8TH INTERNATIONAL CONGRESS ON SCIENCE AND SKIING

March 11–15, 2019
Vuokatti, Finland

PROGRAMME

M. Karczewska-Lindinger
A. Hakkarainen, V. Linnamo, S. Lindinger
**DAY 1 - Monday 11th of March**

12:00 - REGISTRATION

15:00  
**Vesa Linnamo & Stefan Lindinger;** Opening of the Congress

15:10  
**Vesa Linnamo;** Emeritus prof. Paavo Komi Memorial lecture

15:30 **KEYNOTE**  
**Erich Müller;** Science in skiing (ICSS): past – present - future

### Session 1: Young Investigator Award (YIA) competition

**Chair David Bacharach**

16:00  
**Julian Fritz;** Knee joint loading during loaded squat jump landing (YIA)

16:15  
**Veronica Bessone;** Torso and hip flexions influence ski jump landing impact (YIA)

16:30  
**Matthew Cross;** Magnitude and relationship between force output and performance in giant slalom (YIA)

16:45  
**Clément Delhaye;** Kinetic and kinematic turn switch detection in giant slalom (YIA)

17:00  
**COFFEE AND TECHNICAL EXHIBITION**

17:45  
**Roman Bachmann;** Automatic 3D motion capture in Alpine skiing using deep learning and computer vision (YIA)

18:00  
**Aaron Martinez;** Development of an automatic alpine skiing turn detection algorithm based on a simple sensor setup (YIA)

18:15  
**Jingjing Xue;** A comparison of physiological variables between Chinese national cross-country skiers and long distance runners (YIA)

18:30  
**Christina Mishica;** Heart rate variability in young athletes: when should we measure it and does it relate to performance? (YIA)

18:45  
**Valeria Rosso;** Measures of impairment in cross-country sit skiing (YIA)

19:00  
**Christian Weich;** The attractor method – a novel tool to highlight subtle differences in cross-country ski skating techniques (V1 vs. V2) (YIA)

19:30  
**GET TOGETHER EVENING (with finger food) AND TECHNICAL EXHIBITION**  
(Congress venue)
DAY 2 - Tuesday 12th of March

Session 2: Biomechanics in Alpine Skiing

Chairs Erich Müller and Josef Kröll

09:00 KEYNOTE David Bacharach; Bridging the gap between science and practice in winter sports
09:30 INVITED Josef Kröll; Application of power-force-velocity profiling to “ICSS” disciplines
9:50 John Seifert; Muscular responses to ski width when skiing on groomed and powder snow conditions
10:05 Lynn Ellenberger; Biomechanical analysis of jump landings in competitive alpine skiers: cross-sectional observations from youth to elite level
10:20 ARCHINISIS - company presentation
10:30 COFFEE AND TECHNICAL EXHIBITION
11:10 Carlo Denier; Skicross-starting facility: indoor vs. snow starts
11:25 Marie Javet; Performance of the pole-push during starts in Alpine skiing
11:40 Renzo Pozzo; Biomechanical efficiency of different starting techniques in ski cross
11:55 Matthias Olvermann; Analysis of the first acceleration phase of the female downhill world cup in Garmisch-Partenkirchen 2018
12:10 1080 MOTION - company presentation
12:20 LUNCH
14:00 1080 MOTION - company demonstration (outside)

Session 3: Physiology and Training in Cross-Country Skiing & Biathlon

Chairs Marko Laaksonen and Øyvind Sandbakk

14:30 KEYNOTE Øyvind Sandbakk; Modern training concepts in cross-country skiing
15:00 INVITED Marko Laaksonen; Biathlon - has the sport changed during the past decades and can science keep up?
15:20 INVITED Ilkka Heinonen; Limiting cardiovascular factors of cross-country skiing performance
15:40 Stephanie Moore; Influence of torso movement deviation on metabolic economy during V1 and V2 skate techniques
15:55 Elias Bucher; Analysis of the U23 cross-country Ski World Championship 2018 Sprint: Relative terrain performances and sex differences
16:10 Jan Kocbach; Sex-based differences in speed and sub-technique selection during an international competition in classical XC skiing
16:25 Guro Solli; Block versus traditional periodization of HIT: A comparison of two roads leading to Rome for the world’s most successful cross-country skier
16:40 Pietu Korhonen; Effects of maximal upper-body strength training on double poling technique on young female skiers
Session 4: Posters

