Amsterdam Movement Sciences

VU VRIJE UNIVERSITEIT AMSTERDAM

Amsterdam UMC University Medical Centers

Annual Report 2018

Amsterdam Movement Sciences

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#AmsterdamMovementSciences
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Thanks to Solveig Lund, Mirjam van Bavel

Contents

Movement Matters

We are delighted to present to you the Annual Report of Amsterdam Movement Sciences research institute for 2018. In our second year as a collaborative hub and spoke research institute on human movement, we have established a solid base upon to progress with collaboration for scientists on all levels, both senior as well as junior researchers.

We look back at 2018 as a year when we were clearly visible in scientific and patient centered research and activities. During our annual meeting in March 2018, which was held during the Pyeong-Chang Olympics in South Korea, the enthusiasm for the research institute was there for all to see, you can read more about it further on in the report.

In this introduction we would like to mention that we are especially proud of the PhD committee and the activities they have initiated. The committee have set up, and are aiming to build further, a community of PhD researchers; they offer other young researchers a network they can turn to for either professional, scientific, or alternatively, a more informal circuit.

Research integrity is an area within academia that is gaining importance; from being a mundane topic that all researchers preferred to avoid, with the introduction of the in 2018 updated Netherlands Code of Conduct for Research Integrity, it has entered center stage. All PhD candidates within the institute have a broad introduction to research integrity during their PhD trajectory, with the aim that they know how to handle, should the need arise.

In the years to come, we aim to proceed on the road taken; in 2020 we will have our first mid-term assessment, where we will evaluate if the institute as set out in 2017 is on the right track, or whether we have to adjust the course.

We invite you to enjoy this annual report to see what we have accomplished and meet some of our members. Should you want further detail, we refer you to the appendix and our website.

On behalf of the AMS management,

Professor dr. Frans Nollet, M.D.

Professor dr. Mario Maas, M.D.

Directors

Research Programs

Amsterdam Movement Sciences studies human movement and physical performance in healthy individuals and in individuals with disorders causing movement impairments. The research of the institute is organized in three programs: Sports and Work, Ageing and Morbidity, and Restoration and Development.

Sports and Work

The program Sports & Work aims at life-long healthy participation in sports and work, by healthy and disabled individuals. Optimization of physical performance is key in this program that encompasses elite sports performance and talent development, recreational sports and work activities. Prevention and optimizing recovery of musculoskeletal injury are other key topics in this program. Interdisciplinary collaboration is actively pursued to deepen our understanding of contemporary issues and to optimize impact of interventions.

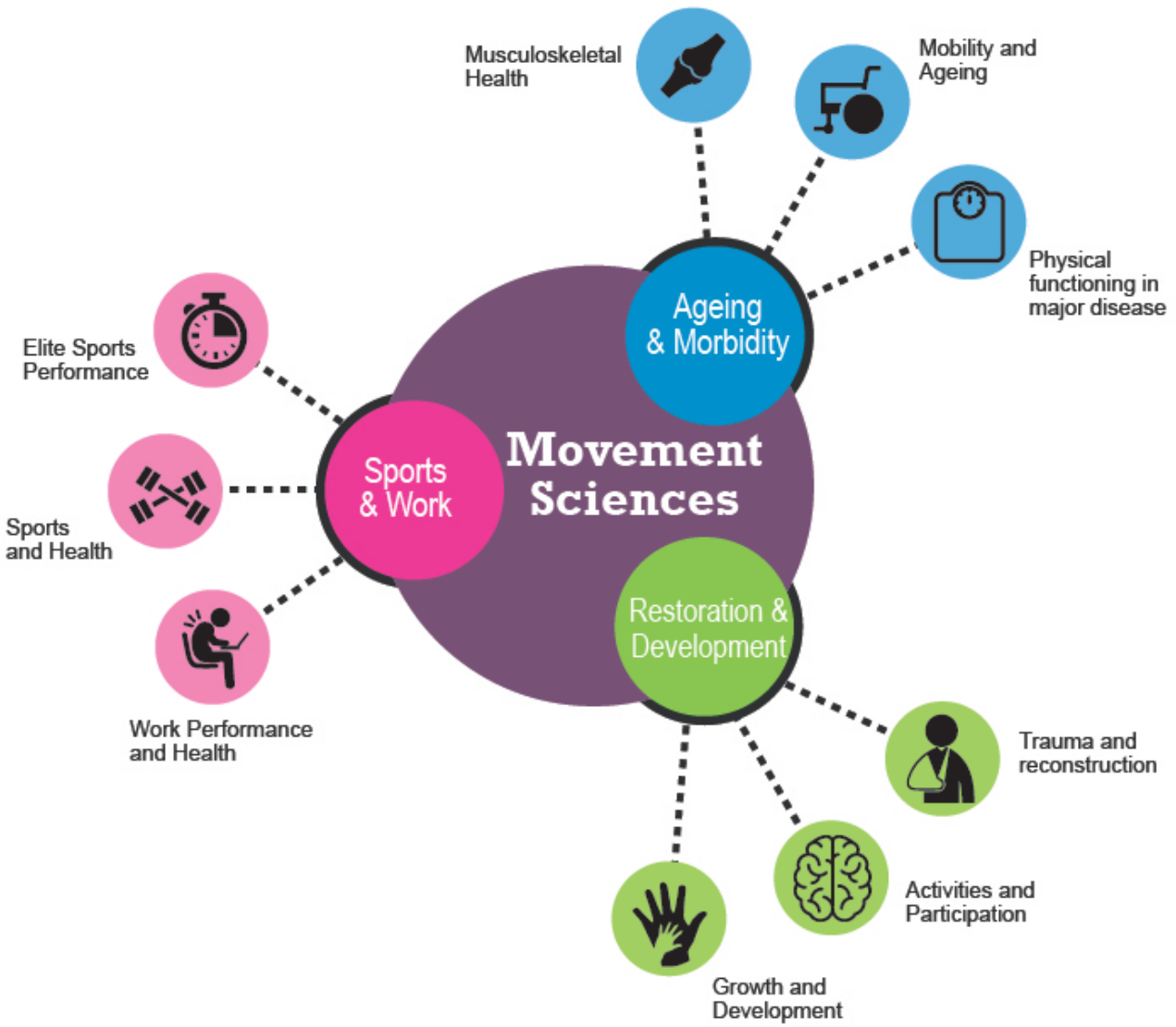
Ageing and Morbidity

The program Ageing and Morbidity aims to combat the negative effects of ageing and age-related disorders. Movement is sub-served by our musculoskeletal system, which relies on various organ systems that control and support it. The interactions of these systems are studied to reveal how physical performance can be maintained with ageing and optimized in chronic diseases. Since physical activity is also crucial for the maintenance of the underlying systems, the aim is to understand how physical stimuli can optimize structure and function of the musculoskeletal system in order to sustain adequate mobility and physical performance.

Restoration and Development

The program Restoration and Development aims to optimize physical performance of individuals, including children, with musculoskeletal injuries and neurological disorders affecting movement abilities. Consequences of these disorders become apparent at the three WHO-ICF levels of functioning: impairments in function of body structures (tissues and organs), limitations in functional activities, and restrictions in participation in society. Translational research comprises all these three levels and their interrelationships to understand and improve movement and physical performance in the context of personal and environmental factors.

Research Programs



Interviews

Marike van der Schaaf,
Research Associate Acute Care Rehabilitation at Amsterdam UMC (AMC) and University of Applied Sciences (HvA)

Marike van de Schaaf is a physiotherapist and epidemiologist and obtained her PhD in 2009 on the subject Functional Recovery After Critical Illness. As senior researcher at the Department of Rehabilitation Medicine of Amsterdam UMC and Associate Professor at the Hogeschool van Amsterdam (HVA), she is in charge of the project.

