Personal information

Name / Surname	**Zignoli, Andrea**
Address	San Pietro In Cariano, Italy 🇮🇹
Personal Email	Institutional: andrea.zignoli@unitn.it Personal: andrea.zignoli@yahoo.it
Home page	andreazignoli.github.io
Nationality	Italian 🇮🇹
Date of birth	Apr 24^{th}, 1984
Gender	Male

Current positions

Date	Since Apr 2020 🇺🇸
Part-time data scientist	Athletica Inc. Developing mathematical models of human performance for a virtual training platform. My activity mostly consists in supporting the app developers with my expertise in modelling the physiological and biomechanical response to exercise. Ref: Paul Laursen
Date	Since Dec 2021 🇮🇹
Teaching Fellow	Department of Cellular, Computational and Integrative Biology - CIBIO, University of Trento, Trento, Italy. Instructor for the 3-credit module on Modeling within the Technology and Innovation in Sports course in the Master's program in Exercise Science and Human Movement Ref: Francesco Biral
Date	Since Apr 2022 🇮🇹
Fellow Researcher	Department of Industrial Engineering, University of Trento, Trento, Italy. Ref: Francesco Biral
Date	Since Dec 2021 🇬🇧
Associate Editor	Sports Engineering Journal Engagement with science and engineering communities. Work as Associate editor working alongside the other Editors and report to the Editor-in-Chief. Ref: Thomas Allen

For more information please email me.

Research and work experience

Date	Apr 2021 – March 2024 🇺🇸
Full-time data scientist	Supersapiens Continuous glucose monitoring signal processing. My activities mostly consist in time series analyses (including anomaly detection and forecasting) and pattern recognition (sales, app usage data, etc.). Ref: Kristina Skroce
Date	Apr 2022 – Nov 2022 🇦🇺
Visiting researcher	Exposed to the work done at the School of Human Movement and Nutrition Sciences, Faculty of Health and Behavioural Sciences, University of Queensland, Brisbane, Australia. Ref: Jeff Coombes
Date	Oct 2021 – Apr 2022 🇩🇰
Visiting researcher	Exposed to the work done at the Research Unit Muscle Physiology and Biomechanics, Department of Sport and Biomechanics and the Center for Active and Healthy Aging, University of Southern Denmark, Odense, Denmark. Ref: Paolo Caserotti
Date	Dec 2020 – Dec 2021 🇮🇹
Postdoctoral researcher	University of Trento, Department of Industrial Engineering. The main goal of my activities is twofold: 1) to develop mathematical models (both first-principle and statistical/data-driven) for the sport technology industry and 2) to deploy such models on different platforms (from servers to microcontrollers) and deliver proofs of concepts of TRL 3 and 4. The outcome of my activities include scientific publications and state-of-the-art algorithms for sport performance analysis evaluation. Ref: Francesco Biral
Date	Nov 2019 – Nov 2020 🇮🇹
Postdoctoral researcher	University of Trento Department of Industrial Engineering DDL-Meccatronica Project Setup of ”Deep Learning Lab” at the ProM Facility (TN, I). Ref: Paolo Bosetti
Date	Since Nov 2017 🇮🇹
Postdoctoral researcher	University of Trento Department of Industrial Engineering *De Motu* Project Designing physical and virtual models of the kinematic of the human knee. Research partners include: ProM Facility (TN, I), CeRiSM Research Centre (TN, I) and the MUSE Science Museum (TN, I). Ref: Francesco Biral
Date	Nov 2016 – May 2017 🇯🇵
Visiting researcher	KAST Kanagawa Academy of Science and Technology KSP East, 3F, 3-2-1 Sakado, Takatsu-Ku, Kawasaki-Shi, Kanagawa 213-0012, Japan. *Development of Haptic Robots for Medicine, Rehabilitation, and Welfare* Project Ref: Shimono Tomoyuki
Date	April 2016 – July 2016 🇮🇹

