sep[1], Simone Eussen[1], Martien van Dongen[1], Nicolaas Schaper[1], Hans Savelberg[1]
[1]Maastricht University

At Least 10-Minute Bouts and Breaks in Sedentary Behavior are Associated with Diabetes/Elevated Blood Glucose.
Pauliina Husu[1], Kari Tokola[1], Jaana Suni[1], Henri Vähä-Ypyä[1], Harri Sievänen[1], Tommi Vasankari[1]
[1]The UKK Institute for Health Promotion Research

Physical Activity and Sedentary Behaviour in Patients with Inflammatory Joint Disease: A Cross Sectional Study
Kirsty Bell[1], Danny Rafferty[1], Gordon Hendry[1], Martijn Steultjens[1]
[1]Glasgow Caledonian University

10:00 – 11:00 **Auditorium C: Taking a 'Step' Forward**

Session Chair: Jeffrey Hausdorff (Tel Aviv Sourasky Medical Center)

The Detection of Purposeful Stepping Using a Wrist Worn Accelerometer
Ben Stansfield[1], Stefan Teufl[1], Jenny Preston[2], Frederike van Wijck[1]
[1]Glasgow Caledonian University, [2]Douglas Grant Rehabilitation Centre, Ayrshire Central Hospital

Slow but Sure: The Accurate Measurement of Slow Stepping
Nicholas Smith[1], Andy Kerr[2], David Loudon[3]
[1]University of Strathclyde and PAL Technologies Inc., [2]University of Strathclyde, [3]PAL Technologies Inc.

Free-Living Dynamic Skeletal Loading Estimation Using Tri-Axial Accelerometers
Emma Fortune[1], Kenton Kaufman[1]
[1]Mayo Clinic

The Distribution of ActivPAL Postural and Stepping Classifications within ActiGraph Activity Classifications
Alexandra Clarke-Cornwell[1], Penny Cook[1], Malcolm Granat[1]
[1]The University of Salford

11:00 – 11:15 **Break**

11:15 – 12:15 **Speakers and Abstracts**

Kirschstein Auditorium: Clinical Applications of Monitoring Devices

Session Chair: Alison Cernich (National Institutes of Health)

Physical Performance Monitoring and Clinical Applications in Orthopedics
Matthew Smuck (Invited Speaker) Stanford University, USA

Daily Program continued

Objective Ambulatory Activity Better Describes the Function of Patients with Hip Deformities
Wilshaw Stevens Jr[1], Kirsten Tulchin-Francis[1], Adriana DeLaRocha[1], David Podeszwa[1]
[1]Texas Scottish Rite Hospital for Children

Objective Diagnosis and Outcome Assessment of Shoulder Pathologies is Clinically Feasible Using Inertial Activity Monitors to Derive Asymmetry of Intense Upper Arm Movements
Bernd Grimm[1], Stijn Martens[2], Matthijs Lipperts[3], Ralph Walbeehm[1], Steven Samijo[1]
[1]Zuyderland Medical Center, [2]University of Maastricht, [3]St. Anna Hospital

11:15 – 12:15 **Auditorium A: Accelerometer Wear-Time and Activity Analysis**
Session Chair: Ulrich Ebner-Priemer (Karlsruhe Institute of Technology)

Comparing Methods for Creating an Overall Physical Activity Estimate from Multiple Accelerometer Days
Eric Shiroma[1], Osorio Meirelles[1], Lenore Launer[1], Tamara Harris[1]
[1]National Institute on Aging

More High Intensity Physical Activity in the Population with New Method to Process ActiGraph Accelerometer Data
Daniel Arvidsson[1], Jan Brønd[2], Elias Johannesson[1], Lars Bo Andersen[3], Örjan Ekblom , Elin Ekblom Bak , Göran Bergström[1], Mats Börjesson[1]
[1]University of Gothenburg, [2]University of Southern Denmark, [3]Western Norway University of Applied Sciences, [4]The Swedish School of Sport and Health Sciences

How many Days are Enough for Measuring Physical Behavior with the ActivPAL in Working Adults?
Nicolas Aguilar-Farias[1], Nicolas Salom-Díaz[1], Pía Martino-Fuentealba[1]
[1]Universidad de La Frontera

Utility of ActiGraph wear sensor in Assessing Wear-Time in 24-Hour Wrist Measurement
Anna Pulakka[1], Eric Shiroma[2], Tamara Harris[2], Sari Stenholm[1]
[1]University of Turku and Turku Univeristy Hospital, [2]National Institute on Aging

11:15 – 12:15 **Auditorium B: Multimodal Assessment**
Session Chair: Theresa Cruz (National Institute of Health)

The Context of Physical Activity of Older Adults in Daily Life: Combining Accelerometry and Ecological Momentary Assessment
Miriam Cabrita[1], Harm op den Akker[2], Monique Tabak[2], Miriam Vollenbroek-Hutten[1], Hermie Hermens[2]
[1]University of Twente, [2]Roessingh Research and Development

Associations of Real-Life Mobility with Measures of Physical, Cognitive, as well as Psychosocial Functioning in Community-Dwelling Older Adults
Eleftheria Giannouli[1], Otmar Bock[1], Wiebren Zijlstra[1]
[1]German Sport University Cologne

Estimating Energy Expenditure During Outdoor Level Walking Using Global Positioning System or Accelerometry in Patients with Peripheral Artery Disease
Pierre-Yves de Müllenheim[1], Ségolène Chaudru[2], Guillaume Mahé[2], Alexis Le Faucheur[1]
[1]ENS Rennes, [2]Clinical investigation center (CIC) 1414, INSERM

Using Bluetooth Proximity Sending to Determine Location in a Workplace
Bronwyn Clark[1], Suleeporn Tinakorn na ayudhaya[1], Elisabeth Winkler[1], Charlotte Brackenridge[1], Genevieve Healy[1], Stewart Trost[2]
[1]Cancer Prevention Research Centre, School of Public Health, The University of Queensland, [2] School of Exercise and Nutrition Sciences, Queensland University of Technology

11:15 – 12:15 **Auditorium C: Sleep Classification**
Session Chair: Rebecca Spencer (University of Massachusetts, Amherst)

Accuracy of an Automated Algorithm to Detect Nocturnal Sleep in Adults using 24-Hour Waist Accelerometry
Tiago Barreira[1], Jessica Redmond[2], John Schuna Jr[3], [4]Catrine Tudor-Locke
[1]Syracuse University, [2]Utica College, [3]Oregon State University, [4]University of Massachusetts Amherst

Accurate Measurement of Sleep Outcome Variables Using Wrist-Worn Monitors May Require User Input
Daniel Heil[1], Blakely Brown[2], Kari Jo Harris[2], Mike Tryon[3], Wei Zhu[1]
[1]Montana State University, [2]University of Montana, [3]Salish Kootenai College

Automated Sleep Scoring Algorithms for Activity Monitors -A Comparison to Polysomnography in the Raine Study
Peter Eastwood[1], Ian Dunican[1], Kevin Murray[1], James Slater[1], Kathleen Maddison[1], John Caldwell[2], Leon Straker[3]
[1]University of Western Australia, [2]Coastal Performance Consulting, [3]Curtin University

Sleep Pattern Detection Using Raw Tri-Axial Wrist and Hip Actigraphy in the Raine Study
Michelle Trevenen[1], Kevin Murray[1], Berwin Turlach[1], Leon Straker[2], Peter Eastwood[1]
[1]University of Western Australia, [2]Curtin University

12:15 – 1:00 **Lunch and Poster Session 1**

1:00 – 1:45 **Lunch and Poster Session 2**

1:45 – 2:45 **Symposia**

Kirschstein Auditorium - Symposia
Jacek Urbanek: ***Statistical Modelling of Circadian Rhythms of Physical Activity***

Auditorium A - Symposia
Joanne McVeigh: ***The Clinical Utility of Accelerometers in Clinical Populations***

2:45 – 3:45 **Speakers and Abstracts**

Kirschstein Auditorium: Utility of Consumer Devices
Session Chair: Genevieve Healy (The University of Queensland, School of Public Health)

Measuring Physical Behavior: Insights from Device Manufacturers and Academic Research Laboratories
Kate Lyden (Invited Speaker) KAL Research & Consulting | University of Massachusetts, USA

Which Heart Rate-Based Monitor is Better: Apple Watch or Fitbit Charge HR?
Yang Bai[1], Gregory Welk[2], Paul Hibbing[3], Konstantinos Mantis[2]
[1]University of Vermont, [2]Iowa State University, [3]University of Tennessee

Criterion Validity of Consumer and Research Grade Activity Monitors During Brief, Intermittent Walking
Lindsay Toth[1], Paul Hibbing[1], Susan Park[1], Alvin Morton[1], Whitney Pittman[1], Damla Sarisaltik[1], Andrew Kaplan[1], Scott Crouter[1], David Bassett[1]
[1]The University of Tennessee Knoxville

Daily Program continued

2:45 – 3:45 **Auditorium A: Physical Activity Measurement in Youth**

Session Chair: Alan Donnelly (University of Limerick)

EASY – An Instrument for Surveillance of Physical Activity in Youth

Russell Pate[1], Kerry McIver[1], Michael Beets[1], Marsha Dowda[1]

[1]University of South Carolina

Full Day Arm Movement Patterns Across Early Infancy

Beth Smith[1], Ivan Trujillo-Priego[1], Joanne Shida[1], Christianne Lane[1]

[1]University of Southern California

All days, most days, or an average: Operationalizing the Current Physical Activity Recommendation for Children and Youth

Rachel Colley[1], Valerie Carson[2], Didier Garriguet[1], Ian Janssen[3], Karen Roberts[4], Mark Tremblay[5]

[1]Statistics Canada, [2]University of Alberta, [3]Queen's University, [4]Public Health Agency of Canada, [5]Children's Hospital of Eastern Ontario Research Institute

2:45 – 3:45 **Auditorium B: Ambulation in Older Adults**

Session Chair: Jorunn Helbostad (Norwegian University of Science and Technology)

How much Does Healthy Gait Change when Moving away from a Laboratory?

Fabio Storm[1], Christopher Buckley[1], Claudia Mazzà[1]

[1]University of Sheffield

Turning at Home and During Community Ambulation in Parkinson's Disease: A New Measure for Fall Risk?