'A majority of critically ill patients admitted to an Intensive Care Unit develop long term restrictions in daily functioning and participation problems, as part of the Post Intensive Care Syndrome (PICS). Physical impairments such as severe muscle weakness (Intensive Care Unit Acquired Weakness) and impaired exercise tolerance persist for up to 5 years after ICU discharge. It is estimated that just over a third of the 80.000 IC patients a year receive PICS, for which there is no adequate care. Muscle weakness occurs quickly: necessitating a prolonged recovery trajectory. The whole body is in a state of disarray. The hormonal balance can change. The patients develop complaints that they themselves do not associate with the IC admission and that the care providers do not recognize either, as a result of which they do not receive the necessary treatment. It is therefore important to identify IC-related symptoms early and to start appropriate interdisciplinary rehabilitation treatment. Intensive Care Medicine is not that old. Recently the PICS syndrome has been recognized. General practitioners do not always recognize this problem. A majority of critically ill patients admitted to an Intensive Care Unit develop long term restrictions in daily functioning and participation problems. This lack of knowledge hampers the development of individualized physical exercise programs, and

"A majority of Intensive Care patients develop long term restrictions in daily functioning"

leaves patients and physiotherapists with difficulties in finding a proper balance between sufficient training load to improve functional recovery. Evidence shows however, that early rehabilitation is safe and improves physical functioning and quality of life. This project connects to and builds on previous research within our group on the development and implementation of rehabilitation interventions for patients during and after an IC stay.

The AMS grant offers the opportunity to strengthen the translational chain between the clinical and fundamental field of exercise physiology in collaboration with Dr. K. Gerrits and Dr. R. Jaspers of the Department of Human Movement Sciences. Given the large similarities in research topics, finding the optimal training dose and minimizing the risk of overburdening, a stronger collaboration is an important step for further development of the research field. It is important to build a consortium for the collaboration on exercise physiology and training of vulnerable persons.

This project fits extremely well to the AMS mission by conducting research to optimize physical performance in critically ill, elderly and chronic diseases, as the institute strives to support the scientific development and clinical leadership from student to senior researchers. By bringing together the fields of expertise covering physical performance in Aging and Chronic diseases, Acute Illness and Physiology, we bridge across programs within AMS. Studying the impact of exercise in critically ill patients will facilitate the development of knowledge on the cutting-edge of exercise physiology and training principles in various vulnerable populations and in the understanding of underlying mechanisms of physical recovery'.

Richard Jaspers,
Associate Professor, Faculty of Behavioural and Movement Sciences.

"Collaboration with many branches of science definitely creates added value!'"

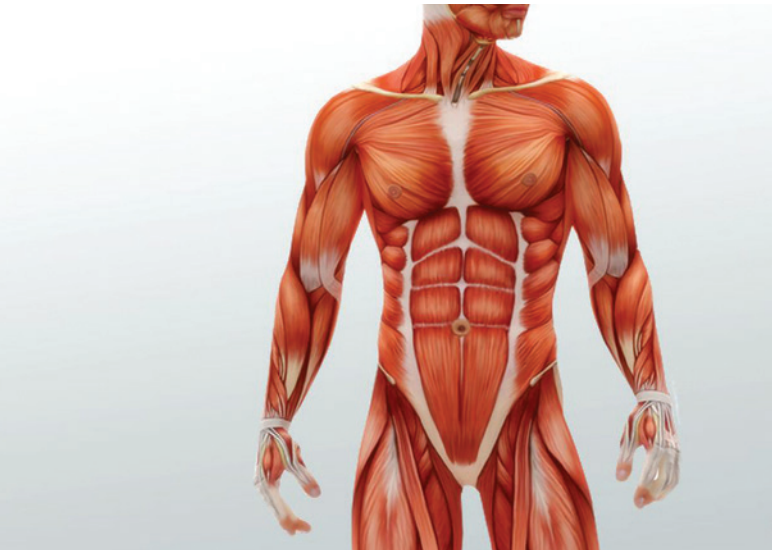
There is a strong relationship between morbidity and the loss of muscle mass

'Gaining more insight into the role of muscles is very important for the recovery of IC patients. It is known that people with chronic conditions, heart, kidney and lung failure as well as cancer always lose muscle mass. You get a low level of inflammation, which leads to muscle breakdown. In short, there is a strong relationship between morbidity and the loss of muscle mass. Mortality also seems to be lower in people with higher muscle mass. Muscle research is about clarifying the mechanisms underlying the interactions between the regulation of muscle fibre size and mitochondrial density. Richard Jaspers has developed a 3 D ultrasound, a good measuring instrument to map the quality of the muscle.

The aim is to maintain muscle mass. We know it goes fast, but we want to monitor the exact process. An IC patient cannot possibly stay in an MRI, but with our method we have devised an alternative. First of all we establish: how fast the process of muscle loss develops, how does the muscle change and secondly, how does the intervention work. The Rehabilitation department of Amsterdam UMC/ location AMC, has developed a system in which people quickly notice the effect of that intervention. They will walk with the help of a special device. In this way, the blood circulation can be resumed. You can then quickly measure what the effect is on the muscle mass.

Muscle in relation to brain, bone, immune system and blood circulation
Preservation of muscles (and bones) is therefore very important. A muscle is an organ that makes all kinds of substances that affect other organs.

Our body consists for 40% of muscles. You use it to counteract, to move, but there is also a large organ that makes all kinds of substances that have their effect on other organ systems. If you move, your cognition improves. It can contribute to slowing down Alzheimer's and Parkinson's disease. Research has also shown that exercise can have an inhibiting effect on the development of tumours. But we are still investigating how exactly this process works. Can you boost the immune system so that you can help clean up cancer cells? When do you do what and to what extent? How much and what kind of exercise do you have to do? If your muscles continue to be damaged for a long time, you will maintain the immune response and get fibrosis, which means connective tissue, not muscle tissue. This process can also be seen with ageing. The immune system comes into play in all kinds of situations. Sometimes you have to activate it, sometimes you have to muffle it. To realize this, we work together with several disciplines such as Anatomy, Neuroscience, Molecular Cell Biology and Immunology in order to map out these kinds of relationships between other tissues. Of course, you can't boost the system indefinitely.



Sports

An important research I focus on is: how do I combine endurance and sprint capacity? Stimulating them at the same time works against each other. On the one hand, improving endurance and, on the other hand, sprinting ability and muscle length and recovery capacity. How do you maintain the recovery capacity of muscles, how can you maintain the potential of stem muscle cells to regenerate? How do you make your muscles longer and thicker? What are its mechanisms? This is interesting for both sports and rehabilitation, where people with spasticity develop contractures. Children with spastic muscles have short muscles. How can you prevent contractures by keeping muscles long? We can translate our findings into sport. Thick muscles are strong, if they are long they can quickly contract. How can you prevent contractures by keeping muscles long? Do materials from the muscle end up in the brain when you move? You can keep the muscles long and as a result you can increase their participation. Nutrition can also play an important role in this. In short, we work from the cell to the whole person. For all these researches, we work together with various disciplines. The research master's programs therefore end up everywhere. Collaboration with many branches of science definitely creates added value!'

Aart Nederveen, professor of Applied MR Physics and medical physicist at Radiology and Nuclear Medicine, Amsterdam UMC

You can't see without looking properly

This curious statement was the title of Aart Nederveen's inaugural lecture as Professor of Applied Physics in 2018. His research in the field of Radiology covers all three areas embedded in the Amsterdam Movement Sciences institute: Sports and Work, Ageing and Morbidity and Restoration and Development.