Scholarship holder	CeRiSM Research Centre of Sport Mountain and Health, University of Verona, Department of Neurological and Movement Science, Verona (VR), Italy. Human movement and physiological response to exercise data collection and analysis. Virtual modeling and optimal control algorithm application. Ref: Federico Schena
Date	Jan – Apr 2016 🇮🇹
Collaboration	University of Trento, Department of Industrial Engineering, Trento (TN), Italy. Development of virtual models of human bioenergetics and cycling biomechanics. Ref: Francesco Biral
Date	Jan 2013 – Dec 2015 🇮🇹
PhD Student	CeRiSM Research Centre of Sport Mountain and Health, University of Verona, Department of Neurological and Movement Science, Verona (VR), Italy. Thesis title: *Development of integrated tools for bio-mechanical analysis in sport performance: application to cycling*. The thesis aimed at developing bioenergetic and bio-mechanical models of cycling. The final goal was to apply the optimal-control approach in the attempt to replicate experimental data and predict the system behaviour by means of model simulation. Tutors: Barbara Pellegrini & Francesco Biral
Date	Mar – Sept 2015 🇨🇦
Visiting PhD student	Human Performance Laboratory, Faculty of Kinesiology, University of Calgary, Calgary, AB, Canada. Visiting student, research activity, working on musculoskeletal modeling of human lower limb, with focus on anatomical properties and muscle mechanics. Ref: Walter Herzog
Date	Apr – Dec 2012 🇮🇹
Scholarship holder	CeRiSM Research Centre of Sport Mountain and Health, University of Verona, Department of Neurological and Movement Science, Rovereto (TN), Italy. Kinematic data collection and analysis, with focus on walking and running in fatigued conditions. Ref: Federico Schena
Date	Sept – Dec 2011 🇮🇹
Company internship	ZF Padova S.r.l., Arco Plant, Arco (TN), Italy. BOM data analysis. Ref: Daniele Dirignani (HR)
Date	Sept 2010 – Mar 2011 🇬🇧
Visiting Master student	Integrity and Dynamics (SID) office, Research Group of the University of Nottingham, Nottingham, UK. Developing different mathematical models of driver behaviour. Ref: Atanas A. Popov

Education and training

Place and Date: University of Verona, Italy, 2013 – 2015
PhD degree: Movement Science and Physical Exercise (PhD).
Thesis: *Development of integrated tools for bio-mechanical analysis in sport performance: application to cycling*
Key Words: Mathematical modeling, optimal control, bioenergetics, biomechanics, human movement.
Tutors: Barbara Pellegrini & Francesco Biral

Place and Date: University of Trento, Italy, 2008 – 2011
Master degree: Mechatronic Engineering (M.Eng.), final grade: 105/110.
Thesis: *Applications of Control Techniques to the Modeling of the Driver Behavior*
Key Words: Model Predictive Control, mathematical modeling.
Advisors: Prof. Francesco Biral & Prof. Atanas.A. Popov

Place and Date: University of Trento, Italy, 2003 – 2008
Bachelor degree: Industrial Engineering (B.Eng.), final grade: 92/110.
Thesis: *Individuazione Statistica dell'Interfaccia di Cavitazione [Italian].*
Key Words: hydrodynamics, fluid Mechanics.
Advisor: Prof. Filippo Trivellato

Personal skills and competences

Mother tongue: **Italian**

Other language(s): English

Self-assessment *European level*(*)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	C1	C1	B2	C1

(*) *Common European Framework of Reference* (CEF) level

Technical skills and competences

Data acquisition:
Basic level: Quark (CPET), k4-k5 metabolimeters, baropodometric pressure insoles
Advanced level: DELSYS Electromyography, QUALISYS/VICON Motion capture systems, SRM power meter, Lode Ergometer with Pedal Force Measurement System

Computer skills and competences

Coding and software:
Basic level: LaTeX, OpenSim musculoskeletal modeling software, Linux OS, C/C++ coding micro-processors (Arduino, Processing), RStudio (dplyr library)
Intermediate level: Maple, Microsoft Office, Microsoft Windows, Python programming language (Pandas, Scikit-learn), neural network development (by means of the neural network toolbox in the Matlab environment and the TensorFlow and Keras software libraries in Python environment), optimal control problem formulation and solution (by means of the software libraries GPOPS-II and PINS)
Advanced level: Matlab

Computer skills and competences

Signal processing:
Basic level: Pedal force measurements in cycling, force platform (anticipatory postural adjustments and centre of pressure trajectory), ski-pool with strain gauges (pooling forces in skiing), in-shoe pressure for comfort and cushioning, accelerometer and IMUs, GPS, odometers
Intermediate level: Breath by breath pulmonary oxygen consumption, capillary blood lactate concentration, surface electromyography for muscle activation
Advanced level: Joint trajectory and body segment kinematics

For more information please email me.

