

SERGI GARCIA RETORTILLO, PhD, MSc, BSc, PT

Curriculum Vitae



Phone: +34 616 64 02 95

sgarciaretortillo@gmail.com

iD **ORCID:** <https://orcid.org/0000-0002-4867-1589>
R^G **RESEARCHGATE:** https://www.researchgate.net/profile/Sergi_Garcia_Retortillo
T **TWITTER:** @SergiGarciaReto
in **LINKEDIN:** <https://www.linkedin.com/in/sergi-garcia-retortillo/>
g **GOOGLE:** <https://scholar.google.com/citations?user=E59Ae50AAAAJ&hl=en>

1- SHORT BIO

Dr. Sergi Garcia-Retortillo studied Exercise Science and Physical Therapy at the University of Barcelona, where he obtained his master's degree in Physical Activity and Health. In 2016, he received his Ph.D. in Exercise Science. Currently, he serves as Visiting Researcher at the Keck Laboratory for Network Physiology (Department of Physics, Boston University, USA), Assistant Professor of Exercise Physiology at EUSES-University of Girona (Spain), and member of the Complex Systems in Sport Research Group (University of Barcelona, Spain).

*As for his scientific experience, his research program is based on the new emergent field of **Network Physiology of Exercise**, which investigates basic laws of interactions and principles of coordination and integration among diverse physiological systems, and how these interactions change in response to fatigue and training. They have proposed a novel variable, cardiorespiratory coordination, which provides information about the coordinated activity between cardiovascular and respiratory systems during cardiorespiratory exercise testing. Currently, he is working on the analysis of inter-muscular and inter-organ network interactions during exercise. His medium-term aim is to **develop unique fitness assessment systems using novel network-based biomarkers, with the potential to open new and exciting horizons in exercise testing, Exercise Science, Physical Therapy and other Health-related fields**. The most relevant network-based biomarkers of his research agenda are: (i) cardio-respiratory coordination; (ii) inter-muscular coordination; and (iii) cortico-muscular coordination.*

Further, he has worked as an applied strength-conditioning coach and sports physiotherapist during the last 12 years. His experience is mainly focused on the Fitness and Wellness Industry. He trained and treated a wide range of athletes and patients — from high-risk individuals (neuromuscular disorders, autoimmune diseases ...) to athletes (motor, combat sports ...).

2- UNIVERSITY EDUCATION

- PhD in Exercise Science (INEFC – University of Barcelona, 2016).
- Master's in Physical Exercise and Health (INEFC, 2012-2013).
- Postgraduate in Integrative Training (INEFC, 2012-2013).
- Degree in Exercise Science (INEFC – University of Barcelona, 2008-2012).
- Diploma in Physiotherapy (Ramón Llull University, 2007-2010).
- Diploma in Teaching in Physical Education (University of Barcelona, 2004-2007).

3- RESEARCH CERTIFICATES

- Merits in research: positive evaluation in the first 6-years period of research (AQU certificate, 2019).
- Tenure-eligible lecturer (AQU certificate, 2018).

4- PUBLICATIONS

- **Garcia-Retortillo, S.** & Ivanov, P.C. (2022). Inter-muscular networks of synchronous muscle fiber activation. (*Submitted*).
- Balagué, N., Hristovski, R., **Garcia-Retortillo, S.**, Almarcha, M.C., & Ivanov, P.Ch. (2022). Network Physiology of Exercise: Beyond molecular and omics perspectives in Exercise Physiology. *Sports Medicine-Open* (*Accepted*).
- Rizzo, R., **Garcia-Retortillo, S.**, & Ivanov, P. C. (2022). Dynamic networks of physiologic interactions of brain waves and rhythms in muscle activity. *Human Movement Sciences*, 84: 102971.
- Papadakis, Z., **Garcia-Retortillo, S.**, Koutakis, P. (2022). Effects of acute partial sleep deprivation and high-intensity interval exercise on postprandial network interactions. *Frontiers in Network Physiology*, 2: 869787.
- **Garcia-Retortillo, S.**, Rizzo, R., & Ivanov, P.C. (2021). Spectral dynamics of muscle fiber activation in response to exercise and acute fatigue. *IEEE EMBS International Conference of Biomedical and Health Informatics (BHI)*, 1-4. doi: 10.1109/BHI50953.2021.9508556.
- Oviedo, G., **Garcia-Retortillo, S***, Carbó-Carreté, M., Guerra-Balic, M., Balagué, N., Javierre, C. & Guardia, J. (2021). Cardiorespiratory coordination during exercise in Down Syndrome. *Frontiers in Physiology*, 12:704062. doi: 10.3389/fphys.2021.704062
***Corresponding author and co-first author.**
- Balagué, N., Hristovski, R., Almarcha, M., **Garcia-Retortillo, S.**, & Ivanov, P.C. (2020). Network Physiology of Exercise: Vision and Perspectives. *Frontiers in Physiology*. doi: 10.3389/fphys.2020.611550

