Master programme
2020 - 2021

Human Movement Sciences
Welcome to the Human Movement Sciences Master’s degree programme, in which you learn all about the relationship between human behaviour and motor control & performance.

Good choice! This interesting topic fits very well with the societal developments in which exercise and health becomes more and more important.

During our two-year programme, we will help you to master up-to-date knowledge in the broad field of HMS, and shape your own profile which will lead you to an exciting and challenging job!

**Typical questions...**

How can we help healthy people, ageing people or people with a disorder?

- How much should people exercise and why?
- How do we get these people to exercise more?
- How can we prevent deterioration?
- How can we change their behaviour (motivation) ?
- How can assistive tools help them during daily living?
- ... and how do they learn this?

human behaviour and motor control & performance gather new knowledge and skills, and build up a network around topics which might interest you.
Contribute to a healthy society by conducting *high-level research* into *exercise and performance* in healthy people, in people with chronic diseases and in people who are temporarily unable to move properly due to illness or accident.

Conducting *research and analysing measurement data* of people performing context specific tasks.

Collect the data that is necessary for our research, with *advanced measuring equipment* in our laboratories and in the society, at home and in the hospital.

Learn how to *acquire and integrate knowledge* of neurosciences, physiology, biomechanics, psychology, pedagogics, and ethics and philosophy.

Learn how to *perform and implement research* by employing advanced biomedical, behavioural, statistical/epidemiological and laboratory-based methods.

Learn this in a meaningful context, with actual current research themes and problems, in laboratory or clinical context.

In human movement sciences, we focus on the physiological, physical, psychological, cognitive, neurological and biomechanical aspects of exercise and physical activity of individuals who age healthily and of those who need assistive technology or therapy.
Why Groningen?

Because with us, you have two years to make the best version of yourself! In Groningen you can spend two years on your master study, which gives your master project the depth you are looking for. And you will be trained by the best Human Movement Scientists in the North of the Netherlands!

We think that personal profiling with individual attention and lots of personal feedback is important. We will teach you about the current topics, and help you within your projects to meet the scientists, to build your own network. Our Master symposium where you present the results of your master project is the perfect platform to show your network what you learned.

In our advanced courses, you will acquire the skills & tools that you need for your multidisciplinary projects. Our internship platform will help you find the internships you are looking for. We offer personal learning trajectories through academic assignments in the field, even outside of the university with our commercial and social partners.

Together with our students, the next generation of human movement scientists, we try to make a positive and long-term impact on society.

…”during our two-year project based learning programme, we will teach you the latest about human behaviour and motor control & performance, and guide you on the path to an exciting and challenging job!!..”

Our laboratories, run by our own technical support staff, are well equipped with the latest state-of-the-art equipment, which you can use in the field, at home and schools, or in the hospital. As of 2021, we will have a completely new Virtual Reality Lab!
**One master, two specialisations**

**Rehabilitation and Functional Recovery**

acquire an understanding of impaired movement and the restoration of functioning as well as the use of assistive technology in rehabilitation practice.

**Motor Function and Cognition in Healthy Ageing**

explore how, throughout the lifespan, physical activity and innovative movement-based interventions can enhance or preserve cognitive (including neural control) and motor function and prevent or slow chronic diseases.

**Within Healthy Ageing,** we study how we can prevent cognitive and physical decline with various exercise intervention in ageing and age-related chronic diseases like dementia and Parkinson’s disease. We also study how to reduce sedentariness by manipulating the environment. We examine the motor and cognitive/brain aspects of motor learning using advanced neurophysiological and imaging methods. We study gait, balance and upper extremity mechanisms to facilitate daily tasks in healthy ageing and ageing with disease. So, with our research we develop knowledge which can be used to prevent accelerated ageing and to improve quantity and quality of life over the age-span.

**Rehabilitation & Functional Recovery**

Disorders in motor control and current theories about rehabilitation processes

**Mechanisms of motor function and cognition in ageing**

Interventions targeting motor function and cognition in ageing

**Within Rehabilitation,** we study how people learn to control tools and devices, such as wheelchairs, prosthetic limbs and prosthetic arms. Also, we try to understand how prevention and training can improve the lives of complex care patients, for example developing child with Developmental Coordination Disorder, stroke patients, patients with burn injuries, and amputees.

In the hospital, we contribute to the Exercise is Medicine programme, and other health related projects. Because of our knowledge, we are partnering in the Paralympic sports programmes, in which we help the athletes in adapted sports to become the world bests!
Project-based learning is a student-centered pedagogy that involves a dynamic classroom approach in which it is believed that students acquire a deeper knowledge through active exploration of real-world challenges and problems.

Scientific Review
In the first year, we will train you in writing a good scientific review. The specialisation courses provide you with ideas for topics for this review. You will learn to find all the information on a topic of your choice, to judge the quality of this information and to merge and discuss the information in order to answer a specific research question. The review will help you to navigate and process scientific literature more confidently. During this project, you will be supervised by one of our staff members, while working in small groups of 2-4 students.