Martina Mancini[1], Aner Weiss, Talia Herman, Fay Horak , Jeff Hausdorff

[1]Oregon Health & Science University

Investigating the Intervening Effect of Hospitalizations on Physical Activity Patterns Measured by Accelerometry

Amal Wanigatunga[1], Thomas Gill[2], Anthony Marsh[3], Fang-Chi Hsu[3], Lusine Yahjyan[1], Adam Woods[1], Nancy Glynn[4], Abby King[5], Robert Newton[6], Roger Fielding[7], Marco Pahor[1], Todd Manini[1]

[1]University of Florida, [2]Yale University, [3]Wake Forest University, [4]University of Pittsburgh, [5]Stanford University, [6]Louisiana State University, [7]Tufts University

Alterations in Community Stepping and Step Quality Among Older Adults with Mild Cognitive Impairment

Jeffrey Hausdorff[1], Shiran Shustak[1], Inbar Hillel[1], Silvia Del Din[2], Esther Bekkers[3], Elisa Pelosin[4], Freek Nieuwhof[5], Anat Mirelman[1], Lynn Rochester[6]

[1]Tel Aviv Sourasky Medical Center, [2]Newcastle University, Newcastle upon Tyne, [3]KU Leuven, [4]University of Genova, [5]Radboud university medical center, [6]Newcastle University, Newcastle upon Tyne

2:45 – 3:45 **Auditorium C: Physical Activity in Cardiovascular Disease Populations**

Session Chair: Mary Evans (National Institutes of Health)

Unfavorable Physical Behaviour in Persons with Aneurysmal Subarachnoid Hemorrhage: In-Depth Objective Measures of Physical Activity and Sedentary Behaviour

Wouter Harmsen[1], Gerard Ribbers[1], Majanka Heijenbrok - Kal[1], Johannes Bussmann[1], Emiel Sneekes[1], Ladbon Khajeh[2], Fop van Kooten[2], Sebastiaan Neggers[2], Rita van den Berg - Emons[1]

[1]Rijndam Rehabilitation Institute, [2]Erasmus MC

Exploring Free Living Physical Activity Profiles: Beyond Step Count

Danny Rafferty[1], Jason Gill[2], Lorna Paul[2]

[1]Glasgow Caledonian University, [2]University of Glasgow

Quantifying the sit-to-stand and stand-to-sit Transition from Free-living Data

Chris Pickford[1], Andy Kerr[2], Malcolm Granat[1]

[1]University of Salford, [2]University of Strathclyde

Identification and Measurement of Ambulatory Activity after Stroke using Real Time Location Technology

Arshi Iqbal[1], Allison Cooper[2], Przemyslaw Woznowski[3], Claire Butterworth[4], Christopher Rees[5], Alun Preece[6], Robert van Deursen

[1]Royal Bournemouth Hospital, [2]Swansea University, [3]University of Bristol, [4]University Hospital Llandough, [5]University Hospital of Llandough, [6]Cardiff University

3:45 – 4:00 **Break**

4:00 – 5:00 **Keynote Presentation**

Jennifer Hicks, Stanford University, CA, USA

Planetary Scale Smartphone Data Reveal Relationships Between Physical Activity, Environment, & Health

5:00 – 6:00 **ISMPB General Membership Meeting**

Thursday, June 22, 2017

8:30 – 10:00 **Keynote Presentations: Devices in Very Large Cohorts**

Nick Wareham, Medical Research Council, University of Cambridge, UK

Measuring physical activity objectively in the UK Biobank study

Heiner Boeing, German Institute of Human Nutrition, Berlin, Germany

7-day accelerometry in the German Health Study (National Cohort)

James McClain, National Institute of Health, USA

Participant Technology and Assessment in the All of Us Research Program: Current Status and Future Innovations

10:00 – 10:15 **Break**

10:15 – 11:15 **Speakers and Abstracts**

Kirschstein Auditorium: Analytic Approaches and Metrics

Session Chair: Søren Brage (University of Cambridge)

Use of Mean Amplitude Deviation as an Approach to Acceleration Data Processing – Experience from Finnish Population Based Studies

Tommi Vasankari (Invited Speaker) UKK-instituutti, Finland

Paul Jarle Mork: ***Objective Measurement of Physical Activity in the Norwegian HUNT Study***

Paul Jarle Mork[1], Hilde Bårdstu[1], Atle Melleby Kongsvold[1], Astrid Tessem[1], Hans Olav Hessen[1], Helge Langseth[1], Kerstin Bach[1]

[1]Norwegian University of Science and Technology

Arturo Vega-Gonzales: ***Clustering Algorithms for Recognition of ADL Performed with Upper Limbs***

Arturo Vega-Gonzalez[1], Sergio Parra-Sanchez[1], Juan Manuel Gomez Gonzalez[2], Irais Quintero Ortega[1], Mayra Cuellar-Cruz[3], Birzabith Mendoza-Novelo[1], Jose Jorge Delgado-Garcia[1]

[1]Universidad de Guanajuato, División de Ciencias e Ingenierías, [2]Universidad Nacional Autonoma de Mexico, [3]Universidad de Guanajuato, División de Ciencias Naturales y Exactas

Daily Program continued

10:15 – 11:15 **Auditorium A: Consumer Device Applications in Research**

Session Chair: David Bassett (University of Tennessee, Knoxville)

Does Stress Influence the Volume and Pattern of Sedentary Behavior? Group and Person (N of 1) Level Results of 1-Year Observational Study among Health Adults

Keith Diaz[1], Anusorn Thanataveerat[1], Faith Parsons[1], Sunmoo Yoon[2], Ying Kuen Cheung[2], Carmela Alcantara[2], Andrea Duran[1], Ipek Ensari[1], David Krupka[1], Joseph Schwartz[1], Matthew Burg[3], Karina Davidson[1]

[1]Columbia University Medical Center, [2]Columbia University, [3]Yale University School of Medicine

Accuracy of Consumer Physical Activity Trackers for Measuring Step Counts: Comparison against a Validated Waist-worn Pedometer

Charlotte Edwardson[1], Melanie Davies[1], Kamlesh Khunti[1], Tom Yates[1], Alex Rowlands[1]

[1]University of Leicester

Consumer Wearable Activity Trackers as Behavioural Interventions and Continuous Monitoring of Physical Behaviors; Lessons from ACTIVATE trial

Nga Nguyen[1], Brigid Lynch[1]

[1]Cancer Council Victoria/University of Melbourne

10:15 – 11:15 **Auditorium B: From the Lab to Free-Living**

Session Chair: Patty Freedson (University of Massachusetts, Amherst)

From Bounded to Pragmatic Data Collection: Validity of State of the Art Activity Recognition in Daily Life Context

Hala Abdul Rahman[1], Alexis Le Faucheur[1], Ge Di[2], Guy Carrault[2], Jacques Prioux[1]

[1]Ecole Normale Supérieure - Rennes, [2]Université de Rennes 1

Validity of a Statistical Estimation Framework for Energy Expenditure Estimation of Lab-based and Free-Living Physical Activities from a Wrist-Worn Accelerometer

Meynard John Toledo[1], Qiao Wang[1], Alberto Florez Pregonero[1], Barbara Ainsworth[1], Pavan Turaga[1], Matthew Buman[1]

[1]Arizona State University

What Plays the Determinant Role in Persons With Dementia and Sleep Disturbance: Outdoor Walking, Evening Artificial Light Exposure, or Sleep Education: a Meta-Analysis

Chuen-Ru Liu[1], Yiing Mei Liou[1]

[1]National Yang-Ming University.Taipei, TAIWAN

10:15 – 11:15 **Auditorium C: Approaches to Estimating Intensity in Accelerometry**

Session Chair: Rick Troiano (National Cancer Institute)

Estimating Relative Intensity Physical Activity Accelerometer Cut-Points Using a Maximal Graded Exercise Treadmill Test

Juned Siddique[1], David Aaby[1], Whitney Welch[1], Stephen Sidney[2], Bethany Barone Gibbs[3], Jared Reis[4], Patty Freedson[5]

[1]Northwestern University, [2]Kaiser Permanente, [3]University of Pittsburgh, [4]National Heart, Lung, and Blood Institute, [5]University of Massachusetts-Amherst

Classification Accuracy of Cadence Cut-Points for Discriminating Moderate and Vigorous Intensity Ambulation

Elroy Aguiar[1], Ho Han[1], Scott Ducharme[1], Chris Moore[1], John Schuna, Jr[2], Catrine Tudor-Locke[1]

[1]University of Massachusetts Amherst, [2]Oregon State University

Impact of Epoch Lengths on Accelerometer Activity Intensity Estimations for Adults

Ruben Brondeel[1], Jasper Schipperijn[2], Paul Kelly[3], Jacqueline Kerr[4], Yan Kestens[1], Basile Chaix[5]

[1]Centre de Recherche du Centre Hospitalier Universitaire de Montréal (CRCHUM), [2]Department of Sport Sciences and Clinical Biomechanics, University of Southern Denmark, [3]Physical Activity for Health Research Centre (PAHRC) University of Edinburgh, [4]Department of Family Medicine & Public Health, University of San Diego, [5]Inserm, UMR-S 1136, Pierre Louis Institute of Epidemiology and Public Health, Nemesis team

Paramaterizing and Validating Existing Algorithms for Identifying Out-of-Bed Time using Hip-Worn Accelerometer Data from Older Adults

John Bellettiere[1], Yiliang Zhang[2], Vincent Berardi[3], Kelsie Full[1], Andrea LaCroix[1], Chongzhi Di[4]

[1]University of California, San Diego, [2]Peking University, [3]San Diego State University, [4]Fred Hutchinson Cancer Research Center

11:15 – 1:30 **Break**

11:30 – 12:30 **Exhibitor Talks (Kirschstein Auditorium)**

12:30 – 1:30 **Lunch and Poster Session 3**

1:30 – 2:30 **Lunch and Poster Session 4**

2:30 – 3:30 **Special Presentation (Kirschstein Auditorium)**

Deborah Estrin: ***Using Small Data to Personalize, Sustain and Study Health Behavior***

3:30 – 4:30 **Keynote Presentation**

Karl E. Friedl, University of California, San Francisco, USA

Monitoring of Sleep and Other Neurophysiological Parameters Outside of the Laboratory Setting

4:30 – 4:45 Break

4:45 – 6:00 Special Symposium (Kirschstein Auditorium)

Friday, June 23, 2017

8:30 – 9:30 **Keynote Presentation**

Mike McConnell, Verily Life Sciences, CA, USA

Use of mobile/wearable devices for research and clinical care

9:30 – 11:00 **Speakers and Abstracts and Symposia**

Kirschstein Auditorium: Estimating Energy Expenditure with ActiGraph

Session Chair: Dana Wolff-Hughes (National Institutes of Health)

Application of the ActiGraph GT9X IMU to estimate Energy Expenditure

Samuel LaMunion[1], Paul Hibbing[1], David Bassett Jr.[1], Scott Crouter[1]

[1]The University of Tennessee Knoxville

Daily Program continued

ActiGraph Done Six Ways
Charles Matthews[1], Sarah Keadle, Steven Moore[1], Dale Schoeller, Raymond Carroll, Richard Troiano, Joshua Sampson
[1]US NIH/NCI

Use of the ActiGraph GT9X IMU to Predict Energy Expenditure
Scott Crouter[1], Paul Hibbing[1], Samuel LaMunion[1], David Bassett[1]
[1]The University of Tennessee Knoxville