- **Garcia-Retortillo, S.**, Rizzo, R., Wang, J., Sitges, C., & Ivanov, P.C. (2020). Universal spectral profile and dynamic evolution of muscle activation: a hallmark of muscle type and physiological state. *Journal of Applied Physiology*, 129(1). doi:10.1152/jappphysiol.00385.2020

 - Zebrowska, M., **Garcia-Retortillo, S.**, Sikorski, K., Balagué, N., Hristovski, R., Javierre, C., & Petelzik, M. (2020). Decreased coupling among respiratory variables with effort accumulation. *Europhysics Letters.*, 132:28001. doi: 10.1209/0295-5075/132/28001

 - Prats-Puig, A., **Garcia-Retortillo, S.**, Puig-Parnau, M., Vasileva, F., Font-Lladó, R., Xargay-Torrent, S., Carreras-Badosa G., Mas-Parés, B., Bassols, J., & López-Bermejo, A. (2020). DNA methylation reorganization of skeletal muscle-specific genes in response to gestations obesity. *Frontiers in Physiology*, 11:938. doi: 10.3389/fphys.2020.00938
- *Co-first author**
- **Garcia-Retortillo, S.**, Gacto, M., O’Leary, T., Noon, M., Hristovski, R., Balagué., N., & Morris, M. Cardiorespiratory coordination reveals training-specific physiological adaptations. *European Journal of Applied Physiology*, 119, 1701-1709. doi: 10.1007/s00421-019-04160-3

 - **Garcia-Retortillo, S.**, Javierre, C., Hristovski, R., Ventura, J.L., & Balagué, N. A novel approach for cardiorespiratory testing evaluation. *Physiological Measurement*. doi: 10.1088/1361-6579/ab2ca0.

 - Esquiús, L., **Garcia-Retortillo***, S., Balagué, N., Hristovski, R., & Javierre, C. Physiological and performance-related effects of acute olive oil supplementation on moderate exercise intensity. *Journal of International Society of Sports Nutrition*, 16. Doi: 10.1186/s12970-019-0279-6 (cardiorespiratory coordination) ***Corresponding author and co-first author.**

 - **Garcia-Retortillo, S.**, Javierre, C., Hristovski, R., Ventura, J.L., & Balagué, N. Cardiorespiratory coordination in repeated maximal exercise (2017). *Frontiers in Physiology-Exercise Physiology*, 8. doi: 10.3389/fphys.2017.00387

 - Slapšinskaitė, A., **Garcia-Retortillo***, S., Razon, R., Balagué, N., Hristovski, R., & Tenenbaum, G (2016). Cycling outdoors improves the adherence to dissociative focus and endurance. *Psychology of Sport and Exercise*, 27, 78-84. ***Corresponding author**

 - **Garcia, S.**, Slapsinskaite, A., Vázquez, P., Balagué, N., Hristovski, R., Razon, S., & Tenenbaum, G. (2015). Thoughts emerge from task, personal, and environmental constraints during exercise. *Short paper – European Congress of Complex Systems*.