Statistics and data processing

• Classic statistics: normality check, mean difference (t-test), analysis of variance (ANOVA), repeated-measure ANOVA, multi-linear models (mainly conducted within the RStudio environment, i.e. with R language custom-written scripts).
• Machine learning: principal component analysis, cluster analysis, random forest (mainly conducted within the Python environment, i.e. with custom-written scripts and scikit libraries).
• Deep learning: long-short term memory (LSTM), recurrent neural networks (RNN), generative adversarial neural network (GAN), convolutional neural networks (CNN) (mainly conducted within the Python environment, i.e. with custom-written scripts and Keras-Tensorflow libraries).

Fundings (ceased)

• ANTA Award, in collaboration with ECSS (European Congeress of Sport Science). The project consists in a research study titled "DARDAR project: Development (and deployment) of Algorithms to obtain Reliable stride-by-stride running kinematic Data in Real life conditions". In collaboration with the Université de Franche Comté and Prof. Laurent Mourot. Total amount: 20000 €.

• ATHLETICA project: development of a web-based platform for training data processing and sport performance evaluation. Total amount: 9600 €.

• In collaboration with Selle Royal: study and development of a new testing protocol for high-quality cycling shoes. Total amount: 15000 €.

• Post-doctoral fellowship sponsored by the Fondazione Cassa di Risparmio di Trento e Rovereto (CARITRO) DDL-Meccatronica Project to be developed at the *deep learning lab* at the ProM Facility (TN, I). Total amount: 35000 €.

• Restitution M5S 2019 for the development of a web-based application where data from cardiopulmonary exercise tests are used to train an automatic AI-diagnostic system. Total amount: 500 €.

• Starting Grant Young Researchers 2018 (internal call University of Trento) for a project proposal to be written together with Prof. Marcus Pandy at the University of Melbourne, Melbourne, Australia. Total amount: 5000 €.

• Post-doctoral fellowship sponsored by the Fondazione Cassa di Risparmio di Trento e Rovereto (CARITRO) *De Motu* project to be developed at the Department of Industrial Engineering of the University of Trento, Trento, Italy. Total amount: 25000 €.

• International Cooperation grant 2015 for the project *Modeling the Lower Limb of Cyclist* to be developed at the Human Performance Laboratory of the University of Calgary, AB, Canada. Total amount: 3000 €.

• PhD student scholarship for three years between Jan 2013 and Dec 2015 at the University of Verona (Vr, I). Total amount: 60000 €.

• University of Trento scholarship for "The results achieved during the Master Course in Mechatronics Engineering". Total amount: 450 €.

• Funded Erasmus scholarship for six months between Sept 2010 and Mar 2011 at the University of Nottingham (UK). Total amount: 3000 €.

Publications: journal papers (as leading author) LATEST

AI-driven analysis of cardiopulmonary exercise tests to identify gas exchange and ventilatory thresholds
D. Keir, **A. Zignoli**, F.M. Maturana, D. Iannetta, J.M. Murias
Sports Medicine, 2026.

Assessing trajectories and bike handling abilities in road cycling with global positioning system data
A. Zignoli
Sensors, 2025.

Real-time assessment of exercising maximal mean power and speed in endurance sports: a Garmin connect IQ App
A. Zignoli, P. Whitehurst
Sports Engineering - Technical note, 2025.

Personalized nutrition and machine-learning: exploring the scope of continuous glucose monitoring in healthy individuals in uncontrolled settings
A. Zignoli, B. Martinez-Gonzalez, K. Skroce, D.J. Lipman, H.C. Zisser, A. Giorgi
Int J Sport Nutr Exerc Metab., 2024.

Personalized nutrition and machine-learning: exploring the scope of continuous glucose monitoring in healthy individuals in uncontrolled settings
A. Zignoli, K. Skroce, D.J. Lipman, H.C. Zisser
Biomedical Signal Processing and Control, 2023.

Indoor running temporal variability for different running speeds, treadmill inclinations, and three different estimation strategies
A. Zignoli, A. Godin, L. Mourot
PLOS-ONE, 2023.

Association between pre-exercise food ingestion timing and reactive hypoglycemia: insights from a large database of continuous glucose monitoring data
A. Zignoli, Federico Y. Fontana, K. Skroce, David J. Lipman, Felipe M. Maturana, Howard C. Zisser
European Journal of Sport Science, 2023.

How the Oxynet web applications are used to crowdsource and interpret cardiopulmonary exercising tests data
A. Zignoli, A. Fornasiero, F. Gilli, B. Pellegrini, F. Schena
Biomedical Signal Processing and Control, 2023.