'Nowadays there are many elderly individuals becoming aware of the importance of healthy ageing. There is a growing trend to improve health with the right diet or with exercise and less with medication, as for example has been shown for Type 2 Diabetes. Imaging can play an important role here as it is able to non-invasively measure fat content and energy metabolism in organs. Another very interesting development in this context is the use of exercise during MRI. In this way it is possible to see exactly what the effect of movement is in the leg muscles, brain and heart.'

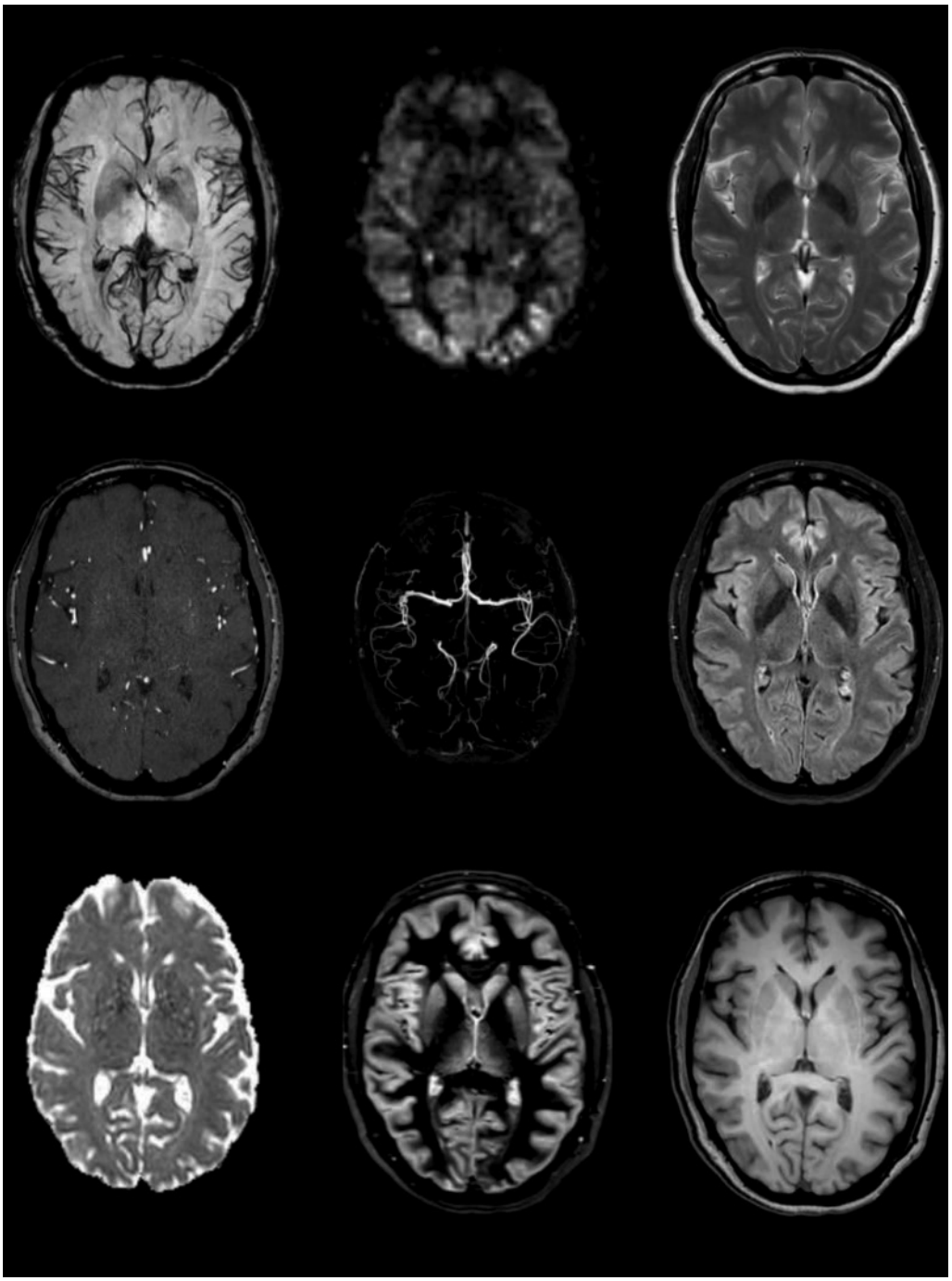
'Using conventional MRI, colleagues of mine have shown that it is difficult to determine when a hamstring injury has healed. Hemorrhage and edema can remain visible on MRI scans for a long time after injury, even when the athlete has been declared fit to play. Muscle damage and healing are complex physiological processes. We can try to approach these by looking at it with multiple MRI methods. MRI measurements that focus on the stiffness of the tissue or the damage to the muscle fibers return to normal values much faster than in the conventional images. Could it be that

"We're seeing more and more of the human anatomy and physiology with MRI"

the fluid around the muscle fibers is still present while the muscle itself has largely healed?

We suspect that this is the case based on what has been shown in recent years in marathon runners. The runners were scanned before the marathon, just after the run and three weeks later. We managed to measure runners from two different marathons: Berlin 2009 and Amsterdam 2017. In both cases we found similar results. With the conventional sequences currently used by radiologists, we could hardly see any muscle damage in marathon runners, even though the runners still experienced a lot of muscle pain. It turns out that by using diffusion-weighted MRI, we could detect damage in the muscles right after the marathon. Luckily it disappeared a few weeks later.'

'We're seeing more and more of the human anatomy and physiology with MRI. However, an MRI scanner doesn't just allow us to discover reality but also to construct it. Our images don't come out of thin air, they're designed by us and are full of human choices and technical limitations. It is hard to make a strict distinction between making an image and making a medical decision on the basis of that image. Technological commitment alone is not enough; we also need ethical commitment in our community along with lively communication between both basic MR physics scientists and medical doctors.'