 - Balagué, N., Hristovski, R., **García, S.**, Aguirre, C., Razon, S., & Tenenbaum, G. (2015). Dynamics of perceived exertion in constant power cycling: time and workload-dependent thresholds. *Research Quarterly for Exercise and Sport*, 86, 371-378. doi:10.1080/02701367.2015.1078870

- **García, S.**, Razon, R., Hristovski, R., Balagué, N., & Tenenbaum, G. (2015). Task-related thought contents dynamics during incremental exercise in trained runners. *The Sport Psychologist*. 29, 302–309. doi:10.1123/tsp.2014-0094

- Balagué, N., Hristovski, R., Aragonés, D., **García, S.**, Razon, S., & Tenenbaum, G. (2014). Intentional thought dynamics during exercise until volitional exhaustion. *The Journal of Sport Sciences*, 33, 48-57 doi: 10.1080/02640414.2014.92183

- Balagué, N., Aragonés, D., Hristovski, R., **García, S.**, & Tenenbaum, G. (2014). Attention focus emerges spontaneously during progressive and maximal exercise. *Revista de Psicología del Deporte*, 1, 57-63

Books

- Balagué, N., Hristovski, R., **García-Retortillo, S.**, & Ivanov, P.C. (2022-expected). From Exercise Physiology to Network Physiology of Exercise. In R. Ferraz, D. Almeida & H.P. Neiva (Eds.), *Exercise Physiology* (1st ed.) (*Accepted*).

- Balagué, N., Hristovski, R., & **García-Retortillo, S.** (2019). Perceived exertion – Dynamic psychobiological model of exercise-induced fatigue. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of Sport Psychology* (4th ed.). New York, NY: Wiley.

5- FUNDING AND GRANTS

Title: The Effects of 12-weeks of Training on Fitness Parameters and Functional Diversity without Caloric Restriction in Apparently Healthy Adults. A randomized control trial.

- Funder: Tonal Strength Institute (TSI).

- Amount: 50,000 \$.

- Period: 2023.

- PI: Zacharias Papadakis; Co-PIs: Sergi Garcia Retortillo, Natàlia Balagué, Plamen Ivanov.

- Status: Pending.

Title: Network Physiology of Exercise. New horizons in fitness and performance assessment

- Funder: Agencia Estatal de Investigación de Proyectos de Generación del Conocimiento. Gobierno de España (Spanish Government).

- Amount: 100,000 eur.

- Period: 2022-2025

- PI: Prof. Natalia Balague and Dr. Sergi Garcia Retortillo.

- Status: Pending.

Title: Atlas of Dynamic Interactions among Organ Systems.

- Funder: W.M. Keck Foundation.

- Amount: 1,000,000 \$.

- Period: 2016-2021.

- PI: Prof. Plamen Ch. Ivanov.

Title: Training and Functional Evaluation: K-Load System.

- Funder: Runner's Care.
- Amount: 3,000 eur.
- Period: 2016.
- PI: Prof. Natàlia Balagué.

Title: Psycho-physiological integration and exercise-induced fatigue.

- Funder: University of Barcelona (2016-PARINEFC-0022).
- Amount: 2,500 eur.
- Period: 2012-2016.
- PI: Prof. Natàlia Balagué.

6- RESEARCH STAYS

- (February 2021 - September 2021):
Keck Laboratory for Network Physiology. Department of Physics, Boston University (USA).
- (April-May 2019):
Keck Laboratory for Network Physiology. Department of Physics, Boston University (USA).
- (May 2018):
Faculty of Physical Education, Sport and Health, Ss Cyril and Methodius University of Skopje (Rep. Macedonia).

7- EMPLOYMENT HISTORY – ACADEMIA (*Part-time appointments*)

- (April 2019-**present**)

Visiting Researcher — Keck Laboratory for Network Physiology, Physics Department (Boston University, Boston, USA).

- (January 2022- May 2022)

Adjunct Instructor – Exercise Science Program, School of Health Science (Lasell University, Newton, USA).

Courses: Exercise Science Capstone Research Course (EXSC 430).

- (October 2020-November 2021)

Assistant Professor – Master’s Physiotherapy Applied to Team Sports (F.C. Barcelona Innovation Hub Universitas & Blanquerna-Ramón Llull University), Spain.