Machine learning models for the automatic detection of exercise thresholds in cardiopulmonary exercising tests: from regression to generation to explanation
A. Zignoli
Sensors, 2023.

Publications: journal papers (as leading author) CONT'D

Insights in road cycling downhill performance using aerial drone footages and an 'optimal' reference trajectory
A. Zignoli, D. Fruet
Sports Engineering - Technical note, 2022.

An intelligent curve warning system for road cycling races
A. Zignoli
Sports Engineering - Technical note, 2021.

Assessment of bike handling during cycling individual time trials with a novel analytical technique adapted from motorcycle racing
A. Zignoli, F. Biral, A. Fornasiero, D. Sanders, T. Van Erp, M. Mateo-March, F.Y. Fontana, P. Artuso, P. Menaspà, M. Quod, A. Giorgi, P.B. Laursen
European Journal of Sport Science, 2021.

Oxynet: a collective intelligence that detects ventilatory thresholds in cardiopulmonary exercise tests
A. Zignoli, A. Fornasiero, P. Rota, V. Muollo, L. A. Peyré-Tartaruga, D.A. Low, F.Y. Fontana, D. Besson, M. Pühringer, S. Ring-Dimitriou, L. Mourot
European Journal of Sport Science, 2020.

Influence of corners and road conditions on cycling individual time trial performance and "optimal" pacing strategy: a simulation study
A. Zignoli
Journal of Sports Engineering and Technology, 2020.

Estimating an individual's oxygen consumption during cycling exercise with a recurrent neural network trained from easy-to-obtain inputs
A. Zignoli, A. Fornasiero, M. Ragni, B. Pellegrini, F. Schena, F. Biral, P.B.Laursen
PLOS-ONE, 2020.

A new optimal control framework to predict realistic pacing and cornering strategies during cycling individual time trials
A. Zignoli, F. Biral
Sports Engineering, 2020

State-of-the art concepts and future directions in modelling oxygen consumption and lactate concentration in cycling exercise
A. Zignoli, A. Fornasiero, E. Bertolazzi, B. Pellegrini, F. Schena, F. Biral, P.B. Laursen
Sport Science for Health, 2019

Expert-level classification of ventilatory thresholds from cardiopulmonary exercising test data with recurrent neural networks
A. Zignoli, A. Fornasiero, F. Stella, B. Pellegrini, F. Schena, F. Biral, P.B. Laursen
European Journal of Sport Science, 2019

Optimal control solution to the predictive dynamics of cycling
A. Zignoli, F. Biral, B. Pellegrini, A. Jinha, W. Herzog, F. Schena
Sport Science for Health, 2017

For more information please email me.

Publications: journal papers (as co-author) LATEST

Continuous glucose monitoring–derived glucose metrics over time in physically active adults without diabetes using a commercial Continuous Glucose Monitoring application
K. Skroce, **A. Zignoli**, Lauren V. Turner, David J. Lipman, Michael C. Riddell, Howard C. Zisser

Topical collection: Fluid Dynamics in Sports
F. Malizia, **A. Zignoli**, · K.E. Teigen Giljarhus
Sports Engineering, 2025.

Continuous Glucose Monitoring Profiles in Elite-Level Professional European Football Players
K. Skroce, **A. Zignoli**, N. Mihic, D.J. Lipman, L.V. Turner, M.C. Riddell, and H.C. Zisser
Journal of Diabetes Science and Technology, 2025.

Moderate heart rate-matched hypoxic exercise: autonomic and cardiovascular responses to different degrees of hypoxic stress
A. Fornasiero, A.G. Represas, **A. Zignoli**, F. Stella, M. Rakobowchuk, L. Mourot
European Journal of Applied Physiology , 2025.

For more information please email me.

Publications: journal papers (as co-author) CONT'D

Assessing Energy Availability and Glucose Dynamics in Adolescent Cyclists: Implications for Nutritional Interventions during Competitive Season
M. Tarocchi, A. Pellegrino, K. Skroce, **A. Zignoli**, L.C. Cavadini, C. Bodini, G. Pagliai, L. Toncelli, L. Stefani, S. Vanni, M. Boddi, A. Modesti, P.A. Modesti
Nutrients, 2024.

Design and development of a feedback system for automatic treadmill speed adaptation
D. Fruet, **A. Zignoli**, R. Modena, B. Pellegrini, L. Gastaldi, L. Bortolan
Proceedings of the Institution of Mechanical Engineers Part P Journal of Sports Engineering and Technology, 2024.