Chairs Thomas Stöggl and Stefan Lindinger

17:10 – 18:30

**Topic: Nordic Skiing**

Renzo Pozzo; Biomechanical efficiency in elite athletes of sprint roller ski

Mats Ainegren; Effects of drafting on VO2 in double poling XC-skiing

Ronny Fudel; Same but different. Are there differences in technique among training and competition in youth cross-country skiing?

Julia Baumgart; Development of a framework for investigating performance, physical and technical demands in para cross-country sit skiing: a case study

Miika Köykkä; Aiming accuracy in biathlon standing shooting performance

Topi Kiljunen; Comparison of gliding and grip properties of different types classical cross-country skis

**Topic: Alpine Skiing**

Hiroshi Hoshino; The power profile of the maximum anaerobic power of Alpine skiers

Kamil Povraznik; Long-term monitoring of power capabilities of pre puberty age sportsmen in Alpine skiing

Vjekoslav Cigrovski; Balance and recreational Alpine skiing are in a causative relationship

Carlo Denier; Alpine skiing starts on snow versus on matt plants

Arrigo Canclini; 3D kinematic analysis of diagonal stride in elite ski mountaineering (skialp) during world cup races

**Topic: Technology**

Frithjof Doerks; Accuracy and practicability of a magnet and magnetometer based split-time system in cross-country and Alpine skiing

Teemu Lemmettylä; Ski tester development for cross-country ski testing

Uwe Kersting; A feedback system to train start performance in ski cross

Vjekoslav Cigrovski; How can Xsens kinematic suit add to our understanding of a slalom turn: a case study in laboratory and field conditions

Masanori Yoshikawa; A study for quantification of Alpine skiing technique related to faster skiing using sensor systems

Esa Tuulari; Integrated sensor system for measuring and analyzing pole work in XC skiing

Cory Snyder; Validation of a simple sensor and algorithm system to calculate edging angle during Alpine skiing
Yu Liu; The effect of transcranial direct current stimulation on improving CMJ performance

Angelica Lunina; Target modeling in sport training of highly skilled cross-country skiers

FREE EVENING

DAY 3 - Wednesday 13th of March

Session 5: Talent and Injury in Skiing

Chairs Christian Raschner and Maarit Valtonen

09:00 KEYNOTE Maarit Valtonen; Preventive medicine in endurance winter sports

09:30 Patricia Doyle-Baker; The base study results in U14 Canadian Alpine ski-racers

09:45 Rick Howell; Scaling lateral heel release across a range of anthropometrics to associate with ACL-friendly Alpine skiing

10:00 Lisa Steidl-Müller; Training load characteristics and injury and illness risk identification in elite youth ski racing: A prospective study

10:15 Jörg Spörrli; Injury-related health problems and illnesses in youth Alpine skiers: a 6 month prospective cohort study of 167 athletes

10:30 Andreas Huber; Single leg jumps as resource to improve injury prevention and the return-to-competition process

10:45 COFFEE AND TECHNICAL EXHIBITION

Session 6: Paralympic Skiing

Chairs Vesa Linnamo and Laura Gastaldi

11:45 INVITED Kaspar Wirz; A cross-country skiing coach perspective on 40 years practical work using scientific input – challenge and chance

11:55 INVITED Laura Gastaldi & Magdalena Karczewska-Lindinger; Race and split time analysis in Para Nordic sit-skiing

12:15 INVITED Maren Goll; Paralympic Alpine skiing – applying approaches from motorsports to the sport of sit-skiing