Absolute Validity of Activity Energy Expenditure Estimates from Wrist Accelerometry
Thomas White[1], Kate Westgate[1], Patrick Olivier[2], Michelle Venables[1], Nick Wareham[1], Soren Brage[1]
[1]University of Cambridge, [2]Newcastle University

Which is the Best Accelerometer-based Metric to Predict Free-living Activity Energy Expenditure?
Jairo Migueles[1], Christine Delisle Nyström[2], Cristina Cadenas-Sanchez[1], Pontus Henriksson[1], Francisco Ortega[1], Marie Löf[2]
[1]University of Granada, [2]Karolinska Institutet

9:30 – 11:00 **Auditorium A: Activity Analysis in Special Populations**

Session Chair: Hans Bussmann (Erasmus MC University Medical Center)

Using Machine Learning and Accelerometry to Improve Energy Expenditure Prediction in Pregnant Women
Alexander Montoye[1], Jordana Dahmen[2], Scott Conger[3], Christopher Connolly[2]
[1]Alma College, [2]Washington State University, [3]Boise State University

Calibration of the GENEActive wrist-and-hip Worn Accelerometer for Prediction of Activity-Related Energy Expenditure in Preschoolers
Berit Steenbock[1], Norman Wirsik[1], Mirko Brandes[1]
[1]Leibniz Institute for Prevention Research and Epidemiology - BIPS

Comparability of Difference Accelerometers and Sites for Activity-Related Energy Expenditure Prediction in Preschool Children
Norman Wirsik[1], Berit Steenbock[1], Mirko Brandes[1]
[1]Leibniz Institute for Prevention Research and Epidemiology - BIPS

Using Expectile Regression and Hidden Markov Models to Assess Accelerometer Data
Norman Wirsik[1], Fabian Sobotka[2], Vitali Witowski[1], Iris Pigeot[1]
[1]Leibniz Institute for Prevention Research and Epidemiology - BIPS , [2]University Oldenburg, Oldenburg, Germany

Fragmentation of Physical Activity and Its Application
Junrui Di[1], Jacek Urbanek[1], Andrew Leroux[1], Adam Spira[1], Jennifer Schrack[1], Vadim Zipunnikov[1]
[1]Johns Hopkins University

Physical activity of frail elderly living at a care facility or at home: Is there a difference?
Bernd Grimm[1], Yvonne Goertz[2], Ivo Buil[2], Inge Joichem[2], Machiel Smid[2], Walther Sipers[1], Ide Heyligers[2]
[1]Dept. Orthopaedic Surgery, Zuyderland Medical Center, [2]Zuyderland Medical Center

9:30 – 11:00 **Auditorium B: Symposium**

Tamara Harris: ***Application of Accelerometry to Identify Clinical Trajectories***

9:30 – 11:00 **Auditorium C: Symposium**

Amy Lu: ***Technology Assisted Physical Activity Measurement Among Children: Attractions and Pitfalls***

11:00 – 11:15 **Break**

11:15 – 12:15 **Speakers and Abstracts and Symposia**

Kirschstein Auditorium: Approaches to Harmonizing and Standardizing Big Data

Session Chair: Malcolm Granat (University of Salford)

The Role of Interactive Visualization in the Interpretation of Big Behavior Data
David Loudon[1], Nikos Mourselas[1], Douglas Maxwell[1]
[1]PAL Technologies Ltd

Motor Activity Research Consortium for Health (mMARCH): Standardization of Procedure and Analyses of Mobile Technologies in Mood Disorders and Related Conditions
Kathleen Merikangas[1], Femke Lamers[2], Lihong Cui[1], Haochang Shou[3], Vadim Zipunnikov[4]
[1]National Institute of Mental Health, [2]VU University Medical Center/GGZ inGeest, [3]University of Pennslyvania, [4]Johns Hopkins Bloomberg School of Public Health

Interoperability of Data and Devices
Joss Langford[1], Matt Reed[2], David Snelling[3], Paul Bruton
[1]Coelition, [2]Unilever Research & Development, [3]Fujitsu Laboratories of Europe, Tessella

11:15 – 12:15 **Auditorium A: Physical Activity Behavior in Youth**

Session Chair: Bronwyn Clark (The University of Queensland)

Objectively Measured Physical Activity and Sedentary Time and Cardio-metabolic Biomarkers in Youth Adults: A Compositional Data Analysis
Joanne McVeigh[1], Anne Smith[1], Erin Howie[2], Aloke Phatak[1], Simeon Jasper[1], Joanne Jacob[1]
[1]Curtin University, [2]University of Arkansas

Activity Pattern Differences Between Obese and Normal Weight Children
Ben Stansfield[1], Ceri Sellers[1]
[1]Glasgow Caledonian University

11:15 – 12:15 **Auditorium B: Symposium**

Genevieve Healy: Using Activity Monitors to Develop, Evaluate, and Refine Whole-Day Interventions

12:15 – 12:45 **Closing Remarks**

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Authors and Presenters

All authors (lead and additional) and presenters are listed here for easy cross-referencing to their respective poster abstract. The full list of abstracts is available as a download from the ICAMPAM website (www.ismpb.org).

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Poster Session 1

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1-1 Effectiveness of a Lateral Wedged Insole on the Levels and Patterns of Free-Living Activity.
Yasser Althebaity[1], Malcolm Granat[1], Anmin Liu[1], Richard Jones[1]
[1]University of Salford

1-3 Comparison Between Wearable Sensors and Infra-Red Cameras-Based Motion Analysis to Evaluate Gait Performance During a Simulated Ecological Task
Einat Kodesh[1], Michal Kafri[2], Tal Krasovsky[1], Tamar, PL Weiss[1], Gabi Zeilig[3], Racheli Kizony[3]
[1]University of Haifa, [2]University of Haifa, [3]Sheba Medical Center

1-5 Use of Wearable Sensors to Quantify Postural Stability Differences in People With Parkinson's Disease With and Without Freezing of Gait
Mahmoud El-Gohary[1], Patricia Carlson-Kuhta[2], Martina Mancini[2], Fay Horak[2], Jessie Huisinga[3]
[1]APDM Inc., [2]Oregon Health & Science University, [3]University of Kansas Medical Center

1-8 Variability in Physical Activity Assessed With Accelerometer is Associated With the Disease in Elderly With Parkinson's Disease
Maria Hagstromer[1], Eric Rullman[1], Erika Franzèn[1]
[1]Karolinska Institutet

1-9 The Modulation of Physical Activity by Clinical States in Bipolar Disorder
Holger Hill[1], Esther Mühlbauer[2], Emanuel Severus[2], Iris Reinhard[3], Michael Bauer[2], Ulrich Ebner-Priemer[1]
[1]Karlsruhe Institute of Technology (KIT), [2]University Hospital Carl Gustav Carus, Technische Universität Dresden, [3]Central Institute of Mental Health

1-11 Cultural Adaptation, Translation and Validation of the Spanish Version of The Past-Day Adult's Sedentary Time (Past) Questionnaire in Chilean Working Adults
Nicolas Aguilar-Farias[1], Pia Martino-Fuentealba[1], Damian Chandia-Poblete[1], Nicolas Salom-Díaz[1]
[1]Universidad de La Frontera

1-13 Interrelationships Among Physical Activity, Body Temperature, Sleep and Lifestyle-Related Diseases in 1645 Community-dwelling People Aged 0-100 Years: the Nakanojo Study
Yukitoshi Aoyagi[1], Sungjin Park[1], Roy Shephard[2]
[1]Tokyo Metropolitan Institute of Gerontology, [2]University of Toronto

1-15 Development of Definitions for Annotation of Physical Activity Performed By Elderly Participants Recorded Using Video Technology
Alan Bourke[1], Espen Alexander Furst Ihlen[2], Jorunn lægdheim Helbostad[2]
[1]Department of Neuroscience, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway, [2]Department of Neuroscience, Faculty of Medicine, Norwegian University of Science and Technology, Tro

1-17 Where Do People Spend Time Sitting, Standing and Stepping in an Office Work Place?
Bronwyn Clark[1], Elisabeth Winkler[1], Charlotte Brakenridge[1], Stewart Trost[2], Genevieve Healy[1]
[1]The University of Queensland, School of Public Health, [2]Queensland University of Technology

1-19 Outdoor Ambulation Post-Stroke Classified By Objective Measures of Free-Living Physical Behaviour
Mona Aaslund[1], Rolf Moe-Nilssen[1], Bente Gjelsvik[2], Bård Bogen[3], Håkon Hofstad[2], Jan Skouen[2], Malcolm Granat[4]
[1]University of Bergen, [2]Haukeland University Hospital, [3]Bergen University College, [4]University of Salford

1-21 Interrater Reliability of Directly-Observed Stepping and Reclining in Lower Limb Amputees in a Laboratory Setting
David Rowe[1], Sarah Deans[1], Alison Kirk[1], Anthony McGarry[1], Hayley Mitchell[1], Lauren Sloan[1], Andrew Walker[1]
[1]University of Strathclyde

1-23 The Use of Accelerometers in Cancer Survivorship Research: A Review of Data Collection and Processing Methods and Quality of Reporting
Terry Boyle[1], Carolyn McIntyre[2], Vinicius Cavalheri[1], Joanne McVeigh[1], Brigid Lynch[3], Emily Jeffery[2], David Barrett[2], Jeff Vallance[4]
[1]Curtin University, [2]Edith Cown University, [3]Cancer Council Victoria, [4]Athabasca University

1-25 AIRplay: Promoting Physical Activity Among Children With Asthma At School and At Home
Miriam Cabrita[1], Randy Klaassen[1], Monique Tabak[2]
[1]University of Twente, [2]Roessingh Research and Development

1-27 Quantifying the Shoulder Movement of Manual Wheelchair Users in the Real World Using an Array of Inertial Sensors
Stephen Cain[1], Emma Fortune[2], Meegan Van Straaten[2], Melissa M. B. Morrow[2]
[1]University of Michigan, [2]Mayo Clinic

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1-29 Using Spiral Plots to Visualise Upper Limb Activity for the Assessment of Prosthesis Use
Alix Chadwell[1], Laurence Kenney[1], Malcolm Granat[1], Sibylle Thies[1], Adam Galpin[1], John Head[1]
[1]University of Salford

1-31 Use of Microsoft Bands as an Outcome Measure in Boys with Duchenne Muscular Dystrophy
Roxanna Bendixen[1]
[1]University of Pittsburgh

1-33 Functional Data Analysis: An Insight into the Circadian Activity Patterns of Middle Aged Men and Women
Leonard Browne[1], Patricia Kearney[2], Tony Fitzgerald[3]
[1]Univesrity of Limerick, [2]University College Cork, [3]Univesrity College Cork

