# MATTEO BERTUCCO

Professore Associato
Dipartimento di Neuroscienze, Biomedicina e Movimento
Università di Verona
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## Studi

Dottorato di Ricerca (Ph.D.)
Università di Verona
Scienze dell'Esercizio Fisico e Movimento Umano, 2010

Laurea Magistrale
Università di Verona
Laurea Magistrale in Scienze Motorie Preventive ed Adattate, 2006

Laurea Triennale
Università di Verona
Laurea in Scienze delle Attività Motorie e Sportive, 2003

## Posizione attuale

2019-presente
Professore Associato
Dipartimento di Neuroscienze, Biomedicina e Movimento
Università di Verona

## Posizioni accademiche precedenti

2017-2019
Ricercatore a tempo determinato Senior
Dipartimento di Neuroscienze, Biomedicina e Movimento
Università di Verona

2016
Tenure-track Assistant Professor
Department of Rehabilitation Sciences
University of Harford, CT, USA

2010 - 2016
Postdoctoral Research Associate
Department of Biomedical Engineering
University of Southern California, CA, USA
Mentor: Prof. Terence D. Sanger

## Incarichi come visiting scholar

2023 (Settembre - Novembre)
Visiting Professor
Department of Kinesiology
Pennsylvania State University, PA, USA

2018 (Febbraio - Maggio)
Visiting Professor
Pediatric Muscle Physiology Lab
Shirley Ryan AbilityLab, IL, USA

2017 (Marzo - Maggio)
Visiting Professor
Department of Rehabilitation Sciences
University of Harford, CT, USA

## Aree di Ricerca

Controllo motorio, apprendimento motorio, biomeccanica, fatica, controllo posturale, locomozione, neuroriabilitazione, decision-making.

## Pubblicazioni

Peer-Reviewed Journal Articles

1. Picelli A, Filippetti M, Pontillo A, Dimitrova E, Valè N, Di Censo R, Smania N, **Bertucco M**. Changes in tibialis anterior muscle activity following tibial nerve block in adults with spastic equinovarus foot: an observational pilot study. Journal of Rehabilitation Medicine. 2025. Dec 1, 57.
2. Nardon M, Piscitelli F, Alessandro C, Tam E, **Bertucco M**. Effects of localized and general fatigue on postural adjustments coupling during predictable external perturbations. Eur J Appl Physiol. 2025; 125(9), 2539–2561.
3. Sinha O, Muttee AP, Wu, JH, **Bertucco M**, Kurtzer I, Singh T. Smooth pursuit eye movements contribute to long-latency reflex modulation in the lower extremity. J Neurophysiol. 2025; 134(3), 998–1006.
4. Tam E, **Bertucco M**, Capelli C. The slow component of oxygen uptake of insulated muscular groups measured with NIRS during intermittent isometric contractions in humans. Physiol Rep. 2025; 13(15), e70491.
5. Nardon M, Sinha O, Kpankpa J, Albenze E, Bonnet C, **Bertucco M***, Singh T*. Prioritized adjustments in posture stabilization and adaptive reaching during neuromuscular fatigue of lower-limb muscles. J Apple Physiol. 2024; 137, 629:645. *Equal contribution.
6. Sinha O, Rosenquist T, Fedorshak A, Kpankpa J, Albenze E, Bonnet C, **Bertucco M**, Kurtzer I, Singh T. Predictive posture stabilization before contact with moving objects: equivalence of smooth pursuit tracking and peripheral vision. J Neurophysiol. 2024; 132, 695:709.
7. Monte A, Benamati A, Pavan A, d'Avella A, **Bertucco M**. Muscle synergies for multidirectional isometric force generation during maintenance of upright standing posture. Exp Brain Res, 2024; 242(8), 1881-1902.
8. Boldo M, Di Marco R, Martini E, Nardon M, **Bertucco M**, Bombieri N. On the reliability of single-camera markerless systems for overground gait monitoring. Comput Biol Med. 2024; 6:171:108101.