Real World Interstitial Glucose Profiles of a Large Cohort of Physically Active Men and Women
K. Skroce, **A. Zignoli**, F.Y. Fontana,F.M. Maturana, D. Lipman, A. Tryfonos, M.C. Riddell, H.C. Zisser
Sensors, 2024.

The effects of a 6-hour ultra-endurance run on postexercise parasympathetic reactivation responses
A. Fornasiero, **A. Zignoli**, B. Pellegrini, F. Schena, G. Doucende, L. Mourot
The Journal of sports medicine and physical fitness, 2023.

Eager to set a record in a vertical race? Test your VO2max first!
A. Fornasiero, A. Savoldelli, **A. Zignoli**, A. Callovini, M. Decet, L. Bortolan, F. Schena, B. Pellegrini
Journal of Sports Sciences, 2023.

Knee flexor and extensor torque ratio in elderly men and women with and without obesity: a cross-sectional study
V. Muollo, **A. Zignoli**, L. Ghiotto, C. Milanese, M. Zamboni, F. Schena, A.P. Rossi
Aging Clinical and Experimental Research, 2021.

Response to Chaen and Trapellieni re: "Shortening Work-Rest Durations Reduces Physiological and Perceptual Load During Uphill Walking in Simulated Cold High-Altitude Conditions," by Fornasiero et al
A. Fornasiero, **A. Zignoli**, M. Rakobowchuk, F. Stella, S. Skafidas, A. Savoldelli, B. Pellegrini, F. Schena, L. Mourot
High Altitude Medicine & Biology, 2021.

Post-exercise cardiac autonomic and cardiovascular responses to heart rate matched and work rate matched hypoxic exercise
A. Fornasiero, **A. Zignoli**, M. Rakobowchuk, F. Stella, S. Skafidas, A. Savoldelli, B. Pellegrini, F. Schena, L. Mourot
European Journal of Applied Physiology, 2021.

Full characterisation of knee extensors' function in ageing: effect of sex and obesity
V. Muollo, A. Rossi, **A. Zignoli**, M. Teso, C. Milanese, V. Cavedon, M. Zamboni, F. Schena, C. Capelli, S. Pogliaghi
International Journal of Obesity, 2020.

Muscle and tendon stiffness and belly gearing positively correlate with rate of torque development during explosive fixed end contractions
A. Monte, **A. Zignoli**
Journal of Biomechanics, 2020.

Publications: journal papers (as co-author) CONT'D

Post-exercise hypotension and reduced cardiac baroreflex after half-marathon run: in men, but not in women
L. Mourot, A. Fornasiero, M. Rakobowchuk, L. Isacco, A. Brighenti, F. Stella, **A. Zignoli**, B. Pellegrini, C. Tarperi, F. Schena
International Journal of Environmental Research and Public Health, 2020.

Shortening Work-Rest Durations Reduces Physiological and Perceptual Load During Uphill Walking in Simulated Cold High-Altitude Conditions
A. Fornasiero, A. Savoldelli, F. Stella, A. Callovini, L. Bortolan, **A. Zignoli**, D. Low, L. Mourot, F. Schena, B. Pellegrini
High Altitude Medicine & Biology, 2020.

Similar cardiovascular and autonomic responses in trained type 1 diabetes mellitus and healthy participants in response to half marathon
L. Mourot, A. Fornasiero, M. Rakobowchuk, S. Skafidas, A. Brighenti, F. Stella, **A. Zignoli**, A. Savoldelli, B. Pellegrini, E. Danese, G. Lippi, C. Tarperi, F. Schena
Diabetes Research and Clinical Practice, 2019.

Cardiac autonomic and physiological responses to moderate-intensity exercise in hypoxia
A. Fornasiero, S. Skafidas, S. Stella, **A. Zignoli**, S. Aldo, M. Rakobowchuk, B. Pellegrini, F. Schena, L. Mourot
International Journal of Sport Medicine, 2019.