1-35 Association Between the Yearlong Physical Activity and Perceived Residential Environment: The Nakanojo Study
Hyuntae Park[1], Sungjin Park[2], Roy Shephard[3], Yukitoshi Aoyagi[2]
[1]Dong-A University, [2]Tokyo Metropolitan Institute of Gerontology, [3]University of Toronto

1-37 Accelerometer Measured Levels of Physical Activity and Sedentary Behavior in Children With Chronic Diseases: A Systematic Review and Meta-Analysis
Rabha Elmesmari[1], Anne Martin[2], John Reilly[3], James Paton[1]
[1]University of Glasgow, [2]Usher Institute for Population Health Sciences and Informatics, [3]3University of Strathclyde

1-39 Effect of Three Actigraph Wear-Time Estimation Methods on Levels of Physical Activity and Sedentary Behavior
Diego Arguello[1], Kristie Andersen[1], Dinesh John[1]
[1]Northeastern University

1-41 Detection Of Risky Event During Box-Lifting
Mikkel Brandt[1], Pascal Madeleine[2], Markus Jakobsen[3], Afshin Samani[2], Lars Andersen[4]
[1]National Research Centre for the Working Environment and Physical Activity and Human Performance group - SMI, Department of Health Science and Technology, [2]Aalborg University, [3]National Research Centre for the Working Environment, [4]National Research Cen

1-43 Agreement of activPAL3 with ActiGraph for Measuring Moderate to Vigorous Physical Activity
Philippa Dall[1], Long F R Lee[1]
[1]Glasgow Caledonian University

1-44 Systematic Calibration of Self-Report Questionnaires Against Objective Measures of Sedentary Behaviour in Older Adults
Philippa Dall[1], Manon L Dontje[1], Dawn A Skelton[1], Sebastien FM Chastin[1], on behalf of the Seniors USP Team[1]
[1]Glasgow Caledonian University

1-47 Cadence Cut-Point Thresholds For Moderate-Intensity Ambulatory Activity in Children and Adolescents: The Cadence-kids Study
Ho Han[1], Elroy Aguiar[1], John Schuna Jr.[2], Tiago Barreira[3], William Johnson[1], Catrine Tudor-Locke[1]
[1]University of Massachusetts Amherst, [2]Oregon State University, [3]Syracuse University

1-49 Cross-Validation of Machine Learning Algorithms During Exergaming for Youth
Karin Pfeiffer[1], Melitta McNarry[2], Kelly Mackintosh[2], Alexander Montoye[3]
[1]Michigan State University, [2]Swansea University, [3]Alma College

1-51 A Novel Posture Based Approach To Fall Detection
Robert Broadley[1], Sibylle Thies[1], Laurence Kenney[1], Jochen Klenk[2], Malcolm Granat[1]
[1]University of Salford, [2]Universität Ulm

1-53 Frequency Filtering and the Aggregation of Raw into Actigraph Counts
Jan Brønd[1], Daniel Arvidsson[2], Lars Bo Andersen[3]
[1]University of Southern Denmark, [2]Center for Health and Performance, Department of Food and Nutrition, and Sport Science, University of Gothenburg

1-55 Improved Classification Accuracy of Resistance Training Exercises Using Wrist-Worn Activity Monitor
Scott Conger[1], Jun Guo[1], Kenzie Mercier[1], Cameron Needham[1], Clare Zamzow[1], Christopher Mecham[1], Hao Chen[1], David Bassett, Jr[2]
[1]Boise State University, [2]University of Tennessee

1-57 Optimal Motion and Mobility Aid Manipulation Planning to Enable Personal Activity Monitoring and Facilitate Safer Sit-To Walk Transitions
Andrew Merryweather[1], Roya Sabbagh Novin[1], Mojtaba Yazdani[1]
[1]University of Utah

1-59 Towards an Improved Step Detection Algorithm Based on Continuous Wavelet Transform (CWT)
Martin Daumer[1], Christian Lederer[1], Timur Nutridinow[1]
[1]SLCMSR e.V. - The Human Motion Institute

1-61 Measurement of Daily Energy Expenditure in Humans Using a Body-Worn Direct Calorimetry Device
Seth Creasy[1], Tracy Swibas[1], Victoria Catenacci[1], Neil Szuminsky[2], Edward Melanson[1]
[1]University of Colorado- Anschutz Medical Campus, [2]Necessity Consulting

1-63 The Difference in Activity Outcomes Between an Ankle-Mounted and Thigh-Mounted Accelerometer in Knee Osteoarthritis Patients Under Free-Living Conditions
Maik Sliepen[1], Elsa Mauricio[1], Matthijs Lipperts[2], Bernd Grimm[2], Dieter Rosenbaum[1]
[1]Universitätsklinikum Münster, [2]Zuyderland Medical Center

1-65 Measuring Upper Limb Activity With Accelerometry in Stroke Patients
Malou Fanchamps[1], Ruud Selles[1], Gerard Ribbers[2], Henk Stam[1], Hans Bussmann[1]
[1]Erasmus MC, [2]Rijndam Rehabilitation

1-69 Review of Statistical Methods for Ecological Momentary Assessment Data and their Application in a Study of Rhythms of Emotion, Activity, and Sleep in Individuals with Mood Disorders
Jordan Johns[1], Vadim Zipunnikov[1], Kathleen Merikangas[2]
[1]Johns Hopkins University, [2]NIMH

Poster Session 2

Wednesday, June 21 • 1:00 – 1:45

2-2 The Effect of Location on Walking Behaviours of Individuals With Intermittent Claudication
Philippa Dall[1], Anna Iveson[1], Malcolm Granat[2], Brian Ellis[1]
[1]Glasgow Caledonian University, [2]University of Salford

2-4 An Investigation Into the Effect of Lower Limb Exercise Programme on Objectively Measured Physical Activity in Individuals With Knee Osteoarthritis.
Jimmy Molyneux[1], Lee Herrington[2], Alex Clarke-Cornwell[2], Richard Jones[2]
[1]Bridgewater Community Foundation National Health Trust, [2]university of Salford

2-6 Inertial Sensor Based Normative Spatiotemporal Gait and Postural Sway Parameters in Typically Developing Children and Young Adults
Joan O'Keefe[1], Medha Parulekar[1], Alexandra Bery[1], Colleen Huml[1], Keith Kravis[2], Chris D Arca[1], Andrew McAsey[3], Anna DeSonia[1], Elizabeth Berry-Kravis[1]
[1]Rush University Medical Center, [2]Northwestern University, [3]University of Wisconsin

2-7 Objective Inertial Sensor Based Gait Outcome Measures for Efficacy of Cyclodextrin Treatment in Niemann-Pick Type C1 (Npc): Preliminary Analysis
Joan O'Keefe[1], Erin Robertson[1], Andrew McAsey[2], Jamie Chin[1], Medha Parulekar[1], Elizabeth Berry-Kravis[1]
[1]Rush University Medical Center, [2]University of Wisconsin

2-10 Classification of Occupations by Accelerometer-Derived Variables for Physical Behaviour: Health Survey for England 2008
Alexandra Clarke-Cornwell[1], Malcolm Granat[1], Penny Cook[1]
[1]The University of Salford

2-12 Stand Up To Loose Fat? Standing Versus Sedentary Behaviour Increases Fat Oxidation and Energy Expenditure
Guy Plasqui[1], Eline Ponsioen[1], Lotte Bock[1], Paul Schoffelen[1]
[1]Maastricht University

2-14 Actigraphy-based Assessment of Circadian Rhythm: Association with Subclinical CVD Measures among Police Officers
Desta Fekedulegn[1], Michael Andrew[1], Luenda Charles[1], Ja Gu[1], Claudia Ma[1], John Violanti[1]
[1]NIOSH/CDC

2-16 Development of a Self-Reported Neighbourhood-Specific Physical Activity Questionnaire
Levi Frehlich[1], Christine Friedenreich, Alberto Nettel-Aguirre, Francisco Alaniz Uribe, Gavin McCormack
[1]University of Calgary

2-18 Older Adults' Step Counts Associated With Both Sitting Less and Standing More
David Conroy[1], Jaclyn Maher[2]
[1]The Pennsylvania State University, [2]University of Southern California

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2-20 The Volume and Pattern of Objectively-Measured Sedentary Behavior Among Stroke Survivors: Findings from REasons for Geographic and Racial Differences in Stroke (REGARDS) Study

Keith Diaz[1], Virginia Howard[2], Andrea Duran[1], Brent Hutto[3], Natalie Colabianchi[4], John Vena[5], Michelle McDonnell[6], Steven Blair[3], Steven Hooker[7]

[1]Columbia University Medical Center, [2]University of Alabama at Birmingham, [3]University of South Carolina, [4]University of Michigan, [5]Medical University of South Carolina, [6]University of South Australia, [7]Arizona State University

2-22 StepWatch Activity Monitor and Actigraph Use in Wheelchair Athletes

Kirsten Tulchin-Francis[1], Wilshaw Stevens, Jr[1], Fernanda Pinarte[1]

[1]Texas Scottish Rite Hospital for Children

2-24 Measurement of Physical Activity and Sedentary Behavior in Breast Cancer Survivors: Congruency of Four Measurement Tools

Whitney Welch[1], Gillian Lloyd[1], Elizabeth Awick[2], Juned Siddique[1], Edward McAuley[2], Siobhan Phillips[1]

[1]Northwestern University, [2]University of Illinois

2-26 A Just-In-Time-Adaptive-Intervention System for Improving Physical Activity Levels of Individuals With Spinal Cord Injury

Shivayogi Hiremath[1], Binod Chhetry[2], Amir Amiri[1], Stephen Intille[2]

[1]Temple University, [2]Northeastern University

2-30 Is Sedentary Behaviour Related to Bone Mineral Density in High-Risk Fracture Patients?