9. Piras A, **Bertucco M**, Del Santo F, Meoni A, Raffi M. Postural stability assessment in expert versus amateur basketball players during optic flow stimulation. J Electromyogr Kinesiol. 2024; 74, 102855.
10. Pascucci F, Cesari P, **Bertucco M**, Latash ML. Postural adjustments to self-triggered perturbations under conditions of changes in body orientation. Exp Brain Res. 2023; 241(8), 2163–2177.
11. Tam E, Nardon M, **Bertucco M**, Capelli C. The mechanisms underpinning the slow component of VO2 in humans. Eur J Appl Physiol. 2024; 124(3): 861-872.
12. Martini E, Boldo M, Aldegheri S, De Marchi M, Vale N, Filippetti M, Smania N, **Bertucco M,** Picelli A, Bombieri N. Real-time Human Pose Estimation at the Edge for Gait Analysis at a Distance. In: 2022 18th International Conference on Distributed Computing in Sensor Systems (DCOSS), pp 45–48.
13. Martini E, Boldo M, Aldegheri S, Vale N, Filippetti M, Smania N, **Bertucco M**, Picelli A, Bombieri N. Preserving Data Privacy and Accuracy of Human Pose Estimation Software Based on CNN s for Remote Gait Analysis. In: 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), pp 3468–3471.
14. Nardon M, Venturelli M, Ruzzante F, Longo V, **Bertucco M**. Response to: Dealing with menstrual cycle in sport: stop finding excuses to exclude women from research. Eur J Appl Physiol. 2022; 122:2491–2492.
15. **Bertucco M**, Nardon M, Mueske N, Sandhu S, Rethlefsen SA, Wren TAL, Sanger TD. The Effects of Prolonged Vibrotactile EMG-Based Biofeedback on Ankle Joint Range of Motion During Gait in Children with Spastic Cerebral Palsy: A Case Series. Phys Occup Ther Pediatr, 2023; 43(3): 351-366.
16. Martini E, Boldo M, Aldegheri S, Valè N, Filippetti M, Smania N, **Bertucco M**, Picelli A, Bombieri N. Enabling Gait Analysis in the Telemedicine Practice through Portable and Accurate 3D Human Pose Estimation. Comput Methods Programs Biomed. 2022; 225:107016.
17. Nardon M, Pascucci F, Cesari P, **Bertucco M**, Latash ML. Synergies Stabilizing Vertical Posture in Spaces of Control Variables. Neuroscience. 2022; 500:79–94.
18. Cesari P, Piscitelli F, Pascucci F, **Bertucco M**. Postural Threat Influences the Coupling Between Anticipatory and Compensatory Postural Adjustments in Response to an External Perturbation. Neuroscience. 2022; 490:25–35.
19. Zandonai T*, **Bertucco M***, Graziani N, Montani V, Cesari P (2022) Transcranial direct current stimulation (tDCS) modulates motor execution in a limb reaching task. Eur J Neurosci. 2022; 56:4445–4454. *Equal contribution.
20. Nardon M, Venturelli M, Ruzzante F, Longo VD, **Bertucco M**. Fasting-Mimicking-Diet does not reduce skeletal muscle function in healthy young adults: a randomized control trial. Eur J Appl Physiol. 2022; 122(3): 651-661.
21. Nardon M, Ruzzante F, O'Donnell L, Adami A, Dayanidhi S, **Bertucco M**. Energetics of walking in individuals with cerebral palsy and typical development, across severity and age: A systematic review and meta-analysis. Gait & Posture. 2021; 90:388–407.
22. Monte A*, **Bertucco M***, Magris R, Zamparo P. Muscle Belly Gearing Positively Affects the Force–Velocity and Power–Velocity Relationships During Explosive Dynamic Contractions. Front Physiol. 2021;12:683931. *Equal contribution
23. Nardello F, **Bertucco M**, Cesari P. Anticipatory and pre-planned actions: A comparison between young soccer players and swimmers. PLoS One. 2021;16(4):e0249635.
24. Borish CN*, **Bertucco M***, Berger DJ, D'Avella A, Sanger TD. Can spatial filtering separate voluntary and involuntary components in children with dyskinetic cerebral palsy? PLoS One. 2021;16(4):e0250001. *Equal contribution
25. **Bertucco M**, Nardello F, Magris R, Cesari P, Latash ML. Postural Adjustments during Interactions with an Active Partner. Neuroscience. 2021;463:14-29.