Delayed parasympathetic reactivation and sympathetic withdrawal following maximal cardiopulmonary exercise testing (CPET) in hypoxia
A. Fornasiero, A. Savoldelli, S. Skafidas, F. Stella, L. Bortolan, G. Boccia, **A. Zignoli**, F. Schena, L. Mourot, B. Pellegrini
European Journal of Applied Physiology, 2018

Physiological factors associated with ski-mountaineering vertical race performance
A. Fornasiero, A. Savoldelli, G. Boccia, **A. Zignoli**, L. Bortolan, F. Schena, B. Pellegrini
Sport Science for Health, 2017

An Extreme Mountain Ultra-Marathon Decreases the Cost of Uphill Walking and Running
Vernillo G., Savoldelli A., Skafidas S., **Zignoli A.**, La Torre A., Pellegrini B., Giardini G., Trabucchi P., Millet G.P. and Schena F.
Frontiers in Physiology, 2016

Energy Cost and Kinematics of Level, Uphill and Downhill Running: Fatigue-Induced Changes After a Mountain Ultramarathon
G. Vernillo, A. Savoldelli, **A. Zignoli**, S. Skafidas, A. Fornasiero, A. La Torre, L. Bortolan, B. Pellegrini, F. Schena
Journal of Sports Science, 2015

Influence of the world's most challenging mountain ultra-marathon on energy cost and running mechanics
Vernillo G., Savoldelli A., **Zignoli A.**, Trabucchi P., Pellegrini B., Millet G.P., Schena F.
European Journal of Applied Physiology, 2014

Pubblications: peer-reviewed conference proceedings

Continuous Glucose Monitoring of Non-Diabetic Professional Cyclists during a Training Camp
A. Giorgi, B. Martinez-Gonzalez, M. Vicini, **A. Zignoli**, K. Skroce
Science & Science Conference, 2023

Automatic Generation of Realistic Cardiopulmonary Exercise Test Data With a Conditional Generative Adversarial Neural Network
A. Zignoli, D. Fruet
Workshop on Sport, Technology and Research - IEEE, 2022

Developing a Testing Protocol to Assess the Mechanical Properties of High-Level Cycling Shoes
D. Fruet, **A. Zignoli**, V. Fontanari, F. Biral, S. Raghavendra, M. Pezzato, E. Saeter
Workshop on Sport, Technology and Research - IEEE, 2022

Estimating Running Kinematics Variability With an IMU Sensor Placed on the Runner's Thorax
A. Zignoli, L. Mourot, D. Fruet
Workshop on Sport, Technology and Research - IEEE, 2022

Biomechanical Analysis and Modeling of Anterior Cruciate Ligament Rupture Conditions: Focus on Female Soccer Players
A. Zignoli, L. Tonelli, D. Fruet, F. Biral, V. Fontanari
Workshop on Sport, Technology and Research - IEEE, 2022

Real-time cross-dataset quality production Assessment in industrial laser cutting machines
N. Peghini, **A. Zignoli**, D. Gandolfi, P. Rota, P. Bosetti
1st International Workshop on Industrial Machine Learning - ICPR, 2020

Including a musculoskeletal model in the control loop of an assistive robot for the design of optimal target forces
A. Zignoli, F. Biral, K. Yokoyama, T. Shimono
IECON, Annual Conference of the IEEE Industrial Electronics Society, 2019

Rationale for researching in DOB/OC-based rehabilitation robots: simulation results
A. Zignoli, T. Shimono, F. Biral
IECON, Annual Conference of the IEEE Industrial Electronics Society, 2018

Analysis of assistive strategies for electric bikes that include rider's physiological characteristics
A. Zignoli, L. Beatrici, F. Biral
International Design Engineering Technical Conferences & Computers & Information in Engineering Conference, 2018

Kinect based system for self-adjusting treadmill speed in cross-country indoor ski
D. Fruet, **A. Zignoli**, L. Bortolan, L. Gastaldi, B. Pellegrini, F.
International Conference on Soft-Computing & Networks, 2015

Application of non-linear model predictive control to the driving task
A. Zignoli, F. Biral, A.A. Popov
First International Symposium on Future Active Safety Technology toward zero-traffic-accident, 2011.