Ruud Franssen[1], Lisanne Vranken[1], Caroline Wyers[1], Wouter Bijnens[1], Tom Melai[1], Robert Velde, van der[2], Joop Bergh, van den[1], Kenneth Meijer[1]

[1]Maastricht University, [2]Viecuri medical center

2-32 Estimation of Muscular and Cardiovascular Load and Fatigue Using Exposure Variation Analysis, Multiscale Permutation Entropy and Heart Rate Variability During a Full Working Day Among Blue-Collar Workers With Lifting Tasks. Cross-Sectional Workplace Study

Markus Jakobsen[1], Emil Sundstrup[1], Mikkel Brandt[1], Lars Andersen[1]

[1]National research centre for the working environment

2-34 Sit-to-stand Movement Repetition During the Acute Stroke Rehabilitation Period

Andrew Kerr[1], Jesse Dawson[2], Terry Quinn[2]

[1]University of Strathclyde, [2]University of Glasgow

2-36 Pattern Changes in Activity and Sedentary Behaviour During a Pedometer Intervention: A Physical Activity Bout Analysis Using Accelerometry

Hideaki Kumahara[1], Makoto Ayabe[2]

[1]Nakamura Gakuen University, [2]Okayama Prefectural University

2-38 Integrating Accelerometer and Continuous Glucose Monitor Data to Study Postprandial Glycemia

Kate Lyden[1], Edward Melanson[2], Tracy Swibas[2]

[1]KAL Research Consulting, [2]University of Colorado, Anschutz Medical Campus

2-40 Impact of Inertial Measurement Unit on Activity Recognition using ActiGraph GT9X

Paul Hibbing[1], Sam LaMunion[1], David Bassett[1], Scott Crouter[1]

[1]University of Tennessee, Knoxville

2-45 The Effect of Walking Speed on Quality of Gait in Older Adults

Bas Huijben[1], Kimberley van Schooten, Mirjam Pijnappels[2], Jaap van Dieën[2]

[1]McRoberts, [2]Vrije Universiteit Amsterdam

2-46 Sources of Error for Wearable Step Counters

Andrew Kaplan[1], Lindsay Toth[1], Paul Hibbing[1], Alvin Morton[1], Susan Park[1], Whitney Pittman[1], Damla Sarisaltik[1], David Bassett[1], Scott Crouter[1]

[1]The University of Tennessee Knoxville

2-48 Regularity of cyclic Movements Assessed By Wearable Systems: Method and Applications' Survey

Marco Rabuffetti[1], Giovanni Scalera[1], Alberto Marzegan[1], Maurizio Ferrarin[1]

[1]IRCCS Fondazione Don Carlo Gnocchi Onlus

2-50 Detecting the Activities of Daily Living of Manual Wheelchair Users in the Real World Using Inertial Sensors

Emma Fortune[1], Beth Cloud[1], Kristin Zhao[1], Melissa Morrow[1]

[1]Mayo Clinic

2-52 Advanced Signal Processing Approach to Walking Detection in the Lab and in the Wild Using Raw Accelerometry Data

Marcin Straczkiewicz[1], Jacek Urbanek[2], Nancy Glynn[3], Tamara Harris[4], Jaroslaw Harezlak[5], Ciprian Crainiceanu[2]

[1]AGH University of Science and Technology, [2]Johns Hopkins University, [3]Center for Aging and Population Health, Graduate School of Public Health, [4]Laboratory of Epidemiology, Demography, and Biometry, National Institute on Aging, [5]Indiana University

2-54 Differentiating Walking from Stair Climbing based on the Raw Accelerometry Data

Jaroslaw Harezlak[1], William Fadel[2], Jacek Urbanek[3], Xiaochun[4] Li , Steven Albertson[5]

[1]Indiana University School of Public Health-Bloomington, [2]Indiana University RM Fairbanks School of Public Health, [3]Johns Hopkins Bloomberg School of Public Health, [4]Indiana University School of Medicine, [5]IUPUI

2-56 Identifying Physical Activity Intensities and Types using Wrist Accelerometer Data

Matin Kheirkhahan[1], Amal Wanigatunga[2], Duane Corbett[1], Vincenzo Valiani[1], Sanjay Ranka[1], Todd Manini[1]

[1]University of Florida, [2]Johns Hopkins University

2-58 Mean Skin Temperature as Covariate to Predict Energy Expenditure.

Boris Kingma[1], Stefanie Vesela[2], Lisje Schellen[1], Kenneth Meijer[1], Wouter van Marken Lichtenbelt[1]

[1]Maastricht University, [2]Eindhoven University of Technology

2-60 Modeling Subject Response to Interventions Aimed at Increasing Physical Activity: A Control Systems Approach

Constantino Lagoa[1], David Conroy[1], Sarah Hojjatinia[1], Chih-Hsiang Yang[1]

[1]The Pennsylvania State University

2-62 A New Wearable Device for Free-Living Measurement of Respiration Rate

Benjamin Griffiths[1], Stephen Preece[1], Charlie Foster-Vigors[1]

[1]Salford University

2-64 Estimation of Respiratory Volume From Thoracoabdominal Breathing Distances: Comparison of Two Models of Machine Learning

Prioux Jacques[1], Steven Gastinger[1], Hala Abdul Rahman[1], Alexis Le Faucheur[1], Patrice Quinton[1], Haitao Kang[2], Remy Dumond[1]

[1]ENS Rennes, [2]Yuewu Electronic Technology Co., Ltd, Room 1008, Building B, No. 2305, Zuchongzhi Road, Shanghai, 20

2-66 Validation of a Research-Grade Accelerometer in Estimating Free-Living Physical Activity: Effect of Sensor Location

Albert Mendoza[1], John Staudenmayer[1], Patty S. Freedson[1]

[1]UMass Amherst

2-68 Effectiveness of Interventions Using Wearable Monitors to Promote Physical Activity: A Meta-analysis

Hanneke Braakhuis[1], Monique Berger[2], Hans Bussmann[1]

[1]ErasmusMC & The Hague University of Applied Sciences, [2]The Hague University of Applied Sciences

2-70 Wearable Physical Activity Trackers: Accuracy in Measuring Activity in People With Parkinson's Disease

Sandra Brauer[1], Caitlyn Payne[1], Hannah Daniel[1], Robyn Lamont[1]

[1]University of Queensland

2-71 Behavioural Impact of a Waist-Worn Tracker That Targets Sitting Time

Genevieve Healy[1], Charlotte Brakenridge[1], Elisabeth Winkler[1], Brianna Fjeldsoe[1]

[1]The University of Queensland, School of Public Health,

2-72 Self-reported and Objectively Measured Physical Activity and Sitting Time in Relation To Self-Rated Health at the Age of 46

Maisa Niemela[1], Raija Korpelainen[1], Maarit Kangas[1], Tuija Tammelin[2], Timo Jämsä[1]

[1]University of Oulu, [2]LIKES Research Centre for Physical Activity and Health

Poster Session 3

Thursday, June 22 • 12:30 – 1:30

3-1 The Influence of All Aspects of Physical Activity on Cardiometabolic Health in an Irish Adult Population
Cormac Powell[1], Brian Carson[1], Kieran Dowd[2], Ailish Hannigan[1], Helen Purtil[1], Ivan Perry[3], Patricia Kearney[3], Janas Harrington[3], Grainne Hayes[1], Alan Donnelly[1]
[1]University of Limerick, [2]Athlone Institute of Technology, [3]University College Cork

3-3 Motor Neglect After Brain Damage: Evidences From Differential Actigraphy
Marco Rabuffetti[1], Chiara Pagliari[1], Gilles Rode[2], Norbert Nighoghossian[3], Francois Cotton[4], Francesca Baglio[1], Lucia Spinazzola[5], Marine Lunven[6], Paolo Bartolomeo[6]
[1]IRCCS Fondazione Don Carlo Gnocchi Onlus, [2]Hôpital Henry-Gabrielle, Hospices Civils de Lyon, [3]Neurological Hospital, Université Lyon 1, [4]Université Lyon 1, [5]Azienda Ospedaliera di Gallarate, [6]Hôpital Pitié-Salpêtrière

3-5 FXTAS, PD, and ET Subjects Demonstrate Distinct Gait, Balance and Tremor Deficits Under Normal, Environmentally Challenging, and Dual-Task Conditions using an inertial sensor system
Erin Robertson[1], Deborah Hall[1], Andrew McAsey[1], Maija Swanson[1], Alexandra Bery[1], Colleen Huml[1], Elizabeth Berry-Kravis[1], Joan O'Keefe[1]
[1]Rush University Medical Center

3-7 Measurement of Physical Activity Levels and Self-Efficacy during Early Recovery after Acute Myocardial Infarction
Abedalmajeed Shajrawi[1], Malcolm Granat[1], Felicity Astin[2], Ian Jones[3]
[1]University of Salford , [2]University of Huddersfield/ Calderdale & Huddersfield NHS Foundation Trust, [3]Liverpool John Moores University

3-9 The Association of Sedentary Behaviour and Mental Wellbeing in the Workplace
Abolanle Gbadamosi[1], Malcolm Granat[1], Christopher Pickford[1], Alexandra Clarke-Cornwell[1]
[1]University of Salford

3-11 Associations of Objectively Assessed Sedentary Time and Physical Activity With Mortality in a Swedish Population Based Cohort - A 15 Year Follow-up
Maria Hagstromer[1], Ing-Mari Dohrn[1], Lydia Kwak[1]
[1]Karolinska Institutet

3-13 Ability of Thigh and Hip-Worn Actigraph Accelerometers to Classify Postures and Activity iIn Children
Sharon Parry[1], Joanne McVeigh[1], Beatriz de Oliveria[1], Su Wen Joyln Ee[1], Erin Howie[1], Leon Straker[1]
[1]Curtin University

3-17 Tracking Recovery from Orthopedic Surgery in Youth with CP
Nancy Lennon[1], Christopher Church[1], Julie Sees[1], Freeman Miller[1]
[1]Nemours A. I. duPont Hospital for Children

3-19 Barriers to Older Medical Patients Walking in Hospital
Ruth McCullagh[1], Christina Dillon[1], Darren Dahly[1], N. Frances Horgan[2], Suzanne Timmons[1]
[1]University College Cork, [2]Royal College of Surgeons in Ireland

3-21 Patterns of Objectively Measured Sedentary Time in Adults With Intellectual Disabilities.
Arlene McGarty[1], Leanne Harris[1], Thessa Hilgenkamp[2], Craig Melville[1]
[1]University of Glasgow, [2]Erasmus MC

3-23 Measurement of Physical Activity by Accelerometry in Infants and Toddlers
Kerry McIver[1], Marsha Dowda[1], Russell Pate[1]
[1]University of South Carolina

3-25 Machine Learning Algorithms For Activity Recognition in Ambulant Children and adolescents With Cerebral Palsy
Matthew Ahmadi[1], Margaret O'Neil[2], Maria Fragala-Pinkham[3], Nancy Lennon[4], Stewart Trost[1]
[1]Queensland University of Technology, [2]Drexel University, [3]Franciscan Hospital for Children, [4]AI dupont Hospital for Children

3-27 Reliability and Validity of the activPAL for Measuring Stepping and Reclining in Unilateral Lower Limb Amputees
David Rowe[1], Sarah Deans[1], Alison Kirk[1], Anthony McGarry[1], Hayley Mitchell[1], Lauren Sloan[1], Andrew Walker[1]
[1]University of Strathclyde

3-29 Ambulatory Activity Profile Following Treatment for Clubfoot at Age 10 yrs
Wilshaw Stevens Jr[1], Kelly Jeans[1], Kirsten Tulchin-Francis[1], Fernanda Pinarte[1], Lori Karol[1]
[1]Texas Scottish Rite Hospital for Children

3-31 Three Days Monitoring of Activities of Daily Living among Healthy and Parkinsons Disease Patients
Seong Hyun Moon[1], Rahul Soangra[1], Christopher Frames[1], Saba Rezvanian[1], Victoria Smith[1], Markey Olsen[1], Thurmon Lockhart[1], Abraham Lieberman[2]
[1]Arizona State University, [2]Barrow Neurological Institute