26. Nardello N, Bertoli E, Bombieri F, **Bertucco M**, Monte A. The Effect of a Secondary Task on Kinematics during Turning in Parkinson's Disease with Mild to Moderate Impairment, Symmetry (Basel). 2020; 12: 1284.
27. **Bertucco M**, Dunning A, Sanger TD. Tuning of Standing Postural Responses to Instability and Cost Function. Neuroscience. 2020; 428; 100–110.
28. Borish CN, **Bertucco M**, Sanger TD. Effect of target distance on controllability for myocontrol. Int. J. Hum. Comput. Stud. 140 (2020) 102432.
29. **Bertucco M**, Lunardini F, Nardon M, Casellato C, Pedrocchi A, Sanger TD. Vibro-tactile EMG-based biofeedback induces changes of muscle activity patterns in childhood dystonia. 9th Int. IEEE/EMBS Conf. Neural Eng., IEEE, 2019: 53–56.
30. **Bertucco M**, Sanger TD. A model to estimate the optimal layout for assistive communication touchscreen devices in children with dyskinetic cerebral palsy. IEEE Trans Neural Syst Rehabil Eng. 2018; 26(7):1371-1380.
31. Borish CN, Feinman A, **Bertucco M**, Ramsy NG, Sanger TD. Comparison of speed-accuracy tradeoff between linear and non-linear filtering algorithms for myocontrol. J Neurophysiol. 2018; 119(6): 2030-2035.
32. Veneri D, Gannotti M, **Bertucco M**, Fournier Hillman SE. Using the ICF model to gain perspective of the benefits of yoga in stroke, MS and children to inform practice for children with CP: A meta-analysis". J Alternat Compl Med. 2018; 24(5): 439:457.
33. Lunardini F, Casellato C, **Bertucco M**, Sanger TD, and Pedrocchi A. Children With and Without Dystonia Share Common Muscle Synergies While Performing Writing Tasks. Ann Biomed Eng. 2017; 45(8):1949-1962.
34. Liyanagamage SA, **Bertucco M**, Bhanpuri NH, Sanger TD. Scaled vibratory feedback can bias muscle use in children with dystonia without changing overall performance in a redundant one-dimensional myocontrol task. J Child Neurol. 2017;32:161-169
35. Lunardini F, Casellato C, **Bertucco M**, Sanger TD, Pedrocchi A. Muscle synergies in children with dystonia capture healthy patterns regardless the altered motor performance. Conf Proc IEEE Eng Med Biol Soc 2015. 2015; 2099-2102.
36. **Bertucco M**, Bhanpuri NH, Sanger TD. Perceived Cost and Intrinsic Motor Variability Modulate the Speed-Accuracy Trade-Off. PLoS One. 2015;10(10): e0139988.
37. Lunardini F, Maggioni S, Casellato C, **Bertucco M**, Pedrocchi A, Sanger TD. Increased task-irrelevant components of muscle activity in childhood dystonia. J Neuroeng Rehabil. 2015; 12: 52.
38. Lunardini F, **Bertucco M**, Casellato C, Bhanpuri NH, Pedrocchi A, Sanger TD. Speed-accuracy trade-off in a trajectory-constrained self-feeding task: a quantitative index of unsuppressed motor noise in children with dystonia. J Child Neurol. 2015;30(12):1676-85.
39. Dunning A, Ghoreyshi A, **Bertucco M**, Sanger TD. The Tuning of Human Motor Response to Risk in a Dynamic Environment Task. PLoS One. 2015;10(4):e0125461.
40. Bhanpuri NH, **Bertucco M**, Young SJ, Lee A, Sanger TD. Multiday transcranial direct current stimulation causes clinically insignificant changes in childhood dystonia: A pilot study. J Child Neurol. 2015; 30(12): 1604-15.
41. **Bertucco M**, Sanger TD. Current and emerging strategies for childhood dystonia. Journal of Hand Therapy. 2015; 28(2):185-93.
42. **Bertucco M**, Dayanidhi S. Can the period of postnatal co-development of the rubrospinal and corticospinal systems provide new insights into refinement of limb movement? J Neurophysiol. 2015; 113: 681–683.
43. Bhanpuri NH*, **Bertucco M***, Ferman D, Young SJ, Liker MA, Krieger MD, Sanger TD. Deep brain stimulation evoked potentials may relate to clinical benefit in childhood dystonia. Brain Stimulation. *Equal contribution. Brain Stimul. 2014; 7(5): 718-726.
44. Milanese C, **Bertucco M**, Zancanaro C. The effects of three different rear knee angles on kinematics and kinetics in sprint start. Biology of Sport. 2014; 31: 209-215.