Contributions to international conferences (as leading author)

Incorporating the maximal mean power profile in time trial simulations for more efficient optimal pacing strategy calculations
A. Zignoli, F. Biral
Cycling Science Conference, Florence, 2024

DeMotu project: design and production of a 3D printed human knee for research in biomechanics
A. Zignoli, C. Malacarne, P. Bosetti, L. Bortolan, D. Tombolato, F. Biral
MSH, Mountain Sport and Health, 2019

3D printed anatomical model of the human knee joint as a research tool in biomechanics
A. Zignoli, C. Malacarne; P. Bosetti, L. Bortolan, D. Tombolato, M.G. Pandy, F. Biral
European Society of Biomechanics, 2019
Modeling the acute physiological response to cycling exercise: the blood lactate concentration challenge
A. Zignoli, A. Fornasiero, M. Morelli, F. Biral, E. Bertolazzi, B. Pellegrini, F. Schena
Workshop: Modelling in Endurance Sports, 2016

An optimal control approach to the high intensity interval training design
A. Zignoli, A. Fornasiero, A. Savoldelli, M. Morelli, E. Bertolazzi, F. Biral, B. Pellegrini
World Congress of Cycling Science, 2016

What virtual modelling can tell us about bioenergetics and biomechanics in cycling
A. Zignoli, F. Biral, B. Pellegrini, F. Schena
VI International Congress Mountain Sport and Health, 2015

Application to cycling of a bioenergetic model: Towards a multi-level biomechanical model for global cyclist performance analysis
A. Zignoli, A. Savoldelli, F. Biral, B. Pellegrini, F. Schena
World Congress of Cycling Science, 2014

Experimentally validated cyclist kinematic model: Towards a multi-level biomechanical model for optimal performance analysis
Zignoli A., Biral F., Pellegrini B., Schena F.
V International Congress Mountain Sport and Health, 2013

For more information please email me.

Contributions to international conferences (as co-author)

Glucose monitoring profiles in professional football players without diabetes: match analysis and comparison with an active population
K. Skroce, **A. Zignoli**, N. Mihic, D. Lipman, M. Riddell, H. C. Zisser
EASD, Madrid, 2024

Greater Number of Cardio Sessions, Protein for Breakfast, and Reducing Fatigue Can Minimize Glucose Variability
J. S. Gottschall1, N. A. Henderson, C. M. Cassin, B. Hastings, **Zignoli A.**, K. Skroce, D. Lipman, H. Zisser
ACSM, 2023

Novel use of real time Continuous Glucose Monitor (CGM) energy management system as a behavioral change tool for amateur and professional athletes
Skroce K, Fontana Y.F., Maturana M.F., **Zignoli A.**, Lipman D., Riddell M.C, Zisser H. C.
International Biochemistry of Exercise Conference (IBEC) – Toronto, Canada, 2022

The "Development of Algorithms to obtain Reliable stride-by-stride running kinematic DAta in Real life conditions (DARDAR)" project
A. Godin, **A. Zignoli**, N. Peghini, L. Mourot
ECSS Virtual Congress, 2021

Obesity combined with ageing impairs the functional abilities of the knee extensor muscles during isometric and concentric contractions in women
V. Muollo, A.P. Rossi, **A. Zignoli**, C. Milanese, M. Zamboni, C. Capelli, F. Schena
European and International Congress on Obesity, 2020

Effects of acute hypoxia on cardiac autonomic modulation following maximal cardiopulmonary exercise testing
A. Fornasiero, A. Savoldelli, S. Skafidas, F. Stella, L. Bortolan, G. Boccia, **A. Zignoli**, F. Schena, L. Mourot, B. Pellegrini
ECSS Congress, 2018

Contributions to national conferences

Optimising pacing strategy in cycling during individual time trials: merging 3D rider-bicycle dynamics and bioenergetics
A. Zignoli, P. Menaspa, A. Giorgi, M. Quod, F. Biral
XI Italian National Congress SISMES, 2019

Can machine learning techniques inform maximal vs submaximal classification in cardiopulmonary exercising testing?
A. Zignoli, P. Rota, G. Loso, S. Pogliaghi
XI Italian National Congress SISMES, 2019

Heart rate variability and baroreflex sensitivity decrease after strenuous exercise: similar response in type I diabetes and healthy subjects
A. Fornasiero, L. Mourot, S. Skafidas, A. Brighenti, A. Gentilin, F. Stella, **A. Zignoli**, A. Savoldelli, B. Pellegrini, C. Tarperi, F. Schena
X Italian National Congress SISMES, 2018

Cycling: covering 60 km in 1 hour
A. Zignoli
Invited presentation, Pre-Symposium: The limits of human performance, 2018

Estimating oxygen uptake in cycling using neural network analysis of easy-to-obtain inputs
A. Zignoli, M. Ragni, A. Fornasiero, P. B. Laursen , F. Schena, F. Biral
IX Italian National Congress SISMES, 2017