Examples of an MRI image of the head with different MRI glasses

Nathalie Bravenboer,
Senior researcher
in Bone Biology at
Amsterdam UMC

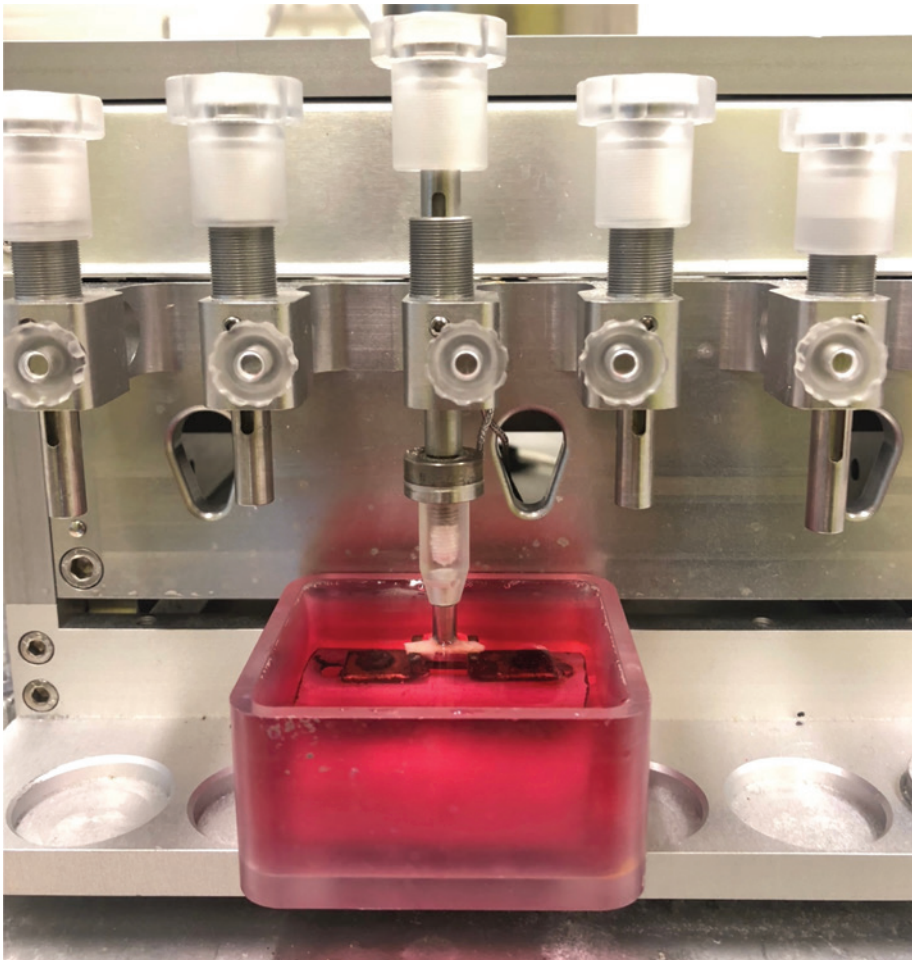
Central question in her research is: how can we make a bone stronger with mechanical stress? This is important for research in Ageing, Sports and Revalidation. The subject has been investigated earlier in rats and mice. Research has now been done on small pieces of human bone in culture. 'In that setting we can keep bone tissue ten to twelve days alive. The load takes place by bending the bone. Working on human material gives much more possibilities than working on animal material. It appears from research that load of the bones works favourably on the load-carrying capacity. In the past we have studied rats with a backpack, with a load of as much as 40%. In this way it appeared that controlled bone formation was stimulated. We are now applying load with a device that will map this process even better: the process from load to bone formation. How does this exactly work? What is the influence of disease on this process?

The mechanical signal in bone needs to be translated into a biochemical signal that can activate cells. This is tested by RNA expression as a pre-stage of proteins. On cell level, potential therapies are screened for making more collagen for brittle bone disease. We want to test on mice whether these therapies do make the bones stronger. In addition, a lot of research is done in collaboration with ACTA. For example, how does padding with bone from another place from the body make the jaw suitable again for dental implants?

We also work with artificial bone in these cases. For example series of jaw biopsy of 6 – 12 months, this takes a lot of time, even after that long period

"A skeleton is buzzing with life"

it hasn't been converted to real bone yet. Also, certain cancer patients come into consideration, sometimes the bone is badly damaged by radiation therapy. The effect of irradiation on bone is examined to help patients cured from head and neck cancer in the rehabilitation of their mouth. Bones have a lot of communication with muscles, proteins, many chemical reactions take place. Bone is not an isolated organ, there is influence of the tissues around it and vice versa. A skeleton is buzzing with life!'



Experimental set up of a strip of human bone tissue that is loaded by three-point bending in a tissue culture experiment.

Annemiek Buizer,
Pediatric Rehabilitation Physician, Faculty Of Behavourial and Movement Sciences

Nadia Dominici,
Associate Professor, Faculty of Behavioural and Movement Sciences, Coordination Dynamics

From stepping reflex to independent walking

Annemiek Buizer works with children from 0 to 18 years old. 'I am mainly concerned with children who have disorders of the central nervous system. Cerebral palsy (CP) is the largest diagnostic group. We can medically do more with all kinds of treatments. But we can also measure more precisely how you move, and how you could improve that with, for example, training, splints or surgery. In the future, this will enable us to make a better choice as to what is the best treatment for a child to keep moving properly'. Nadia Dominici deals with the development of the motor abilities. She and her team are using the latest brain scanning and sensor technologies to study what happens as children develop the muscular and brain power required to walk on their own for a project called 'Learn2Walk. Brain meets spine: the neural origin of toddlers' first steps'. Her research group consists of MSc and PhD and PostDoc students, who work on studies related to the development of walking from neonates stepping until independent walking in typically developing children and in children with neuromotor disorders. 'We monitor movement in children's first steps. We study the interplay between muscular and brain activity in children from few months old to the moment they start to walk independently. Children have the instinct to walk from the moment they are born, and even before; a 'stepping reflex' is hardwired in their neural circuitry. But it takes about one year before children can start walking independently. The first independent steps of a child represent a milestone of human growth and development, but the brain must reach a certain degree of maturity before the ability to walk is being developed. She found that new babies have two basic activation

"Understanding the progression from the stepping reflex to independent walking could help find new therapies for children with cerebral palsy"

patterns that coordinate the leg muscles involved in the stepping reflex. These are later supplemented by two new ones that usually develop in the first year of life. 'What I'm looking at now is how and when these new (activation) patterns emerge, and the relationship between the muscles and the brain. We are looking at what happens in typically developing children and in those with cerebral palsy. We then plan to trial a novel rehabilitation therapy before serious gait problems occur, which are more difficult to correct. Depending on the type of CP and the level of severity, we hope it will be possible to train children to improve their mobility and independence'. Using a combination of movement sensors attached to the legs, and muscle - and brain activity recordings, the team hopes to track how the brain develops in preparation for coordinating walking – and what happens in children who have mobility problems due to brain injuries such as CP. Annemiek Buizer: 'In CP, the initial injury is in the brain, usually from birth. We want to understand exactly how this impairs their development of walking. Understanding the progression from the stepping reflex to independent walking could help find new therapies for children with cerebral palsy, during or shortly after birth. We will investigate how therapies currently offered to children with CP affect the reorganization of muscular or brain activity. We strive for an interdisciplinary treatment method. We compare therapies and medication. We tend towards a diagnosis at the earliest possible stage, so you can still make interventions'. For the future expansion of prospective cohort studies in cerebral palsy, using international networks, could offer an opportunity for long-term follow-up of large groups of patients and comparison of the effectiveness of different treatments'.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Highlights

Annual Research Meeting

Lecture by Jan Ykema

The **2nd AMS Annual Research Meeting** was held on February 16, in Amsterdam ArenA congres-center. The event took place during the Olympic Games in PyeongChang, South Korea, and as sports runs in our researchers' blood, sports was part of the theme at the meeting. The whole community of researchers watched the women's ice speed skating together, and for the scientific part, Professor Marco Sandri (University of Padova, Italy) gave the key note Exercise, *mitochondria and protesostasis: a cross road for health ageing*. A representative from the Dutch Health Council, dr.ir. **Rianne Weggemans**, gave the key note lecture on the **Dutch Physical Activity Guidelines**. There was a well-visited poster session and the winners of the AMS Innovation call presented their work. For the whole community of AMS researchers a thoroughly successful meeting.

The **RaMBaM (**Regeneration and Mechanobiology of Bone and Muscle) meetings were organized for a third year in a row, focusing on the way physical

Frans Nollet at the Annual Meeting 2018

and chemical cues modulate cell fate and adaptation, and how changes in cell or tissue mechanics contribute to development, physiology and disease. The organisers of the RaMBaM meetings are Dr. A.D. Bakker, (ACTA), Dr. N. Bravenboer (VUmc), Dr. R.T. Jaspers (FBMS) and prof.dr. J. Klein Nulend. The meetings were organized on a selection of topics; **prof.dr. Paul van Zuijlen** talked about The Skin Dissected; **dr. P.A. Nolte** talked about *Orthopaedics keeps moving*, and **prof.dr. D. Wismeijer** presented *Where are we going to in Oral Implantology*? The RaMBaM meetings are well visited by a varied group of senior and junior researchers, and always generate broad discussion and stimulate new insights.