45. Casellato C, Maggioni S, Lunardini F, **Bertucco M**, Pedrocchi A, Sanger TD. Dystonia: Altered Sensorimotor Control and Vibro-tactile EMG-Based Biofeedback Effects. XIII Mediterranean Conference on Medical and Biological Engineering and Computing 2013. IFMBE Proceedings. 2014; 41: 1742-1746.
46. Young SJ, **Bertucco M**, Sanger TD. Cathodal transcranial direct current stimulation in children with dystonia: a sham-controlled study. J Child Neurol. 2014; 29(2): 232-239.
47. **Bertucco M**, Sanger TD. Speed-accuracy testing on the Apple iPad® provides a quantitative test of upper extremity motor performance in children with dystonia. J Child Neurol. 2014; 29:1460-1466.
48. **Bertucco M**, Cesari P, Latash ML. Fitts' Law in early postural adjustments. Neuroscience. 2013; 213: 61-69.
49. Young SJ, **Bertucco M**, Sheehan-Stross R, Sanger TD. Cathodal transcranial direct current stimulation in children with dystonia: a pilot open-label trial. J Child Neurol. 2013; 28(10): 1238-1234.
50. **Bertucco M**, Cesari P. Does movement planning follow Fitts' law? Scaling anticipatory postural adjustments with movement speed and accuracy. Neuroscience. 2010; 171(1): 205-213.
51. Milanese C, Bortolami O, **Bertucco M**, Verlato G, Zancanaro C. Anthropometry and motor fitness in children aged 6-12 years. Journal of Human Sport and Exercise. 2010; 5(2) 265-279.
52. **Bertucco M**, Cesari P. Dimensional analysis and ground reaction forces for stair climbing: effects of age and task difficulty. Gait and Posture. 2009; 29(2): 326-331.
53. Cesari P, **Bertucco M**. Coupling between punch efficacy and body stability for elite karate. Journal of Science and Medicine in Sport. 2008; 11(3): 353-356.

PubMed; Google Scholar; ResearchGate

## Didattica

“Biomechanics and motor control”, Laurea Magistrale in scienze motorie preventive ed adattate (2017-2025)

“Apprendimento delle abilità motorie nello sport” (all’interno dell’insegnamento di Programmazione e conduzione dell’allenamento), Laurea Magistrale scienze dello sport e della prestazione fisica (2016-2025)

“Attività motoria in età evolutiva”, Laurea in Scienze delle attività motorie e sportive (2019-presente)

“Controllo e apprendimento motorio”, Laurea in Scienze delle attività motorie e sportive (2021-presente)

“Controllo e apprendimento motorio”, Corso di Laurea in Scienze Motorie, Sport e Benessere, interateneo con l’università di Trento (2025-presente)

“Movimento umano e pratica sportiva: basi e applicazioni” (all’interno dell’insegnamento di Fondamenti di attività motoria e sportiva”), Laurea Magistrale in Management delle attività sportive innovative e sostenibili (2023-presente)

“Computational mechanisms underlying sensorimotor learning”
Ph.D. program in Neuroscience, Psychological and Psychiatric Sciences, and Movement Sciences (2022-2025)

“Muscle fatigue and intense exercise effects on motor control and learning”
Ph.D. program in Neuroscience, Psychological and Psychiatric Sciences, and Movement Sciences (2023-2024)

“Muscle fatigue and intense exercise effects on motor control and learning”
National PhD program in Kinesiology and Sport Sciences (2023-2024)