3-33 Do Sources of Psychological Stress Differentially Impact Exercise? Results of a 1-Year Observational Study among Healthy Adults
Daniel Mota[1], Faith Parsons[1], Jacob Julian[1], Carmela Alcantara[1], Ipek Ensaari[1], David Krupka[1], Joseph Schwartz[2], Matthew Burg[3], Karina Davidson[1], Keith Diaz[1]
[1]Columbia University Medical Center, [2]Stony Brook University, [3]Yale University School of Medicine

3-35 Synergistic Association of Objectively Measured Physical Activity and Diet Quality in Older Japanese Adults: the Nakanojo Study
Hyuntae Park[1], Sungjin Park[2], Roy Shephard [3], Yukitoshi Aoyagi[2]
[1]Dong-A University, [2]Tokyo Metropolitan Institute of Gerontology, [3]University of Toronto

3-37 On the Measurement of Running Style in Extreme Conditions: Recording and Analysis of 3D Acceleration Data During a Mountain Ultra-Marathon in The Alps
Martin Daumer[1], Almond Stoecker[2], Karl Müller[3], Sonja Greven[4], Christian Lederer[3]
[1]SLCMSR e.V. - The Human Motion Institute & Trium, [2]LMU Munich, [3]SLCMSR e.V. - The Human Motion Institute, [4]LMU

3-39 Impact of the EGNOS Feature And Environmental Conditions on GPS Accuracy During Outdoor Walking
Alexis Le Faucheur[1], Ségolène Chaudru[2], Pierre-Yves de Müllenheim[3], Bénédicte Noury-Desvaux[4]
[1]Ecole normale supérieure de Rennes, [2]Centre d'investigation clinique (CIC) 1414. Institut National de la Recherche et de la Santé Médical, [3]Laboratoire Mouvement, Sport, Santé (M2S). Université de Rennes 2, [4]Institut de Formation en Education Physique et en Sport d'Angers (IFEPSA-UCO)

3-41 Reliability of Stair Climbing Parameters Measured With an Inertial Measurement Unit Fixed to the Lower Back
Bas Huijben[1], Evelien Van Roie[2], Irena Simonovic[2], Christophe Delecluse[2], Rob van Lummel[1]
[1]McRoberts, [2]KU Leuven

3-43 Precision and Patient Acceptance of a Belt-Worn Wearable (actibelt) in Patients With Osteoporosis and/or After Trauma Surgery
Timur Nuritdinow[1], Julian Fürmetz[2], Martin Daumer[3], Alexander Keppler[2], Gerhard Aigner[4], Christian Lederer[3], Wolfgang Böcker[2]
[1]SLCMSR , [2]LMU, [3]SLCMSR/Trium, [4]Trium

3-45 Physical Activity Recognition Using Wrist-Worn Accelerometers: Comparison of Dominant And Non-Dominant Arm
Dieu Olivier[1], Jacques Mikulovic[2], Paul Fardy, Paul Beghin[3], Jérémy Vanhelst
[1]UerEPSSS (EA 7369), [2]LACES, [3]Lille Inflammation Research International Center

3-47 Joint Angle Measurement in Yoga using IMUs
Isirame Omofuma[1], Himanshu Pota[2], Sunil Agrawal[1]
[1]Columbia University, [2]University of New South Wales at ADFA

3-49 Concurrent Measurement of GPS and Event-Based Physical Activity Data: A Methodological Framework for Integration.
Philippa Dall[1], Anna Iveson[1], Malcolm Granat[2], Brian Ellis[1]
[1]Glasgow Caledonian University, [2]University of Salford

3-51 The Effect on Human Activity Recognition Classifier Accuracy With Changing Windowing Overlap.
Alan Bourke[1], Espen Alexander Furst Ihlen[2], Jorunn lægdheim Helbostad[2]
[1]NTNU, [2]Department of Neuroscience, Faculty of Medicine, Norwegian University of Science and Technology

3-53 Calibration of Triaxial Accelerometers in Swimming
Jose Ribeiro[1], Rui Pereira[1], Ricardo Fernandes[1], Arturo Abraldes[2], Rodrigo Zacca[1], Jorge Mota[1]
[1]Sports Faculty at University of Porto, [2]Faculty of Sports Sciences; University of Murcia

3-55 Validity and Relevance of Distinguishing Cycling in Physical Activity Logs
Hans Savelberg[1], Malcolm Granat[2]
[1]Maastricht University, [2]University of Salford

3-57 Activity Counts/Minute from Two Non-Proprietary Algorithms Compared to Those Obtained from ActiLife
John Schuna[1], Tiago Barreira[2], William Johnson[3], Catrine Tudor-Locke[4]
[1]Oregon State University, [2]Syracuse University, [3]Pennington Biomedical Research Center, [4]University of Massachusetts Amherst

3-59 Validation in Free-Living Conditions of Physical Activity Energy Expenditure Prediction From Hip-Worn Triaxial Accelerometry Processed With an Automatic Postureand Activity Recognition Algorithm
Maël Garnotel[1], Hector-Manuel Romero-Ugalde[2], Thomas Bastian[3], Maeva Doron[2], Pierre Jallon[2], Guillaume Charpentier[4], Sylvia Franc[4], Stéphane Blanc[5], Stéphane Bonnet[2], Chantal Simon[1]
[1]CRNH Rhone-Alpes, [2]CEA LETI, [3]Université de Strasbourg, [4]CERITD, [5]IPHC, DEPE, CNRS

3-61 Comparability of Raw and Count-Based Data from the ActiGraph GT9X Link and GT3X+ Accelerometers
Alexander Montoye[1], Michael Nelson[2], Josh Bock[2], Mary Imboden[2], Leonard Kaminsky[2], Kelly Mackintosh[3], Melitta McNarry[3], Karin Pfeiffer[4]
[1]Alma College, [2]Ball State University, [3]Swansea University, [4]Michigan State University

Poster Session 3 continued

3-63 A Review of Step-counting Devices' Mean Absolute Percent Errors (MAPE): Informing Validation Standards
Christopher Moore[1], Elroy Aguiar[1], Ho Han[1], Catrine Tudor-Locke[1]
[1]University of Massachusetts

3-65 Feasibility of Piezoelectric Energy Harvesting Chip Based Sensor for Human Activity Monitoring
Kimio Oguchi[1], Takashi Kawashima[1]
[1]Seikei University

3-67 Valid Detection of Wheelchair Driving in Addition to Regular Posture and Motion Detection
Karin Postma[1], Tachèl Latour[2], Hendrika van den Berg[1], Herwin Horemans[1], Johannes Bussmann[1]
[1]Erasmus MC, [2]LUMC

3-69 Accuracy of Wristable Heart Rate Monitors During Treadmill Walking/Running in Healthy Young Adults
Makoto Ayabe[1], Yoshiki Okita[1], Hideaki Kumahara[2]
[1]Okayama Prefectural University, [2]Nakamura Gakuen University

3-71 Does It Matter Which Wrist You Wear Your Fitbit to Count Steps?
Gregory Cloutier[1], Bertha Lee[1], Dinesh John[1]
[1]Northeastern University's Bouve College of Health and Sciences

3-72 Usability of Consumer Devices For Self-Monitoring Sedentary Behaviour/Inactivity: Experiences From a Sample of Office Workers
Charlotte Edwardson[1], Sophie O'Connell[2], Tom Yates[1], David Dunstan[3], Fehmidah Munir[4]
[1]University of Leicester, [2]University Hospitals of Leicester, [3]Baker IDI, [4]Loughborough University

3-73 The Relationship Between User Height and Steps Measured by a Consumer Activity Tracker
Jagath Jai Kumar[1], Greg Petrucci[1], Brittany Masteller[1], Melanna Cox[1], John Staudenmayer[1], John Sirard[1], Patty Freedson[1]
[1]UMass Amherst

Poster Session 4

Thursday, June 22 • 1:30 – 2:30

4-2 The Level of Disagreement Between Self-Perceived and Accelerometer-Measured Daily Steps in Women - the mPED trial.
Barbora Silarova[1], Nadra Lisha[1], William Haskell[2], Yoshimi Fukuoka [3]
[1]Institute for Health and Aging, [2]Stanford Prevention Research Center, [3]Institute for Health and Aging/ Department of Physiological Nursing

4-4 The Relation Between Physical Activity, Sedentary Behaviour and Physical Function in Knee Osteoarthritis Patients
Maik Sliepen[1], Elsa Mauricio[1], Matthijs Lipperts[2], Bernd Grimm[2], Dieter Rosenbaum[1]
[1]Universitätsklinikum Münster, [2]Zuyderland Medical Center

4-6 Inertial Sensor Based Fall Risk Variables Are Indicators of Frailty Among Cardiovascular Disease Patients Prone to Adverse Post-Operative Outcomes
Rahul Soangra[1], Thurmon Lockhart[2], Christopher Frames[3], Abraham Lieberman[3]
[1]Chapman University, [2]Arizona State University, [3]St. Joseph's Hospital and Medical Center

4-8 How Many Weekdays of Stepwatch Activity Data Are Necessary? A Preliminary Analysis of Various Patient Populations
Kirsten Tulchin-Francis[1], Wilshaw Stevens, Jr[1], Chan-Hee Jo[1]
[1]Texas Scottish Rite Hospital for Children

4-10 Objectively Measured Physical Activity Across Different Occupations Among Aging Workers
Anna Pulakka[1], Jussi Vahtera[1], Tuija Leskinen[1], Annemarie Koster[2], Sari Stenholm[1]
[1]University of Turku and Turku Univeristy Hospital, [2]Maastricht University

4-12 Can Continuous Monitoring of Physical Behaviour of Older Adults in Care Homes Provide Useful Information to Improve Care?
Sathish Sankarpandi[1], Sibylle Thies[1], Claire Royston[2], Laurence Kenney [1], Malcolm Granat[1]
[1]University of Salford, [2]Four Seasons Health Care

4-14 Wearable Activity Data to Identify the Cardiometabolic Phenotype of Employees Achieving Physical Activity Guidelines
Beth Smith[1], Meike Niederhausen[1], Allen Rassa[1], Vaughan Tuohy[1], Luke Burchill[1]
[1]Oregon Health and Science University

4-16 Environmental Factors Moderate the Effect of a Physical Activity Intervention
Whitney Welch[1], Bonnie Spring[1], Siobhan Phillips[1], Juned Siddique[1]
[1]Northwestern University

4-18 Does Cardiac Rehabilitation Reinforced With a Behavioral Intervention Improve Physical Behaviour? The OPTICARE Randomized Controlled Trial
Nienke ter Hoeve[1], Madoka Sunamura[2], Henk Stam[3], Ron van Domburg[3], Rita van den Berg-Emons[3]
[1]Erasmus MC/ Capri Cardiac rehabilitation, [2] Capri Cardiac rehabilitation, [3]Erasmus MC