Courses: **Exercise Physiology - Strength Training.**

- (January 2020-January 2022)

Assistant Professor – Master’s in Pediatric Physiotherapy (International University of Catalonia, Spain).

Courses: **Therapeutic Intervention- Exercise Prescription, Final Project mentoring** (total: 2 graduate students).

- (October 2017-November 2021)

Assistant Professor – Master’s Physical Activity and Health (INEFC – University of Barcelona, Spain).

Courses: **Advanced Exercise Physiology, Final Project mentoring** (total: 3 graduate students).

8- EMPLOYMENT HISTORY – ACADEMIA (Full-time appointment)

- (July 2022 – Present)

Assistant Teaching Professor. Department of Health and Exercise Science, Wake Forest University (Winston-Salem, NC, USA).

Courses: HES 150 Introduction to Health and Exercise Science, HES 350L Human Physiology Labs, and HES 353 Physiology of Exercise.

- (February 2016 - January 2022)

Assistant Professor and Coordinator —EUSES (University of Girona, Spain)

(8.1.) Coordinator for International Relations (2018-July 2022)

Main tasks:

- Consolidation and creation of new Academic Agreements:
 - Coventry University (UK).
 - West Chester University (USA).
- Study abroad trips/programs:
 - Coventry University (UK): International Exchange seminar: Girona 2017, Girona 2018, Coventry 2019.
 - West Chester University (USA): Study abroad March 2020 (cancelled COVID).
 - Slippery Rock University (USA): Internship-Study program 2019.
 - James Cook University (Australia): Internship program 2017, 2018, 2019.
- Student exchange programs: Erasmus+, Erasmus+ for Traineeships, Prometeu, Sicue.
- Management of Students Excellence Grants.

(8.2.) Coordinator Double Degree Sports Science + Physical Therapy (2017-2020)

Main tasks:

- Mentorship and academic coaching.
- Organization of “General Education” courses for undergraduate students: Microsoft Office, Writing, Leadership, Self-management, Job search.
- Community service — Salt (Spain): Social Work and Diversity Volunteer Programs.
- Faculty search committee.
- Tutoring for elite athletes.
- Curriculum development.
- Student with special education needs.
- Devising strategies for growing and improving the program.
- Engage in professional development.
- Internship coordination
- Other Service activities.

(8.3.) Assistant Professor –Exercise Science Program (2016-July 2022)

Courses: **Exercise Physiology, Strength & Conditioning, Training Methodology, Fitness Assessment,** Biomechanics, Exercise Prescription, Recovery Methods, First Aids, **Final Project mentoring** (total: 20 undergraduate students).

(8.4.) Assistant Professor – Physical Therapy Program (2016-July 2022)

Courses: Sports Physiotherapy, **Therapeutic Exercise,** Sports Therapy, Basics of Physiotherapy, **Final Project mentoring** (total: 7 undergraduate students).

9- EDITORIAL/REVIEWER

- Associate Guest Editor – Frontiers in Network Physiology: "Understanding Exercise, Fitness and Health through Dynamic Networks of Physiologic Systems Interactions".
- Associate Guest Editor – International Journal of Environmental Research and Public Health. Special Issue: "Tissue Crosstalk Adaptations to Physical Exercise".
- Associate Guest Editor — Frontiers in Aging Neuroscience: "Lifestyle and Self-management of Chronic Pain across the Lifespan".
- Reviewer and assistant of the Specialty Chief Editor for the journal:
 - o Frontiers in Network Physiology – Section Network Physiology of Exercise.
- Member of the Review Editorial Board for the journals:
 - o Frontiers in Physiology – Section Fractal and Network Physiology.
 - o *Isokinetics and Exercise Science*.
- Guest Reviewer for the journals:
 - o Sports Medicine Open.
 - o Frontiers in Physiology.
 - o New Journal of Physics.
- Organizing Committee: *V Catalan Research Conference in Exercise and Sport 2018* and 2020.
- Abstract Reviewer: *International Congress of Complex Systems in Sport 2017: Linking theory and practice*.
- Member: American Physiological Society.