“Principi di apprendimento motorio e analisi del movimento”
Scuola di specializzazione in Medicina dello Sport e dell'Esercizio Fisico (2022-2024)

## Didattica alla University of Hartford

“Biomechanics”
Doctor of Physical Therapy (DPT) program (Fall 2016)

## Didattica alla University of Southern California

Lezioni ad invito per l’insegnamento 'Introduction to Biomimetic Neural Engineering' (BME452), Bachelor of Science in Biomedical Engineering:

- Ottobre 19, 2011: The electrophysiology and information theory in clinical childhood movement disorders.
- Settembre 12, 2012: What does engineering have to do with childhood movement disorders?
- Ottobre 30, 2013: What does biomedical engineering have to do with childhood movement disorders?

## Incarichi istituzionali

2025-presente
Coordinatore del Gruppo di Studio in “Biomeccanica, Controllo e Apprendimento Motorio, Società Italiana di Scienze Motorie e Sportive.

2022-presente
Coordinatore del corso di Laurea Magistrale in scienze motorie preventive, Università di Verona.

2022- presente
Membro Commissione Didattica per i corsi di laurea Magistrale in scienze motorie preventive e laurea in Scienze delle attività motorie e sportive, Università di Verona

2022-presente
Membro Commissione AQ per i corsi di laurea Magistrale in scienze motorie preventive e laurea in Scienze delle attività motorie e sportive, Università di Verona

2017-2020
Membro Commissione Tirocini e Carriere per i corsi di laurea Magistrale in scienze motorie preventive e laurea in Scienze delle attività motorie e sportive, Università di Verona

2017-2021
Coordinatore saperi minimi di Fisca e Matematica per il corso di laurea in Scienze delle attività motorie e sportive, Università di Verona.

## Finanziamenti

2023-2025
Co-Principal Investigator, “Multiscale Analysis of Human and Artificial Trajectories: Models and Applications”.
PRIN 2022
€ 280798 (€ 68,010.00 Università di Verona, Bertucco)

2020-2021
Principal Investigator, “Neural and metabolic mechanisms of muscle fatigue in subjects with cerebral palsy”.
Glia Neuroscience Onlus.
€ 4000

2018-2019
Principal Investigator, “A top-down approach to study the supraspinal and metabolic factors of muscle fatigue in children and adolescents with cerebral palsy”.
Brain Research Foundation Verona and Banca Intesa Sanpaolo.
€ 12000

2017-2018
Principal Investigator, “Effects of the fasting mimicking diet on the central and peripheral components of muscle fatigue”.
Create Cures Foundation.
€ 12000

2016
Principal Investigator, “Anticipatory postural adjustments during motor development in children with cerebral palsy”.
Vincent Coffin Grant, University of Hartford, CT, USA.
$ 3000

2014-2015
Co-Principal Investigator, “Augmented sensory feedback to improve selective motor control during gait in children with cerebral palsy”.
California Community Foundation.
$ 50000

2014-2015
Co-Principal Investigator, “Augmented sensory feedback to improve selective motor control during gait in children with cerebral palsy”.
Southern California Clinical and Translational Science Institute. Research Pilot Funding Award.
$ 27000

## Premi

2016 Emerging Researcher Travel Award.
ISAAC (The International Society for Augmentative and Alternative Communication) Conference 2016, Toronto, Canada.
Award CAD $ 1000

2015 USC Postdoc Association travel award.

Participation in the 2015 Annual Meeting of the Society for the Neural Control of Movement, Charleston, SC, USA.
Award $ 3000

2014 ISSNAF (Italian Scientists and Scholars in North America) Awards 2014. Finalist selected.
Project presented: “The Tuning of Human Motor Behavior to Uncertainty and Cost”.