4-20 Can the Custom Algorithm for One Fitness Wearable Be Used for Another Device?
Kalai Tsang[1], Dan Ding[1]
[1]University of Pittsburgh

4-22 Comparing Preschoolers' Physical Activity and Sedentary Time During Childcare Hours Using 20 and 60 Minutes Non-Wear Time Thresholds
Trish Tucker[1], Leigh Vanderloo[1], Molly Driediger[1], Andrew Johnson[1], Shauna Burke[1], Jennifer Irwin[1], Brian Timmons[1]
[1]University of Western Ontario

4-26 Increased Standing Time Is Associated with Lower Diastolic Blood Pressure in Adolescents.
Grainne Hayes[1], Kieran Dowd[2], Ciaran MacDonncha[1], Brian Carson[1], Ailish Hannigan[1], Matthew Herring[1], Helen Purtill[1], Cormac Powell[1], Eibhlis O'Connor[1], Clodagh O'Gorman (MD)[1], Alan Donnelly[1]
[1]University of Limerick, [2]Athlone Institute of Technology

4-28 Quantifying Daily Activity and Energy Expenditure in Spinal and Bulbar Muscular Atrophy
Joshua Woolstenhulme[1], Joseph Shrader[2], Cris Zampieri[2], Galen Joe[2], Angela Kokkinis[3], Alice Schindler[3], Kenneth Fischbeck[3], Christopher Grunseich[3]
[1]The George Washington University, [2]The National Institutes of Health, [3]National Institute of Neurological Disorders and Stroke

4-30 24-hour Population-Level Activity Patterns: Application of Relative Versus Standard Reference Frame
Chris Pickford[1], Simon Gerrard-Longworth[1], Sathish Sankarpandi[1], Alex Clarke-Cornwell[1], Malcolm Granat[1]
[1]University of Salford

4-32 Objectively Measured Physical Activity in a Community Sample of Adolescents and Young Adults in Germany: Results of the BeMIND study
Lars Pieper[1], John Venz[1], Catharina Voss[1], Jana Hoyer[1], Katja Beesdo-Baum[1]
[1]Technische Universitaet Dresden

4-34 Contribution of Work To Overall Sedentary Behavior in Chilean Workers
Francisco Soto-Rodríguez[1], Nicolás Salom Díaz[1], Damian Chandia-Poblete[1], Pia Martino-Fuentealba[1], Matias Infante-Grandon[1], Nicolas Aguilar-Farias[1]
[1]Universidad de La Frontera

4-36 Wearable Sensor-Based 48-Hour Activity and Gait Monitoring in the Acute Care Setting
Ik-Hyun Youn[1], Jong-Hoon Youn[1], Ka-Chun Siu[2], Brian Knarr[1], Jungyeon Choi[1]
[1]University of Nebraska at Omaha, [2]University of Nebraska Medical Center

4-38 Fragmentation of Physical Activity is Associated with Poor Function in Older Adults
Pei-Lun Kuo[1], Vadim Zipunnikov[1], Junrui Di[1], Amal Wanigatunga[1], Eleanor Simonsick[2], Stephanie Studenski[2], Luigi Ferrucci[2], Jennifer Schrack[1]
[1]Johns Hopkins Bloomberg School of Public Health, [2]National Institute on Aging

4-40 Modeling Energy Balance while Correcting for Measurement Error via Free Knot Splines
Daniel Ries[1], Alicia Carriquiry[1], Robin Shook[2], Gregory Welk[1]
[1]Iowa State University, [2]Children's Mercy Hospitals and Clinics

4-42 Reproducibility of Body Posture and Activity Intensity Measures in Adults
Pedro Saint-Maurice[1], Sarah Keadle[2], Joshua Sampson[1], Charles Matthews[1]
[1]National Cancer Institute, [2]California Polytechnic State University

4-44 Validation of APDM Opal Inertial Sensors for Gait Analysis in the Pediatric Population
Vincent Shieh[1], Ashwini Sansare[1], Minal Jain[1], John Collins[2], Thomas Bulea[1], Cris Zampieri[1]
[1]National Institutes of Health, [2]George Mason University

4-46 Association of resampled Accelerometer Data With Estimated vo2max And Perceived Health Status In Population Based Sample
Henri Vähä-Ypyä[1], Pauliina Husu[1], Jaana Suni[1], Kari Tokola[1], Harri Sievänen[1], Tommi Vasankari[1]
[1]UKK Institute

Poster Session 4 continued

4-48 A Fast and Robust Algorithm for Detection of Sitting and Standing from Wrist-Worn Accelerometry Data

Marcin Straczkiewicz[1], Vadim Zipunnikov[2], Nancy Glynn[3], Tamara Harris[4], Jaroslaw Harezlak[5]

[1]AGH University of Science and Technology, [2]Johns Hopkins University, [3]Center for Aging and Population Health, Graduate School of Public Health, [4]Laboratory of Epidemiology, Demography, and Biometry, National Institute on Aging, [5]Indiana University

4-50 Classification of Physical Activities and Sedentary Behaviour Using Raw Data ff 3D Accelerometer

Petra Tjurin[1], Maisa Niemelä[1], Mari Huusko[1], Riikka Ahola[2], Maarit Kangas[1], Timo Jämsä[1]

[1]University of Oulu, [2]Polar Electro Ltd

4-52 Development of an Algorithm to Temporally Align Two Common Measures of Sleep Data in the Raine Study

Michelle Trevenen[1], Kevin Murray[1], Berwin Turlach[1], Leon Straker[2], Peter Eastwood[1]

[1]University of Western Australia, [2]Curtin University

4-54 A Novel Two-Step Algorithm for Estimating Energy Expenditure from Wrist Accelerometer Data in Youth

Stewart Trost[1], Matthew Ahmadi[1], Karin Pfeiffer[2]

[1]Queensland University of Technology, [2]Michigan State University

4-56 Accelerometer-determined Steps/Min Versus Activity Counts/Min for Discriminating Moderate-Intensity Ambulation

Catrine Tudor-Locke[1], Elroy Aguiar[1], Ho Han[1], Scott Ducharme[1], Jongil Lim[1], Christopher Moore[1], Michael Busa[1], John Schuna[1], Tiago Barreira[1], Stuart Chipkin[1]

[1]University of Massachusetts Amherstt

4-58 Evaluation of Change Point Detection in the Classification of Activity Transitions

Joshua Twaites[1], Melvyn Hillsdon[1]

[1]University of Exeter

4-60 Functional Modeling of Individual Walking Strides in Accelerometry Data

Jacek Urbanek[1], William Fadel[2], Jaroslaw Harezlak[2], Vadim Zipunnikov[1], Ciprian Crainiceanu[1]

[1]Johns Hopkins Bloomberg School of Public Health, [2]Indiana University

4-62 Tracking the Real World - Methods to Evaluate and Improve User Acceptance of Wearables in Clinical Trials

Astrid Sitte[1], Dueniz Guerdal[1], Martin Daumer[2]

[1]Trium Analysis Online GmbH, [2]Sylvia Lawry Centre for Multiple Sclerosis Research e.V

4-64 Free-living Validity of the Zephyr Bioharness 3 for Measuring Energy Expenditure Relative to the Physical Activity Compendium

Benjamin Duncan[1], Alberto Florez Pregonero[1], Meynard Toledo[1], Matthew Buman[1]

[1]Arizona State University

4-66 Estimation of Physical Activity Intensity With Classifying Non-Ambulatory and Ambulatory Activities by a Triaxial Accelerometer in Young Children

Chiaki Tanaka[1], Yuki Hikihara [2], Takafumi Ando [3], Yoshitake Oshima[4], Chiyoko Usui [5], Yuji Ohgi [6], Koichi Kaneda [2], Shigeho Tanaka[7]

[1]J. F. Oberlin University, [2]Chiba Institute of Technology, [3]National Institute of Advanced Industrial Science and Technology, [4]University of Marketing and Distribution Sciences, [5]Tokyo Woman's Christian University, [6]National Institute of Health and Nutrition

4-68 Detection of Obstructive Sleep Apnea Events from a Wearable Sensor Using Dynamical Analysis

Mayank Gupta[1], Eduardo Salazar[2], Qiao Wang[1], Meynard Toledo[1], Matthew Buman[1], Pavan Turaga[1]

[1]Arizona State University, [2]University of Arizona

4-70 Characterizing Sleep Quality Outcomes for Children Using a Wrist-Worn Accelerometry-Based Activity Monitor

Daniel Heil[1], Blakely Brown[2], Kari Jo Harris[2], Mike Tryon[3], Wei Zhu[1]

[1]Montana State University, [2]University of Montana, [3]Salish Kootenai College