In December 2018 the research program **Sports and Work** held a research symposium entitled **Healthy Sports Performance**. The symposium was organized by program leaders **Evert Verhagen** (Amsterdam UMC, location VUmc) and **Geert Savelsbergh** (FBMS, VU). The speakers at

the symposium were **Joao Brito** who gave the talk *Performance and Health, two sides of the same medal* and the presentation by sports physician **Kasper Janssen** who stressed the importance of sleep to maximize performance.

On August 28, the 3rd RM (**Research Master**) Graduation Congress took place at VU University. There were more than 110 participants at the congress, and 14 research master students presented the results of their one year research projects within the various departments associated with AMS. **Dr. Annemieke Buizer** and **Prof.dr. Jeroen Geurts** (both Amsterdam UMC, location VUmc) were keynote speakers at the congress, which has become one of the leading Movement Science congresses in the Netherlands.

The Lancet published a viewpoint series called *Low Back Pain a call for action,* where it called for low back pain to be put on World's Health Agenda in a series of three papers published in the spring

Amsterdam Young Academy

of 2018, by a group of low back pain experts. The approach to curing low back pain differs widely throughout the world, and in the series the experts, among them **Maurits van Tulder** (Faculty of Science, VU) called for a more conservative approach with exercise one of the key solutions as opposed to surgery, which is widely used in the US.

Katinka van der Kooij (Behaviour and Movement Sciences, VU), was in 2019 appointed member of the **Amsterdam Young Academy** (AYA). The AYA was set up in 2018, and the members of AYA will be selected each year by the deans of faculties of University of Amsterdam and Vrije Universiteit Amsterdam. The aim of the academy is to provide an independent platform to exchange critical perspectives, promote cross-disciplinary exchange of ideas and collaboration, and to strengthen the Universities' engagement with the city of Amsterdam and society.

Bastian Pietras (Behaviour and Movement Sciences, VU), was on December 20, 2018 awarded the distinction *Cum Laude* (with honours) for his defence of his dissertation *Modeling phase synchronization of interacting neuronal populations: From phase reductions to collective behavior of oscillatory neural networks.* On his project, Bastian Pietras was supervised by professor**A. Dafferts-hofer, professor A. Stefanovska** and **professor P.V.E. McClintock**. The project was financed by an EU-Horizon 2020 **Marie Skłodowska-Curie Innovative Training Network** grant, part of the COSMOS project.

AMS in 2018 issued **two innovation calls,** where a total of €1.500.000 was available for various research projects. Talented researchers from Amsterdam UMC, both locations, were granted projects in the field of Tenure Develoment / Mid career; Tenure Development / Clinical Leadership; Post Doc/Early Career, Grant applications, Feasibility studies / pilot projects; as well as PhD candidate and MSc Student grants.
Read more in Section 'Grants'

Bastian Pietras

Organization

Frans Nollet,
Director AMS VU, Amsterdam UMC

Mario Maas,
Director AMS, AMC

Geert Savelsbergh,
Program Leader P1 Sports and Work, VU FBMS

Solveig Lund,
Policy Officer, VU FBMS

Evert Verhagen,
Program Leader P1 Sports and Work, VUmc

Raymond Ostelo,
Program Leader P2 Ageing and Morbidity, VU Faculty of Sciences

Sicco Bus,
Program Leader P2 Ageing and Morbidity, AMC

Theo Smit,
Program Leader P3 Restoration and Development, AMC

Richard Jaspers,
Member, VU FBMS

Wouter Schallig,
PhD Representative, VUmc

Erwin van Wegen,
Program Leader P3 Restoration and Development, VUmc

Eric Voorn,
PhD, Postdoc Representative, AMC

Research Integrity

In 2018 The Dutch VSNU (the Association of Universities in the Netherlands) introduced a new Netherlands Code of Conduct for Research Integrity. How to deal with integrity and ethical questions can on paper be quite straight forward, but on the work floor and between colleagues, or when dealing with colleagues of a higher rank, it can be experienced as an area of in which to tread with care. AMS and Amsterdam UMC see research integrity as an important field in which all scientists, both senior and junior, should be fully aware of. All PhD candidates have to complete a course of research integrity, and it is an item that the institute will keep on the agenda.

Integrity Bingo

Jaap van Netten set up an engaging and educational model on research integrity. 'The reason I set this up, was the new code of conduct on scientific integrity. Scientific Integrity is increasingly important; as we know, there have been a number of well-publicized examples of misconduct. However, these are the extremes of wrongdoing. Much more difficult are the day to day choices you have to make; the issues which take place in a grey area and where you can be more or less honest. I thought: The code of conduct consists of 3 gross violations, 5 overarching values and 60 concrete standards, but how do you ensure that people start thinking about it? I came up with the idea of a bingo, where some parts of the code are described as "bingo balls", and the audience has to find the correct norm on their bingo card. This way you

Jaap van Netten,
Researcher at the department of Rehabilitation Medicine, Amsterdam UMC, and Human Movement Scientist

use playful education to create awareness of these issues without forcing it on anyone.

I initially set up the bingo for a departmental meeting at Rehabilitation medicine. The questions that arose were what choice should I make here, which interests play a role? For example, there is pressure to publish quickly, but you want to do it properly. The area is in a state of flux, there is a lot of discussion within science. How do we, e.g., deal with counting publications and grants? Is counting publications really a reflection of quality? What you want to know is does my work have impact? You want to evaluate yourself, how good is the work I do? If you choose an outcome measure, people will move towards that outcome measure. Consequently the construct changes, as people will behave according to the outcome measures. By emphasizing the counting of publications, one stimulates a certain kind of behaviour. How can we choose outcome measures in such a way that it encourages better research? How do we choose outcome measures that stimulates behaviour corresponding to all standards in the code of conduct? Many questions, with no clear answers. But thinking about them is a good start for any researcher'.

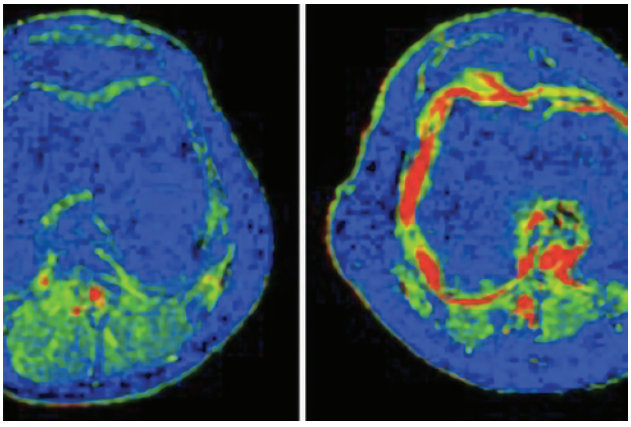
Societal impact

Prof.dr. Gino Kerkhoffs and **prof.dr. Mario Maas** (both Amsterdam UMC, location AMC and **prof.dr. Evert Verhagen** Amsterdam UMC, location VUmc), were in the spring of 2018 given a mark of appreciation by TeamNL for their substantial contribution to the development and performance of Dutch top athletes. They were given the token of appreciation for their contribution in medical care and the expertise they offer Dutch top athletes, and were awarded the virtual badge High Performance Partner of TeamNL. As a result of the care offered by professor Kerkhoffs, Maas and other sports specialists and consultants, the Netherlands is a front runner in the area of sports- and movement care.