Physiological determinants of ski-mountaineering vertical race performance
A. Fornasiero, A. Savoldelli, G. Boccia, **A. Zignoli**, L. Bortolan, F. Schena, B. Pellegrini
IX Italian National Congress SISMES, 2017

Modelling acute blood lactate concentration response to cycling exercise
A. Zignoli, A. Fornasiero, E. Bertolazzi, F. Biral, B. Pellegrini, F. Schena
VIII Italian National Congress SISMES, 2016

The most effective pedaling technique is not the most efficient: a theoretical demonstration
A. Zignoli, A. Jinha, F. Biral, B. Pellegrini, W. Herzog, F. Schena
VII Italian National Congress SISMES, 2015

Maximal power output in cycling: the effect of ankle flexibility
A. Avancini, M. Benazzoli, M. Baldi, P. Parolari, **A. Zignoli**, P. Zamparo
VII Italian National Congress SISMES, 2015

Validation of a bioenergetic mathematical model to estimate oxygen consumption and lactate concentration in cycling
Zignoli A., Skafidas S., Biral F., Pellegrini B., Schena F.
VI Italian National Congress SISMES, 2014

For more information please email me.

Workshops

• 16 June 2021 and 14 June 2022 · International Summer School in Wearable Sensors in Sport, Energetics and power monitoring in sport, How to process power data in sports (**invited presentation**, from remote).
Ref: Andrea Nicolò & Elena Bergamini

• 11-13 September 2016 · Wokshop Modelling in Endurance Sports, University of Konstanz - Konstanz, Germany.
Ref: Dietmar Saupe

• 3-5 February 2016 · OpenSim Europe Workshop, Rizzoli Orthopaedic Institute research Centre - Bologna, Italy.
Ref: Giordano Valente

• 01-02 December 2013 · Velosystem, Tecnico Ergonomo Ciclismo (1st level) Italian Cycling School, Montichiari - Brescia, Italy.

Teaching, mentoring and other academic activities

Teaching

• Academic year 2023-24 · Teaching the integrative lab didactic within the academic course of *Technology and Innovation in Sports*, Master degree in Physical Education and Sport, University of Verona, Trento, Italy.
Ref: Stefano Biressi

• Academic years 2019-20, 2020-21, 2021-22, and 2022-23 · Teaching assistant of the integrative lab didactic within the academic course of *Technology and Innovation in Sports*, Master degree in Physical Education and Sport, University of Verona, Trento, Italy.
Ref: Francesco Biral

• Academic years 2015-16 and 2017-18 · Teaching assistant of the integrative lab didactic within the academic course of *Technology of measurement systems*, Master degree in Physical Education and Sport, University of Verona, Verona, Italy.
Ref: Barbara Pellegrini

• Academic years 2013-14 and 2014-15 · Teaching assistant of the integrative lab didactic within the academic course of *Movement and sport biomechanics*, Master degree in Physical Education and Sport, University of Verona, Verona, Italy.
Ref: Paola Zamparo

Co-advisor in master theses

1) M. Morelli, 2) L. Beatrici, 3) G. Mazzaglia, 4) M. Negri, 5) F. Pedri, 6) E. mantovani, 7) M. Boscaro (University of Trento, Master degree in Mechatronics Engineering), 8) L. Tonelli (University of Trento, Master degree in Materials Engineering), 9) L. Stantuari (University of Verona, Master Degree in Physical Education and Sport).

Review activities

Referee for the following conferences/journals: IECON conference · Transactions in Mechatronics · Journal of Sports Sciences · Frontiers in Physiology · Cycling Science Journal · Scandinavian Journal of Medicine & Science in Sports · Anais da Academia Brasileira de Ciências · Sports · Materials · Plos One · Sports Engineering · Nature Scientific Communications

Additional information

Research interests

Mathematical modelling · Kinesiology · Sport performance · Robot-assisted rehabilitation

Personal interests

Outdoor · Photography · Running · Cycling

References

Contacts

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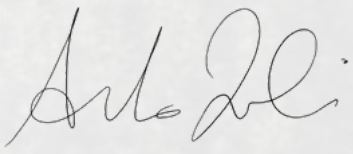
Francesco Biral · francesco.biral@unitn.it
Kristina Skroce · kristina@supersapiens.com
Paul Laursen · paul@athletica.ai

Andrea Zignoli, February 2026

I do hereby declare that the above given statements are true and correct to the best of my knowledge
Accordingly to art. 46 and 47 of D.P.R. 445/2000



For more information please email me.