Program at a Glance

	TUESDAY, JUNE 20
9:00 - 12:45 PM	**Pre-Conference Workshops**
12:45 - 1:45 PM	**Break**
1:45 - 5:30 PM	**Pre-Conference Workshops**
5:30 - 4:30 PM	**Break**
6:00 - 8:00 PM	**Welcome Reception at Hyatt Bethesda**
	WEDNESDAY, JUNE 21
8:30 - 9:00 AM	**Welcome**
9:00 - 10:00 AM	Keynote Presentation: **Bjorn Eskofier**, Friedrich-Alexander Univeristat Erlangen-Nürnberg, Germany
10:00 - 11:00 AM	**Speakers and Abstracts** *Incorporating Place-Based Data* Kirschstein Auditorium | **Speakers and Abstracts** *Analytic Approaches for 24 Hour Data* Auditorium A | **Speakers and Abstracts** *Physical Activity and Associated Outcomes* Auditorium B | **Speakers and Abstracts** *Taking a 'Step' Forward* Auditorium C
11:00 - 11:15 AM	**Break**
11:15 -12:15 PM	**Speakers and Abstracts** *Clinical Applications of Monitoring Devices* Kirschstein Auditorium | **Speakers and Abstracts** *Accelerometer Wear-Time and Activity Analysis* Auditorium A | **Speakers and Abstracts** *Multimodal Assessment* Auditorium B | **Speakers and Abstracts** *Sleep Classification* Auditorium C
12:15 - 1:00 PM	**Lunch and Poster Session 1**
1:00 - 1:45 PM	**Lunch and Poster Session 2**
1:45 - 2:45 PM	Symposium - **Joanne McVeigh** *The Clinical Utility of Accelerometers in Clinical Populations* Auditorium A | Symposium - **Jacek Urbanek** *Statistical Modelling of Circadian Rhythms of Physical Activity* Kirschstein Auditorium
2:45 - 3:45 PM	**Speakers and Abstracts** *Utility of Consumer Devices* Kirschstein Auditorium | **Speakers and Abstracts** *Physical Activity Measurement in Youth* Auditorium A | **Speakers and Abstracts** *Ambulation in Older Adults* Auditorium B | **Speakers and Abstracts** *Physical Activity in Cardiovascular Disease Populations* Auditorium C
3:45 - 4:00 PM	**Break**
4:00 - 5:00 PM	Keynote Presentation: **Jennifer Hicks**, Stanford University, USA
5:00 - 6:00 PM	**ISMPB General Membership Meeting**
	THURSDAY, JUNE 22
8:30 - 10:00 AM	Keynote Session: **Devices in Very Large Cohorts**
10:00 - 10:15 AM	**Break**
10:15 - 11:15 AM	**Speakers and Abstracts** *Analytic Approaches and Metrics* Kirschstein Auditorium | **Speakers and Abstracts** *Consumer Device Applications in Research* Auditorium A | **Speakers and Abstracts** *From the Lab to Free-Living* Auditorium B | **Speakers and Abstracts** *Approaches to Estimating Intensity in Accelerometry* Auditorium C
11:15 - 11:30 AM	**Break**
11:30 - 12:30 PM	**Exhibitor Talks**
12:30 - 1:30 PM	**Lunch and Poster Session 3**
1:30 - 2:30 PM	**Lunch and Poster Session 4**
2:30 - 3:30 PM	**Special Presentation: Deborah Estrin** Kirschstein Auditorium
3:30 - 4:30 PM	Keynote Presentation: **Karl E. Friedl**, University of California, USA
4:30 - 4:45 PM	**Break**
4:45 - 6:00 PM	**Special Symposium Kirschstein Auditorium**
6:00 - 7:30 PM	**Break**
7:30 - 10:00	**Banquet at Hyatt**
	FRIDAY, JUNE 23
8:30 - 9:30 AM	Keynote Presentation: **Mike McConnell**, Verily Life Sciences, USA
9:30 - 11:00 AM	**Speakers and Abstracts** *Estimating Energy Expenditure with ActiGraph* Kirschstein Auditorium | **Speakers and Abstracts** *Activity Analysis in Special Populations* Auditorium A | Symposium: **Tamara Harris** *Application of Accelerometry to Identify Clinical Trajectories* Auditorium B | Symposium: **Amy Lu** *Technology Assisted Physical Activity Measurement Among Children: Attractions and Pitfalls* Auditorium C
11:00 - 11:15 AM	**Break**
11:15 - 12:15 PM	**Speakers and Abstracts** *Approaches to Harmonizing and Standardizing Big Data* Kirschstein Auditorium | **Speakers and Abstracts** *Physical Activity Behavior in Youth* Auditorium A | Symposium: **Genevieve Healy** *Using Activity Monitors to Develop, Evaluate, and Refine Whole-Day Interventions* Auditorium B
12:15 -12:45 PM	**Closing Remarks**

Exhibitors

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PAL Technologies™ activPAL™ provides researchers with robust and objective measurement of free-living physical behaviors, providing the evidence for novel treatment approaches and interventions. The ability to determine time spent in the primary postures as well as time spent in activities including walking, running, cycling, and vehicular transportation, allows daily activity patterns to be clearly visualized and analyzed. The pocket-worn Activator™, with a battery life of a year, is a flexible long-term physical behavior monitor providing researchers with real-time upload of sedentary behavior and physical activity data via Bluetooth, enabling dynamic behavioral interventions to be monitored and adjusted from the cloud.

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ActiGraph

ActiGraph is the leading provider of clinical-grade activity and sleep monitoring solutions for the global scientific community. Built on 15 years of data capture and management expertise, ActiGraph's new CentrePoint platform leverages cloud, mobile, and wireless technologies to capture and deliver real-world data in near real time. As the most widely used activity monitoring system for research, ActiGraph hardware and software solutions have been used in dozens of clinical drug trials and hundreds of health and population studies, including the U.S. National Health and Nutrition Examination Survey (NHANES), the Harvard Women's Health Study, and the NAKO Health Study.

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Website: actigraphcorp.com
Twitter: @actigraph

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Since 2008, Activinsights have used lifestyle insight from wearables and connected devices to support healthcare services in over 40 countries around the world. Our technologies and data analysis approaches are supported by over 200 peer-reviewed scientific papers.

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Fitabase is powering the next generation of mobile and connected research. We support a robust data management platform designed to help researchers and clinicians remotely collect activity, weight, and nutrition information from their participants and patients. Since 2012, we have supported over 250 projects, including academic research studies, healthcare innovation projects, and clinical trials.

Website: https://www.fitabase.com

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COSMED is the world leader of metabolic, body composition, and lung function diagnostic equipment. Featured at ICAMPAM 2017 is the K5 – a new generation Wearable Metabolic System, and the only device of its type. The K5 expands the scope of metabolic testing – from human performance assessment to clinical exercise testing.

Website: http://www.cosmed.com/en/

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McRoberts is an innovative and flexible organization with over 25 years of experience, and one of the leaders in ambulatory monitoring of physical activity. We apply our knowledge of human movement and analysis of raw data to facilitate simple solutions in healthcare, pharmacy and research for evaluating physical functioning.

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Website: www.mcroberts.nl
Twitter: https://twitter.com/McRobertsNL

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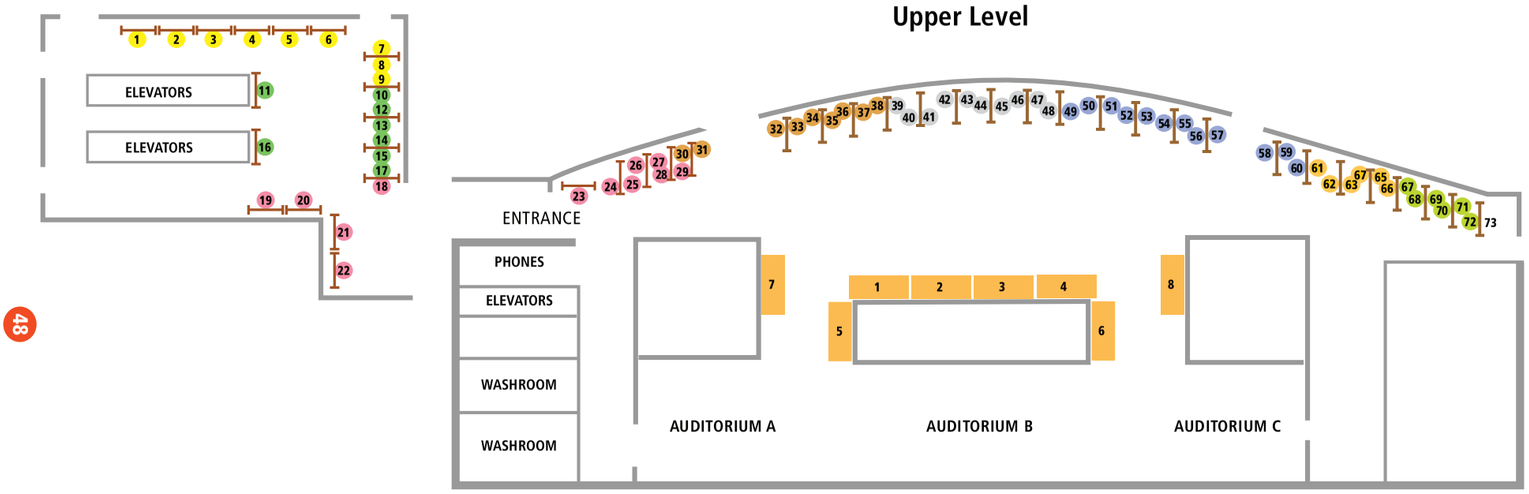
Notes

Poster Sessions 1 & 2

Floor Plan • Wednesday June 21 • Natcher Conference Center



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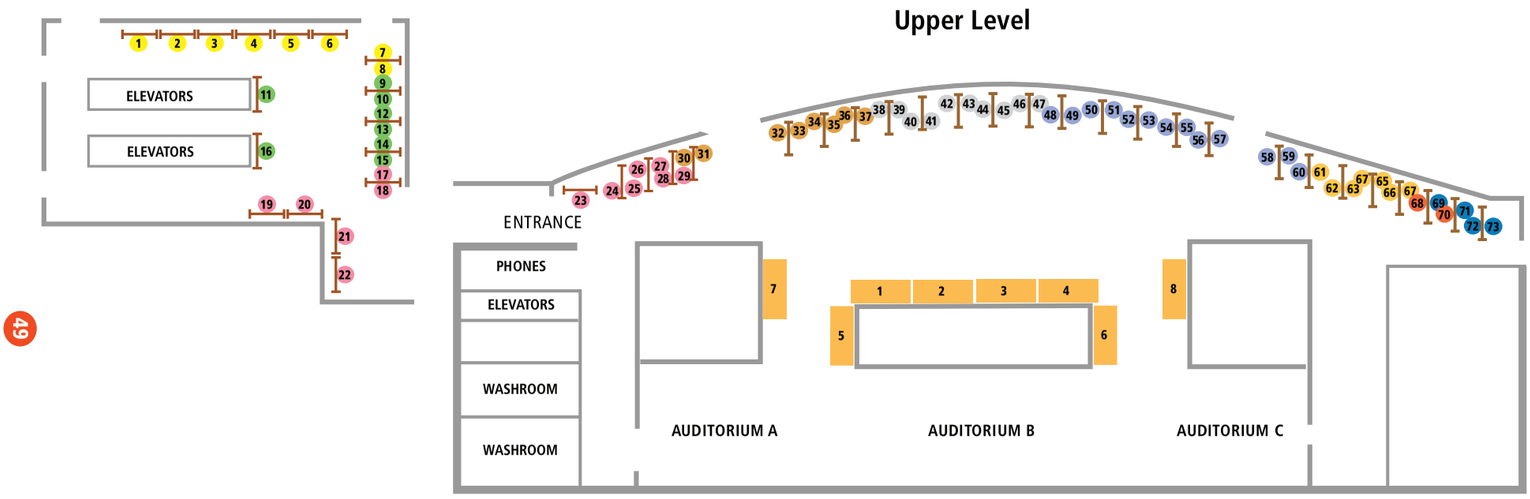
Poster Themes

- A Multimodal Assessment
- B Clinical Applications
- C Real-World Applications (Site Specific)
- D Special Populations
- E 24-Hour Activity Cycle
- F Research Devices
- G Algorithm Development
- H Device Development and Validation
- I Use of Consumer Devices in Research
- J Consumer Devices
- K Sleep Research

Poster Sessions 3 & 4

Floor Plan • Thursday June 22 • Natcher Conference Center



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Poster Themes

- A Multimodal Assessment
- B Clinical Applications
- C Real-World Applications (Site Specific)
- D Special Populations
- E 24-Hour Activity Cycle
- F Research Devices
- G Algorithm Development
- H Device Development and Validation
- I Use of Consumer Devices in Research
- J Consumer Devices
- K Sleep Research

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