Maas & Kerkhoffs, team NL

The researchers within the Medical Imaging Quantification Center (MIQC), **dr.ir. Josien Douw – van den Noort** and **dr.ir. Chiel den Harder**, in collaboration with the **PIs prof.dr. Mario Maas, prof.dr.ir. Aart Nederveen** and **prof. dr.ir. Gustav Strijkers**, all from Amsterdam UMC, location AMC, together implement research-methods, -techniques and -results into the clinical practice of radiology. In 2018 several techniques were implemented that have led to improved diagnostics and treatment evaluation in patients. The MIQC researchers developed a pipeline for a semi-quantitative automatic analysis of Dynamic Contrast Enhanced MRI (DCE MRI) for children

Pixel by pixel analysis of DCE-MRI curve patterns in knees of active and inactive juvenile idiopathic arthritis patients



with Juvenile Idiopathic Arthirtis (JIA) to assess the disease activity and effectiveness of medication. The results are now sent directly to the digital Picture Archiving and Communication System (PACS) and are used by the radiologists to set the diagnosis. The MIQC researchers also developed a whole-body MRI scan protocol that is now implemented and used in the clinical practice of radiology and gives MR water and fat images for the diagnosis in patients with myositis.

Andrea Maier and her team invented a new model to measure the development of morbidity. The research focuses on determining the risk of accelerated ageing in large groups of people, who have been followed in different countries over the past twenty years; for example, it is now possible to classify a group of sixty and seventy-year-olds into 'no risk of physical deterioration', 'moderate risk of deterioration' and 'high risk of deterioration'. The latter group usually already has one or two chronic diseases at that age.

Andrea Maier (FBMS, VU), Marijke Trappenburg and **Carel Meskers (both Amsterdam UMC, location VUmc)** in 2018 organized a series of

Andrea Maier

lectures on Healthy Ageing for the elderly. In the series they informed the public about what the individual can do for healthy ageing and the role of movement and nutrition therein. The sessions proved very popular and were well visited by the target audience. This was done as part of the EU financed research project Physical Activity and Nutrition INfluences In ageing (PANINI).

Ronald van Vollenhoven

Sauvik das Gupta

As a member of the European League Against Rheumatism (**EULAR**) Task Forces**, Professor Ronald van Vollenhoven (Amsterdam UMC, location AMC),** elaborated the recommendations for the treatment of **Rheumatoid Arthritis**. The recommendations are currently in progress and will be presented in 2019. As part of EULAR Prof. van Vollenhoven further worked on the recommendations for Systemic Lupus Erythematousus (SLE), which are submitted for publication, and Lupus Nephritis which will be presented in June 2019. He also directed a clinical trial that established that ustekinumab is effective in the treatment of **SLE** (Van Vollenhoven et al, Lancet, 2018). For now, this medication is available "off-label", and a confirmatory trial is underway. If successful, this would represent an important breakthrough for the treatment of this chronic autoimmune disease.

PhD candidate **Sauvik das Gupta** (FBMS) and fellow entrepreneurs and students at FBMS, were in December 2018 awarded a **NWO Take-Off Phase-1 Grant** of €40.00 for the project **FITSURANCE**. The project aims to contribute to reduce overall health costs by offering employers the opportunity to monitor employees' activities through a mobile application, and offer the said employees health check-ups and personalized physical activity and dietary advice, with the aim to reduce sick leave and costs for health insurance. The project focuses on preventing diseases rather than curing them, and encourages a healthy, productive and cheerful workforce.

AMS in the press

deVolkskrant

Voorpagina | Nieuws & Achtergrond | Columns & Opinie | Video | Wetenschap | Mensen | De Gids | Cultuur & Med

ACHTERGROND HITTE EN HET LIJF

Hoe het lichaam de hitte te lijf gaat

Niet alleen huizen hebben een thermostaat, het lichaam heeft er ook één. Centraal gelegen in het brein bevindt zich de hypothalamus, een hersengebied dat onder meer de temperatuur in het lichaam regelt. Bij een lichaamstemperatuur van 37 graden Celsius functioneert alles optimaal, bij hogere temperaturen komt het lichaam in actie om de boel te koelen. Met een goede reden: vanaf 43 graden sterven cellen af.

Tonie Mudde 24 juli 2018, 11:42

Een van de populairste manieren van afkoelen: naar het strand. Beeld Ton Koene

Het lichaam kan zichzelf op twee manieren koelen. Ten eerste met droge warmteafgifte. Doordat de temperatuur van de huid hoger is dan de omgeving, straalt het lichaam warmte uit en het koelt het door lucht die erlangs blaast. Daarnaast is er de zogeheten natte warmteafgifte, oftewel: zweten. Verdamping van water onttrekt dan warmte aan het lichaam.

De individuele verschillen zijn fors, maar doorgaans zijn mannen wat beter in zweten dan vrouwen, zegt Hein Daanen, hoogleraar thermofysiologie aan de Vrije Universiteit. 'Vrouwen krijgen eerder een rood hoofd omdat het lichaam bloed naar de huid stuurt om de temperatuur daar omhoog te krijgen. Een hogere huidtemperatuur zorgt voor betere warmteafgifte aan de omgeving.'

Koelere huid kost wat

Het pompen van bloed naar de huid om af te koelen heeft een prijskaartje: andere organen krijgen minder. Het brein bijvoorbeeld, waardoor mensen zich duizelig kunnen voelen. Ook de darmen krijgen minder bloed dan ze gewend zijn. Gebeurt dat te lang, dan kan dit zorgen voor diarree, wat weer het risico op uitdroging vergroot. Onderzoekers van de Universiteit van Hawaï in Mānoa publiceerden vorig jaar een studie waarin ze liefst 27 manieren beschrijven waarop een hittegolf kan doden.

'Hitte kan inderdaad een hele verzameling aan medische problemen opleveren', zegt Daanen. 'De geschiedenis leert bovendien dat hittegolven vaak leiden tot extra sterfte.'
Het CBS rekende hier al eens aan voor de hittegolf van 2003. In een week in augustus met een gemiddelde maximumtemperatuur van dik 30 graden gingen er ruim 2.800 mensen dood, waarvan 10 procent hittegerelateerd.

Die extra sterfte treft vooral ouderen, al blijkt het ingevoerde hitteplan goed te helpen om doden te voorkomen. De ouderen die wel stierven tijdens eerdere hittegolven: zijn dit dan allemaal ernstig verzwakte tachtigplussers die anders een paar weken later waren gestorven? Daanen: 'Als het alleen zeer kwetsbare ouderen betreft, dan zou je na een hittegolf juist een beduidend lagere sterfte verwachten. Maar onderzoek wijst uit dat de mindere sterfte in de maanden na de warmte bescheiden is. De warmte duwt dus echt niet alleen ouderen over het randje die toch al bijna dood waren. De hitte doodt ook ouderen waar Magere Hein nog helemaal niet op zat te wachten.'

Twee miljoen mensen met rug- of nekpijn, 'hardnekkige mythes' over goede aanpak

28-11-2018, 20:31

NOS: BINNENLAND (/NIEUWS/BINNENLAND/)

GESCHREVEN DOOR

Paulus Houthuijs
redacteur Online
(mailto:paulus.houthuijs@nos.nl)

Zit niet onderuit, maar altijd rechtop. Hou je rug kaarsrecht als je iets tilt. Het zijn twee veelgehoorde adviezen om rugpijn te voorkomen of te beperken. Ook vandaag, nu bekend is geworden dat twee miljoen Nederlanders last hebben van rug- of nekpijn (http://nos.nl/artikel/2261172-twee-miljoen-mensen-hebben-last-van-hun-rug-of-nek.html). Maar wat is er wetenschappelijk bewezen?