12:35 Matthias Scherge; Determination of factors influencing the effectiveness of propulsion of Paralympic sitskis

12:50 LUNCH

Session 7: Free afternoon - skiing
DAY 4 - Thursday 14th of March

Session 8: Cross-Country Skiing

Chairs Barbara Pellegrini and Walter Herzog

09:00 KEYNOTE Walter Herzog; Cross-country skiing as a model for human movement analysis
09:30 INVITED Barbara Pellegrini; Relationships between cross-country skiing economy and athletes' skills
09:50 INVITED Thomas Stöggli; Altered demands in cross-country skiing
10:10 Jørgen Danielsen; Source of power generation during double poling at shallow and steep inclines
10:25 Olli Ohtonen; Effects of fatigue on propulsive forces during ski skating
10:40 Petri Ollonen; A biomechanical analysis of a cross-country skiing World Cup competition at Ruka, Finland 2015
10:55 COFFEE AND TECHNICAL EXHIBITION
11:30 Arrigo Canclini; Historical analysis of double poling in high-level XC skiing
11:45 Dan Kuylenstierna; Validation, accuracy and practical use of a miniature force and IMU based power measurement system for analyses of cross-country training and racing – a pilot study
12:00 Florian Paternoster; Biomechanical analysis of G3 skating technique on a treadmill of world-class and national-elite female biathletes
12:15 Chiara Zoppirolli; Kinematic alterations of double poling cycle in groups of skiers with different performance levels during a long-distance race
12:30 Melissa Masters; Ketogenic diets for endurance athletes: weighing the pros and cons
12:45 GAIT UP - company presentation
12:55 LUNCH

Session 9: Ski Jumping

Chairs Mikko Virmavirta and Gertjan Ettema

14:30 INVITED Mikko Virmavirta; Do ski jumpers still need to be light?
14:50 Gertjan Ettema; Dynamics of ski jump take-off skill
15:05 SIMI REALITY MOTION SYSTEMS GMBH – company presentation

Session 10: Air drag and Aerodynamics in Skiing

Chairs Stefan Lindinger and Mats Ainegren

15:25 INVITED Stefan Lindinger; Air drag and aerodynamics in skiing
15:45 Mats Ainegren; A climatic wind tunnel for physiological sports experimentation
16:00 Clemens Früwirth; Frontal area detection during sportive motion with the use of a 3D camera
16:15  Ola Elfmark; The effect of athlete body positioning on aerodynamic drag and performance in Alpine ski racing
16:30  Proskida – company presentation
16:50  COFFEE AND TECHNICAL EXHIBITION

Session 11: Laboratory Demonstrations
17:30 – 18:45 Laboratory demonstrations (Snowpolis building)
20:00  CONGRESS DINNER (Vuokatti Sport Restaurant)

DAY 5 - Friday 15th of March
Session 12: Methodology and Technology in Skiing
Chairs Thomas Stöggl and Masaki Takeda
09:00  INVITED Masaki Takeda; Classical cross-country technique detection by high precision kinematic global navigation satellite system
09:20  Naoto Miyamoto; Validation of wearable kinematic GNSS receiver for cross-country skiing
09:35  Anil Kodiyan; Cross country technique and sub-technique classification using a single inertial sensor placed on the ski
09:50  Uwe Kersting; Feasibility of a method to assess joint loading in snowboard landings
10:05  Ronald Kipp; Ski characteristics from different width skis while powder skiing
10:20  Cory Snyder; Ski style classification and scoring in Alpine skiing using a simple sensor and algorithm system

Session 13: Coaching & Science
Chairs Stefan Lindinger and David Bacharach
10:40  PODIUM DISCUSSION “COACHING now and in 2050?”

Session 14: Closing ceremony
11:20  Stefan Lindinger; ICSS VISIONS
11:40 – 12:00 Vesa Linnamo; CLOSING of the ICSS2019