Master Thesis
In the second year, most of your time (40 ECTS) you will spend on your final project, together with fellow students, researchers and experts, in the field (i.e. home, school, hospital) or in one of our own labs. You will answer your own research questions and test your hypotheses, for which you collect your own data. Based on the outcomes of your analyses, you will write a solid discussion in an article about your study. We aim for a publication in scientific literature. The whole project will be completed with a presentation during our yearly graduation symposium with more than 200 visitors!

Academic Assignments
Academic Assignments are the perfect way to work on your personal and professional skills and competences, during the two years of our programmes. In these projects, you can spend a lot of time (15 ECTS) on free assignments that you think make a good contribution to a good preparation for your career after your graduation. The academic staff members often offer interesting assignments, but we prefer that you find that one unique challenge yourself.

Do you want to do help a company analyze their data? Do you want to organize a scientific event? Do you want to make a scientific website? Do you want to explore the possibilities to start your own company?

All is possible! :-D
In our programmes, we teach you to think and work as an academic.

Because of the way we teach you to work and think, you will soon be an interesting candidate for many employers in the field of research, education, management, policy and health care.

Your Career!

You will learn how to apply your knowledge and research skills as a member of multidisciplinary teams, for example with healthcare specialists, medical doctors, physiotherapists and nurses.

You will be able to work as a scientist at a university, in a hospital or in a company, as a teacher at a (applied) university, as a policymaker in government or in healthcare, start your own company in the health and fitness industry, work as a data scientist in research and development companies, or even in professional fields that you are not yet thinking about....!
Our highly motivated educational staff come from all kinds of disciplines. In our team, we have, next to human movement scientists, also psychologists, biologists, physiotherapists, statisticians, physiologists, anatomists and data scientists, who make a great contribution to our multidisciplinary educational programme. They are well trained and very capable of giving interesting and inspiring lectures. We are proud that several of them won the yearly Teacher of the Year award of the Medical Faculty, and even of the whole University of Groningen! All of them have at least their university teaching qualification. And all have a PhD degree!

Our staff members, who will help you with your master projects, are all experts in their scientific field. Because of their scientific output, many of them are asked as keynote speaker at international congresses, where they pick up the latest insights and knowledge. Their network will help you to build your own network, with opportunities all over the world!
Over the two years, we offer courses that help you to become an expert in your own field. We provide you with the tools, knowledge and skills you need to become a master of science.

Next to the specialisation courses, we will get you up-to-date with the latest insights in motor control, perception and action and prepare you for practice with our course clinical mobility lab. We will teach you about the philosophy of sciences and ethics (compulsory course). Our big data course, the structural equation modelling course and the compulsory advanced statistics course will help you to be competitive with other data sciences programmes. With the dynamical systems course and the signal acquisition and analysis course you will learn to simulate and analyse data of complex or electronic systems. You can shape your own profile further with other internal and external courses.

Courses
Scientific Review topics

How to reduce sedentariness in office?

Does walking improve physiological and physical health?

Does exercise help old adults learn and retain new motor skills?

Can gaming solutions increasing upper extremity function?

Measuring the quantity and quality of movement in an unobtrusive way by means of small sensors worn during activities of daily life

Effects of dance therapy on cognitive function in aging and dementia

Exergames to improve physical activity @home

Changes in coordination patterns in the arm during rehabilitation training after stroke

How statistical properties of perturbations on a moving floor shape motor adaptation

The relationship between physical capacity and activities of daily living / quality of life in wheelchair users

Problems of adolescents with Developmental Coordination Disorder

Physical fitness, physical activity, fatigue and Health Related Quality of Life after burn injury

Barriers and facilitators of implementing lifestyle interventions in the treatment of osteoarthritis in primary and secondary care

Measurements of power output of wheelchair athletes during training and competition

**Motor Function and Cognition in Healthy Ageing**

explore how, throughout the lifespan, physical activity and innovative movement-based interventions can enhance or preserve cognitive (including neural control) and motor function and prevent or slow chronic diseases.

**Rehabilitation and Functional Recovery**

acquire an understanding of impaired movement and the restoration of functioning as well as the use of assistive technology in rehabilitation practice.
Master thesis topics

Passive forms of exercise to slow cognitive decline in vulnerable older people

Motor and cognitive aspects of motor learning in aging using transcranial magnetic stimulation and EEG

Studying how joint loads are affected during daily tasks in people with an elbow artificial replacement

Effects of age and task difficulty on the acquisition, retention, and transfer of a visuomotor skill.

Environmental design influences on active aging

Gait adaptability & flexibility: how do task and age affect gait dynamics

Virtual reality and balance control and walking adaptability

Interventions to stimulate physical activity
Relation between wheelchair skills and upper body pain in elite wheelchair athletes

Biomechanics in Paralympic sport and athletes
Use of assistive devices in patients with physical disabilities and/or chronic diseases inventory

Anaerobic exercise testing in rehabilitation
Exploration of gait kinematics in children with developmental coordination disorder

Reliability analysis of routinely derived gait biomechanical measurement

Motor Function and Cognition in Healthy Ageing
explore how, throughout the lifespan, physical activity and innovative movement-based interventions can enhance or preserve cognitive (including neural control) and motor function and prevent or slow chronic diseases.

Rehabilitation and Functional Recovery
acquire an understanding of impaired movement and the restoration of functioning as well as the use of assistive technology in rehabilitation practice.