Lagerugpijn is de meest voorkomende klacht. En volgens onderzoeker Raymond Ostelo van de Vrije Universiteit Amsterdam moeten mensen kritisch zijn over sommige aanbevelingen die op het internet circuleren.

"De meest hardnekkige mythes over rugpijn gaan er rond als ik op sociale media kijk", zegt de hoogleraar fysiotherapie. "Bijvoorbeeld dat je een speciaal matras moet hebben, of een speciale stoel. Er wordt veel geld verdiend aan zaken als afgestelde stoelen, maar

er is niet veel bewijs dat ze echt werken."

> **Bij 90 tot 95 procent van alle rugklachten weten we niet echt een oorzaak vast te stellen.**
>
> — Raymond Ostelo, hoogleraar fysiotherapie

Het beste wat je kunt doen met rugpijn is actief blijven. En daarin zoveel mogelijk afwisselen, staat ook in de richtlijn van het Nederlands Huisartsen Genootschap (https://www.nhg.org/standaarden/volledig/nhg-standaard-aspecifieke-lagerugpijn#idp213536). Het is het belangrijkste advies waarvan is bewezen dat het echt helpt, hoewel het pijnlijk kan zijn. En om rugpijn te voorkomen, is het devies om zo veel mogelijk je houding af te wisselen.

Altijd rug recht?

"Dat je per se rechtop moet zitten of staan, of dat je niet even onderuit mag zitten - het bewijs is daarvoor dun", zegt Ostelo. Dit wil niet automatisch zeggen dat onderuit zitten of krom staan goed is voor je rug. Maar wetenschappelijk gezien staat dus niet vast dat je constant je rug recht moet houden. Afwisselen lijkt de beste optie.

Er is wel voldoende bewijs dat bij het uitoefenen van zware beroepen, waarin bijvoorbeeld veel getild wordt in ongunstige houdingen, de kans op rugklachten groter is. "Maar er is geen bewijs dat je altijd je rug recht moet houden als je iets van de grond oppakt."

Het is volgens Ostelo wel belangrijk om onderscheid te maken tussen de verschillende soorten rugpijn. Bij rugklachten met een specifieke oorzaak, zoals bijvoorbeeld een hernia, is het belangrijk om hulp in te schakelen van een arts. Bij rugletsel met zo'n specifieke oorzaak kunnen röntgenfoto's, medicatie en operaties mogelijk uitkomst bieden.

'Opereren zelden goede optie'

Maar deze aanpak valt voor de grootste groep mensen met rugpijn juist niet aan te bevelen, zegt de hoogleraar. "Bij 90 tot 95 procent van alle rugklachten weten we niet echt een oorzaak vast te stellen. Opereren is dan zelden een goede optie en sterke medicatie helpt weinig."

Ostelo verwijst daarvoor naar een in maart gepubliceerd onderzoek (https://www.thelancet.com/series/low-back-pain) in het gerenommeerde wetenschappelijk tijdschrift *The Lancet*. "Als je dat op een rij zet, is het vooral belangrijk om mensen gerust te stellen. En te zorgen dat patiënten hun normale activiteiten zo snel mogelijk weer oppakken. Want de meeste rugklachten gaan vaak vanzelf weer voorbij."

Als je geen ernstige rugaandoening hebt, levert een MRI-scan of röntgenfoto volgens het rapport in *The Lancet* weinig op. "Je ziet er dan vaak niets op en mensen worden er toch ongerust van. Dat wakkert het idee dat er toch iets aan de hand is juist aan", zegt Ostelo.

Volgens de hoogleraar kunnen mensen met langer durende rugpijn (zes tot acht weken), die alleen maar erger wordt, het beste terecht bij een huisarts of fysiotherapeut. Dan kunnen ze advies op maat krijgen, dat als het goed is geheel aansluit bij de wensen van het lichaam.

Liefst 33% van ex-profvoetballers krijgt last van gewrichten

Door VAN ONZE TELESPORTREDACTIE
30 jan. 2018 in SPORT

Marco van Basten moest vanwege een ernstige enkelblessure al op 30-jarige leeftijd stoppen als profvoetballer.

© HOLLANDSE HOOGTE

Slijtages van heup, knie of enkel komen maar liefst bij 33 procent van de oud-voetballers voor. En dat, al op relatief jonge leeftijd. Gevolgen: gewrichtspijn, ongemak en verminderde functie. Dit blijkt uit een grootschalig onderzoek, waarin wetenschappers in ons land een coördinerende rol spelen. De diagnose-cijfers steken ongunstig af bij de gemiddelde bevolking.

In totaal werden van 396 oud-profvoetballers de medische gegevens geanalyseerd, op een gemiddelde leeftijd van 36 jaar. Allemaal spelers die gemiddeld 11 jaar op het hoogste niveau speelden. Vijf jaar voor het van start gaan van dit mondiale onderzoek deden ze hun kicksen voorgoed uit. Meest prominent van alle gewrichtsproblemen is slijtage aan knie en enkel. Meer dan de helft van alle oud-spelers (60%) zegt hieraan te lijden.

Eén van de coördinatoren van de studie is oud-profvoetballer: dr. Vincent Gouttebarge, speler van onder meer Volendam en Auxerre. De Fransman is wetenschapper en hoofd medische zaken bij de FIFPro, de internationale vakbond voor profvoetballers die is gevestigd in ons land. Dr. Gouttebarge verrichte deze studie samen met de Amsterdamse hoogleraar orthopedie Gino Kerkhoffs (AMC/VUmc). De twee werkten ook samen met wetenschappers van universiteiten in Japan en Zuid-Afrika.

De onderzoekers zijn geschrokken van de uitkomsten. Ze concluderen dat een gerichte uittreed-check na de actieve carrière noodzakelijk is voor een meer duurzaam behoud van gezondheid. Inmiddels is er een protocol ontwikkeld voor een 'na-carrière medisch onderzoek', waarmee momenteel in ons land proef wordt gedraaid. Later wordt deze medische check uitgerold over alle andere landen die bij de FIFPro zijn aangesloten.

De resultaten van hun breed gedocumenteerde studie hebben de onderzoekers aangeboden aan de vakbladen 'Knee Surgery, Sports Traumatology, Arthroscopy' en 'The physician and sportsmedicine'.

plusonline MENU

6 gezonde gewoontes om langer te leven

Over gezelligheid, zweten en je bloeddruk

Ouder worden komt met gebreken. Experts Andrea Maier en Rudi Westendorp geven tips om ziekten buiten de deur te houden en langer te leven.

1. Check zelf uw bloeddruk

Rudi Westendorp: "Grofweg de helft van de gevallen van hoge bloeddruk blijft onopgemerkt. En als het wel wordt opgemerkt en behandeld, gebeurt dat in de helft van de gevallen niet goed genoeg. Neem zelf de verantwoordelijkheid voor je bloeddruk. Controleer hem elke maand; daar zijn apparaatjes voor. Een hoge bloeddruk tast de bloedvaten van onder andere uw hart en nieren aan en het verdubbelt de kans op dementie. Normaliseert u uw bloeddruk, dan halveert u dat risico. Gebruik verder zo min mogelijk zout, beweeg elke dag een half uur en slik uw medicijnen op tijd."

2. Zweet is goed voor u

Andrea Maier: "Ik kom net van een debatreeks met zalen vol ouderen. Op de vraag: 'Wie beweegt er voldoende?' stak ruim 80 procent de vinger op. Uiteindelijk bleek slechts 21 procent écht genoeg beweging te krijgen. Genoeg is: minstens vijf keer per week een half uur per dag intensief bewegen, dus met zweetdruppeltjes op het voorhoofd. Of een uur stevig doorwandelen voor ouderen. Doet u dat, dan heeft u meer kans om langer te leven. Het is niet precies te zeggen hoeveel. Maar als u genoeg sport, twee stuks fruit per dag eet, niet rookt en weinig alcohol drinkt, dan is de kans dat u in de komende veertien jaar overlijdt 3 procent. Houdt u zich niet aan deze leefregels, dan is dat 24 procent."