2013 USC Postdoc Association travel award.
Participation in the 2013 Annual Meeting of the Society for the Neural Control of Movement, San Juan, Puerto Rico, USA.
Award $ 3000

2008 Young Researchers Award for Poster Presentation, “The Fitts’ law and the anticipatory of postural adjustment”.
5th Scientific Conference on Kinesiology in Zagreb, Croatia, September 10th- 14th, 2008.
Award € 500

## Seminari ad invito

1. Dipartimento di Neuroscienze. Oftalmologia e Genetica, Università di Genova, Settembre 23, 2025.
2. Dipartimento Scienze Biomediche, Università di Padova, Febbraio 19, 2024.
3. “The Action Club” Department of Kinesiology, The Pennsylvania State University, PA, USA, Febbraio 16, 2024.
4. Department of Kinesiology, University of Rhode Island, RI, USA. Ottobre 26, 2023.
5. Centro Neurolesi Bonino Pulejo Messina, IRCCS, Giugno 26, 2023.
6. Department of Kinesiology, University of Rhode Island, RI, USA, Marzo 5, 2018.
7. Rehabilitation Institute of Chicago (RIC), Chicago, USA, Maggio 16, 2016.
8. Center for Mind/Brain Sciences (CIMeC), Università of Trento, Luglio 29, 2015.
9. Department of Exercise Science, University of South Carolina, Columbia, SC, USA, Aprile 17, 2015.
10. Physical Therapy Program, School of Medicine, Washington University in St. Louis, St. Louis, MO, USA, Febbraio 24, 2015.
11. School of Biological and Health Systems Engineering, Arizona State University, Tempe, AZ, USA, Febbbraio 16, 2015.
12. Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL, USA, Gennaio 22, 2015.
13. Children’s Hospital of Los Angeles, Los Angeles, CA, USA, Agosto 26, 2014.
14. Department of Kinesiology, Michigan State University, East Lansing, USA, Gennaio 15, 2014.
15. Dipartimento di Neuroscienze, Biomedicina e Movimento, Università di Verona, Giugno 5, 2013.
16. Dipartimento di Neuroscienze, Biomedicina e Movimento, Università di Verona, Maggio 15, 2012.
17. Division of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, USA, Febbraio 18, 2011.
18. Facoltà di Scienze Motorie, Università di Verona, Marzo 6, 2010.
19. Rehabilitation Institute of Chicago (RIC), Chicago, USA, Febbraio 13, 2010.

## Esperienza editoriale

Editorial Board

Exercise, Sport, and Movement, American College of Sports Medicine da Giugno 2024

Ad hoc Journal Reviewer

- American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, dal 2024
- Experimental Brain Research, dal 2022
- Gait and Posture, dal 2020
- Human Movement Science, dal 2020
- IEEE Transactions on Neural Systems and Rehabilitation Engineering, dal 2022
- Journal of Child Neurology, dal 2020
- Journal of Motor Behavior, dal 2018
- Journal of NeuroEngineering and Rehabilitation, dal 2024
- Journal of Neurophysiology, dal 2024
- Journal of Sports Sciences, dal 2014
- Neuroscience, dal 2024
- Scientific Reports, dal 2021

## Affiliazioni a società scientifiche

Society for the Neural Control of Movement
Society for Neuroscience
International Society of Motor Control
Società Italiana delle Scienze Motorie e Sportive

## Principali risultati agonistici di karate

2009

1° posto, Campionati Mondiali 2009 WUKO, Guadalajara, Messico, gara individuale.

1° posto, Campionati Mondiali 2009 WUKO, Guadalajara, Messico, gara a squadre.

2007

1° posto, Campionati Mondiali 2007 WUKO, Valencia, Spagna, gara a squadre.

2006

1° posto, Campionati Europei 2006 WUKO, St. Polten, Austria gara a squadre.

3° posto, Campionati Europei 2006 WUKO, St. Polten, Austria gara individuale.

2005

2° posto, Campionato Mondiali 2005 WKC, Fortaleza, Brasile gara individuale.

Più di 100 premi in gare nazionali ed internazionali.

## Attestati e brevetti

- Istruttore di Karate, cintura nera 5$^{th}$ Dan, FESIK (Italian Federation of Sportive Karate)
- Licenza di paracadutista (ENAC)
- Istruttore di nuoto 2° livello, FIN (Federazione Italiana di Nuoto)

- Certificato di Paracadutista Militare, Esercito Italiano

**Personal Interests**

- Sports: karate, skydiving, cycling, running, tennis
- Wilderness: Hiking, Climbing
- Culture: Concerts, Museums, Movies, Reading, Food, Wine and Beer Tasting