10- INVITED TALKS

- (April 2022):
Greater New York ACSM Chapter – *Applied Technology in Fitness and Health*.
Network Physiology of Exercise: novel computational tool to assess fitness and performance. New York (USA). 9th April 2022.
Judge for GNYACSM Abstract Research Competition

- (November 2021):
Institute for Sport and Physical Activity Research (ISPAR) – Seminar Series 2021.
Network Physiology of Exercise: how organ systems interact. New horizons in fitness and performance assessment. University of Bedfordshire. Luton (United Kingdom). 24th November 2021.

- (April 2021):
Càtedra d'Esport – Centre d'Estudis Olímpics, Universitat de Girona.
Network Physiology of Exercise: ¿Cómo se comunican nuestros órganos?
Nuevos horizontes en la valoración de la condición física — 21st April 2021.

- (December 2020):
6th Exercise for Health and Rehabilitation Conference. Network Physiology of Exercise. Kaunas (Lithuania) – 2nd May December 2020.

- (May 2020):
May 4-Physiotherapy Experience. Fatigue-related effects on inter-muscular connectivity. Kaunas (Lithuania) – 4th May 2020

- (May 2019):
Cardiorespiratory coordination: A novel variable for testing training and fatigue effects. West Chester University. West Chester (Philadelphia, USA) – 21st May 2019

11- CONFERENCES

Organization

- 7th International Congress of Complex Systems in Sport. ***Scientific President***. Madrid (Spain), September 2022.

- 3rd International Summer Institute on Network Physiology. ***Organizing Committee and Speaker***. Como Lake (Italy), 24th – 29th July 2022.

- 6th International Congress of Complex Systems in Sport: Moving boundaries in Sport Science. ***Chair and organizer of the Exercise Physiology Symposium***. Mainz (Germany), 15th-17th September 2021.

Abstracts

- (May 2022):
2022 ACSM Annual Meeting and World Congresses. Cardiorespiratory coordination among intermediate and novice female collegiate rowers. San Diego, CA (USA) —31st May-4th July 2022.
- (May 2022):
2022 ACSM Annual Meeting and World Congresses. Effects of acute partial sleep deprivation and HIIT on physiological network interactions. San Diego, CA (USA) —31st May-4th July 2022.
- (September 2021):
6th International Conference of Complex Systems in Sport. Network Physiology of Exercise: Bridging the gap. – Mainz, Germany. 17th -20th September 2021.
- (July 2021):
Online. *BHI Biomedical and Health Informatics*. Profiles of muscle fiber activation in response to exercise and fatigue — 27th-30th July 2021.
- (July 2021)
Online. *BHI Biomedical and Health Informatics*. Dynamic networks of physiologic interactions of brain waves and rhythms in muscle activity — 27th-30th July 2021.
- (June 2021):
Seminar Complex Systems in Sport Research Group. Network Physiology of Exercise. Binaced (Spain) — 19th June 2020.
- (November 2020):
Online. *Integrative Exercise Physiology*. American Physiological Society. 9th – 13th November 2020
- (July 2019):
2nd International Summer Institute on Network Physiology. Cardiorespiratory coordination: A novel variable for testing training and fatigue effects. Lake Como School of Advanced Studies (Italy). 28th July – 5th August 2019.
AWARD: 3rd Best Poster – Publication Europhysics Letters.
- (January 2019):
V International JAM Sports Conference. Physiological- and performance-related effects of acute olive oil supplementation at moderate exercise intensity. Valencia (Spain). 25-26th January 2019.

- (October 2018):
II Jornada Catalana de recerca. Cardiorespiratory coordination reveals specific endurance effects after high-intensity interval training. INEFC-Barcelona (Spain). 21st October 2018.

- (May 2018):
 Workshop Internacional Dones i Esport. Dynamic approaches reduce gender segregation in sports sciences. INEFC-Barcelona (Spain).

- (October 2017):
International Congress of Complex Systems in Sport. Cardiorespiratory coordination: a new variable for testing training and fatigue effects. Camp Nou – Barcelona (Spain). 5-6h October 2017.

