



PhD scholarship

“Walking in hypoxia as an innovative strategy to combat obesity”

Overall context

This new international PhD program aims to recruit an individual with a strong interest in the utilization of hypoxic conditioning for obese individuals. While hypoxic/altitude training has historically been used with athletes for performance improvement, recent evidence suggests that exercising in hypoxia might also be a valuable and viable “therapeutic strategy” in non-athletes. The **overreaching purpose** of this research and related PhD program is to conduct a clinical validation of hypoxic conditioning as an innovative strategy for weight management/loss in obese individuals, improving outcomes beyond what is obtained today.

This research has **two specific aims**: 1) To identify the optimal hypoxic conditioning strategies (walking speeds and levels of hypoxia) that minimize joint loading and musculoskeletal discomfort/pain. 2) To evaluate the merits of combining hypoxic living and exercise training and investigate some of the biological mechanisms underpinning hypoxia-induced improvements in cardio-metabolic health and physical fitness.

With the expected benefits of hypoxic conditioning for minimizing joint loads in walking and inducing fat loss and improving health in obese patients, this PhD scholarship may positively impact the health of Middle Eastern populations by the integration of this new and potentially clinically effective intervention in the prescription of weight management.

The *Athlete Health and Performance Research Centre* at Aspetar Orthopaedic and Sports Medicine Hospital in Doha (State of Qatar) is funding a 3-year PhD research opportunity. While the successful candidate will be registered at Lausanne University in Switzerland, Aspetar will employ him/her on a full-time basis as a PhD student. This involves living and working in Qatar permanently for the duration of the research program. Aspetar has world-class normobaric hypoxic facilities (all with the capacity to reach > 5000 m) including 25 bedrooms (double occupancy) and an upgraded altitude engine, two hypoxic training/testing rooms together with inflatable hypoxic marquees (2 configurations: 45-m long and 10 m x 16 m rectangle). The successful candidate will work with Dr. Olivier Girard (Research Scientist) within the *Athlete Health and Performance Research Centre* at Aspetar, Dr. Davide Malatesta (Senior Lecturer) at *Swiss University of Lausanne* and Dr. Ray Browning (Research Director) at *Nike Sport Research Lab*. All the supervisory team members have extensive experience quantifying, in an obese population, alterations in mechanical and energetic costs associated with walking.

Project details

Obesity is a major health burden, with almost one in two individuals being at risk in the Middle East, and is accompanied by an increased risk of insulin resistance, diabetes, hypertension, cardiovascular diseases and various cancers. In order to tackle body fat accumulation and its clinical manifestation, aggressive prevention strategies, mainly based on dieting and regular physical exercise, have been implemented. Often, success rates of long-term weight loss maintenance with lifestyle changes are low due to the poor adherence of the participants to the prescribed therapies. Therefore, the design and clinical validation of alternative strategies are needed to improve body composition and modulate the obesity-associated metabolic risk factors.

Obese patients are often encouraged to engage in regular physical exercise such as walking at self-selected speed (preferred walking speed) to induce negative energy balance. For many obese patients, however, the reality of musculoskeletal disorders such as osteoarthritis, particularly in weight-bearing joints (*e.g.*, spine, knees, and feet) may limit the benefits of physical activity and weight loss. Reducing potentially harmful forces and consequently pain in these joints (knees in particular) during walking may improve locomotor ability in obese patients. In addition, it is known that the adherence to physical activity programs or guidelines is quite low in obese individuals and that lessening the exercise-induced pain can lead to increased adherence. Here, hypoxic exposure (reduction in the oxygen arterial content) during exercising may become particularly relevant since the mechanical load associated with walking under hypoxic vs. normoxic conditions would be significantly reduced to achieve the same metabolic rate. Walking at slower speeds under hypoxic conditions would reduce joint loading ensuring an adequate exercise stimulus for weight management.

Owing to the augmentation of hypoxemia by exercise with hypoxia, it has been suggested that the body weight reduction and its effects on the main cardiovascular and common metabolic disorders associated with obesity may be larger than that by exercise alone. Chronic hypoxia modifies the appetite regulation and has a potentially important impact on energy balance and body composition with reported loss of body mass during prolonged (> 2 weeks) altitude sojourns. Consequently, hypoxic conditioning may be an appropriate form of exercise training for obese patients as it can lead to effective weight loss due to a negative energy balance. A second aim of this PhD program is to verify that living and exercise training in hypoxic conditions would result in greater alterations in obesity and physiological adaptation mechanisms than hypoxic living alone and living and exercise training in normoxic conditions.



Benefits

- * Competitive international tax free salary
- * Return flights to home country once per year
- * Thirty (30) days annual leave per year
- * Housing and transport allowance
- * Medical insurance

- * An excellent research training opportunity in a unique World-class multidisciplinary sports medicine hospital.
- * Access to state of the art equipment and facilities
- * Exceptional networking opportunity with World experts in sport sciences and medicine (a total of over 800 staff including 60 nationalities)

Candidate profile

Essential:

- ✓ Undergraduate degree with at least 65% as a final grade in a relevant science subject, or in a field related to the subject of the project;
- ✓ Ability and experience in collaborating effectively in teams;
- ✓ Ability and experience in prioritizing activities and tasks to accomplish goals within the set deadlines;
- ✓ Excellent written, verbal and presentation skills for both specialist and non-specialist audiences (proof of proficiency in English will be required);
- ✓ Excellent interpersonal skills including clear and concise verbal communication and an ability to negotiate compromises and resolve conflict amicably;

Desirable:

- ✓ MSc/MRes (at Merit or Distinction level) in a relevant science subject, or in a field related to the subject of the project;
- ✓ Good knowledge of altitude physiology and/or clinical/sports biomechanics;
- ✓ Familiarity with determining the primary (body mass/composition, net energy cost of walking, mechanical external work, efficiency, mitochondrial biogenesis, subjective pain) and/or secondary (plasma glucose and insulin responses, high/low-density cholesterol, leptin, triglycerides, blood pressure) physiologic, metabolic and biomechanical outcomes of an intervention;
- ✓ Previous experience in working with clinical populations;
- ✓ Familiarity with the research process in particular scientific writing and advanced statistics.

Personal attributes:

- ✓ An ability to work independently and with initiative at a high level of self-motivation;
- ✓ Ability to prioritize tasks to achieve project goals and meet deadlines;
- ✓ Ability to problem-solve, innovate or adapt;
- ✓ Ability to apply strong interpersonal skills to the building and maintenance of effective working relationships and to written and verbal communication with partners from a variety of professional backgrounds.



How to apply:

Admission to the doctoral program is competitive. The successful applicant must be able to commence full-time study as soon as possible. A shortlist of candidates will be invited to interview.

Your application should include the following:

- A covering letter (maximum of 2 pages) setting out your motivation for applying for the position and explaining how your skills, experience and academic knowledge will contribute to the project;
- Your current curriculum vitae;
- Details of your education (subject, level, institution, date of award), academic transcripts and professional qualifications and distinctions other than degrees;
- Names and contact information of two referees.

Closing date for applications: 15th of September 2017

Further inquiries:

Dr. Olivier Girard (PhD)
Athlete Health and Performance Research Centre
Aspetar Orthopaedic and Sports Medicine Hospital
Doha, Qatar
olivier.girard@aspetar.com
+974 44132493



UNIL | Université de Lausanne

Institut des sciences du sport
de l'Université de Lausanne