- (May 2016):
V Jornada Complexitat.cat - Unifying Science, INEFC Barcelona (Spain), 19th May 2016.

- (August 2015):
 Abstract - Balagué, N., Vázquez, P., García, S., Slapsinskaite, A., Aragonés, D., & Hrstovski, R. Exercising until exhaustion: dynamic integration of brain, muscle, and cardiorespiratory functions. *Meeting of Federation of European Physiological Societies (FEPS) and the Baltic Physiological Societies. Kaunas (Luthenia), 26-29th August 2015.*

- (May 2015):
 Abstract - Garcia, S., Slapšinskaitė, A., Vazquez, P., Hristovski, R., Balagué N. (2015). Thought Dynamics during exhausting exercise. *IV Jornada Complexitat.cat. Tarragona (Spain), 25th May 2015*

- (March 2015):
 Conference presentation - Control de l'entrenament basat en la percepció de l'esforç i del focus d'atenció. *V Seminari del Grup de Recerca Complex Systems in Sport, Menorca (Spain), 27th March 2015.*

- (January 2015):
 Conference presentation - Estratègies cognitives a l'esport de resistència – Control i valoració de l'entrenament. *II Seminari del Grup de Recerca Complex Systems in Sport, Barcelona (Spain), 30th January 2015.*

- (July 2014):
 Abstract - García, S., López, A., Domènec, M., Hernández, G., Fernández, M., Balagué, N., Hristovski, R., Tenenbaum, G. Associative thought contents dynamics during exercise in trained runners. *19th Annual Congress of the ECSS, Amsterdam (Holland), 1-5th July 2014.*

- (June 2014):
Abstract - Balagué, N., Hristovski, R., Aragonés, D., García, S., Slapsinskaite, A., Pol, R., Vázquez, P. Psychobiology of Endurance. A Nonlinear Dynamic Approach. *III Jornada Complexitat.cat*, Barcelona (Spain), 19th June 2014.
- (June 2013):
Abstract - García, S., Montesinos, E., Anguita, A., Morales, J., Hristovski, R., Balagué, N. Task-related thoughts emerge spontaneously during progressive maximum exercise. *18th Annual Congress of the ECSS*, Barcelona (Spain), 26-29th July 2013.
- (July 2012):
Abstract - Balagué, N.; Aragonés, D.; Hristovski, R.; Tenenbaum, G.; Garcia, S. (2012). Rate of perceived exertion changes non-monotonically in constant-power exercise until exhaustion. *17th Annual Congress of the ECSS*, Bruges, 4-7th July 2012.
- (July 2011):
Abstract - Balagué, N.; Aragonés, D.; Pol, R.; García, S.; Cruz, D.; Marín, A.; Díez, M.; Hristovski, R. (2011). Fluctuating dynamics of perceived effort in continuous exercise performed until exhaustion. *16th Annual Congress of the ECSS*, Liverpool, 6-9th July 2011.
- (June 2011):
Aragonés, D.; García, S.; Pol, R.; Balagué, N. (2011). Parámetros coordinativos para el control del entrenamiento. La percepción subjetiva del esfuerzo. *1er Congrés de futbol RCD Espanyol – INEFC*, Barcelona, 3-4th July 2011.

12-PhD STUDENTS

- Effects of crawling before walking on physiologic network interactions in children.
Jorge Cazorla. PhD Defense expected for 2022.

13-AWARDS

- (September 2020):
The American Physiological Society (APS) selected our work “Universal spectral profile and dynamic evolution of muscle activation: a hallmark of muscle type and physiological state” for **APS-Select**, a collection from the APS that showcases some of the best recently published articles in physiological research.
<https://journals.physiology.org/apselect/archive>

- (July 2019):

2nd International Summer Institute on Network Physiology. Cardiorespiratory coordination: A novel variable for testing training and fatigue effects. Lake Como School of Advanced Studies (Italy). 28th July – 5th August 2019.

AWARD: 3rd Best Poster – *Publication Europhysics Letters*.

Winston-Salem, July 2022