3. Denk als de supermarkt

"Uw omgeving heeft invloed op wat u doet. In supermarkten liggen de duurdere producten op ooghoogte, d[illegible] die sneller pakt dan spullen die lager liggen. Zorg dat thuis, in de koelkast, de groenten óók op [illegible]gte liggen. Dan eet u er meer van dan wanneer u ze in de groentela wegstopt. Staat er een gevulde

fruitschaal op tafel, dan komt u eerder aan de twee stuks fruit per dag. Iets vergelijkbaars geldt voor het bestek en de borden die we gebruiken. In een experiment werd groot servies vervangen door klein servies. De proefpersonen aten tot 57 procent minder en vielen af. U eet ook minder soep als u een kleine lepel gebruikt; het gevoel van verzadiging wordt dan eerder bereikt," aldus Rudi Westendorp.

4. Weg met dat buikje

"Mensen hebben de neiging hun gewicht te onderschatten. Ze denken dat ze minder wegen dan ze daadwerkelijk wegen. Zeker 50-plussers krijgen vaak een appel- of peervormig lichaam: vetophoping op de buik of dijen. We onderschatten ook hoeveel we eten op een dag. Iemand biedt u een gebakje aan, u neemt nog een extra stukje kaas of een boterham te veel. Het belangrijkste is dat we ons bewust worden van wat we precies binnenkrijgen op een dag. U kunt dat bijvoorbeeld doen door de 'Eetmeter' van het Voedingscentrum bij te houden, of een app als MyFitnessPal te installeren,"zegt Andrea Maier.

5. Zoek gezelligheid

Rudi Westendorp: "Ouderen met een klein sociaal netwerk hebben een hoger sterfterisico dan rokers, terwijl roken als één van de grootste risicofactoren voor ziekte en overlijden wordt gezien. We weten niet precies hoe het werkt, maar we weten wel dat een groot sociaal netwerk een trits positieve gevolgen heeft. U heeft een beter humeur, u voelt zich veiliger, gewaardeerd en meer ontspannen. Investeer dus in sociale contacten.

6. Handen uit de mouwen

Andrea Maier: "70 procent van de ouderen heeft een tekort aan vitamine D. Dat leidt onder andere tot botbreuken en zwakke spieren. Ons lichaam kan met behulp van zonlicht zelf vitamine D aanmaken. Elke dag een kwartier naar buiten gaan is het best. Zorg wel voor blote huid: handen uit de mouwen. Lukt dat niet, slik dan een supplement; het advies is 20 milligram (800 IU) per dag."

Andrea maier is hoogleraar interne geneeskunde aan het VUmc. Ze heeft als specialisme ouderengeneeskunde, is bezig met de ontwikkeling van een medicijn dat veroudering vertraagt, en denkt dat gezond 130 worden straks heel normaal is.

Rudi Westendorp is hoogleraar ouderengeneeskunde. Hij was zes jaar directeur van het kennisinstituut Leyden Academy on Vitality and Ageing. Nu werkt hij aan de Universiteit van Kopenhagen als Professor of Medicine at Old Age.

Extra tip: volg een gratis cursus over healthy aging

Rudi Westendorp is een van de deskundigen die een gratis cursus verzorgt over gezond ouder worden bij de Leyden Academy. Aanmelden kan tot 1 mei 2018 via deze website.

Appointed AMS Professors and Principal Lecturer

Bianca Buurman-van Es *(AMC) was appointed as UvA professor of* **Acute Geriatrics**. *On June 22, 2018, she gave her inaugural lecture 'Van symptoombestrijding naar duurzame acute ouderenzorg'.*

Evert Verhagen *(VUmc) was appointed to the VU URC (University Research Chair) of Epidemiology of Physical Activity, Sports and Health, and gave his inaugural lecture entitled 'Citius, Altius, Fortius: on the future of physical activity, sports and health' on May 7, 2018. In connection with the inauguration there was an international symposium with the title 'From the Playground to the Olympics – Health and Safety in Sports'.*

Martin van der Esch *was appointed Associate Professor of Interdisciplinary care for chronic joint disorders at Amsterdam University of Applied Sciences (HvA), and gave his inaugural lecture on December 4, 2018.*

Aart Nederveen *(AMC), appointed UvA professor of Applied Magnetic Resonance (MR) Physics, on June 6, 2018 gave his inaugural lecture entitled 'You can't see what you don't see'.*

PhD Enthousiasm

Wouter Schallig,
member PhD Committe

Wouter Schallig is a PhD candidate at the Rehabilitation Medicine department of VUmc and the Radiology and Nuclear Medicine department of AMC. Furthermore, he is a member of the PhD committee, which exists since 2017. Within this committee AMC, VUmc and VU are equally represented (2-2-3). The main goal of the committee is to provide a platform for PhDs within the research institute to meet, interact and collaborate. There is sufficient potential to work together. In particular in the first years of a PhD, there are opportunities of setting up collaborations, as project plans are not so fixed yet. To further stimulated collaborations within the institute it is a good thing that AMS is issuing cooperation grants that allows PhDs to work at different departments within the institute.

In 2018, the committee organized a successful, well-attended PhD day. There were a lot of substantive aspects to this day, including a guest speaker, a workshop and presentations by some of the PhDs within the institute. The day was concluded with a rowing session on the Bosbaan. The evaluation of the day showed very positive results. Especially the rowing was well rated. Therefore, in April 2019, we would like to organize an extra event that is more focused on bringing PhDs together in an informal setting.

Since 2018, we have also created an introductory course. We do this twice a year. During this course we introduce the research institute and ourselves as a committee, and tips & tricks: where to go to arrange things.

In addition, we serve as a source of information: if people need help, we can refer to the right person to solve the problem. We are further developing the supply, now that people know that we are there.

The goal for the future is to keep organizing events that bring PhDs together. Furthermore we would like to intensify the cooperation with the early-career researchers. We might also organize more institution-wide activities, like young teaches old, about for example ethics and scientific integrity. Last but not least, we would like to increase our visibility!

In **April 2018** there was a get together for newly started PhD candidates, to inform them of the institute activates, and the ins- and outs of being a PhD candidate in Amsterdam.

On **October 26**, the **2nd PhD day** was held to great success. The day started off with a presentation for newly started PhD candidates. The day was filled with interesting presentations, amongst others by professor **Mario Maas**, and several PhD candidates. In the afternoon the prize for the best PhD project presentation was awarded to **Eline Flux** of Amsterdam UMC, location VUmc. Following the presentations, the PhDs rounded off with a rowing workshop led by a Dutch International rower, which was highly appreciated, and concluded with a social get together.

The PhD committee had the following members in 2018:

- **Sabrina Chettouf,** Movement Sciences, FGBM
- **Mireille Folkerts,** Movement Sciences, FGBM
- **Lisa Klous,** Movement Sciences, FGBM
- **Rik Kraan,** Radiology, AMC
- **Christine Rustenburg,** Orthopaedic Surgery, AMC
- **Wouter Schallig,** Rehabilitation Medicine, VUmc
- **Niels Waterval,** Rehabilitation Medicine, AMC

Mario Maas and Eline Flux

Awards

Gert Kwakkel (r), Professor Rehabilitation & Development

Gert Kwakkel (Amsterdam UMC, location VUmc), was awarded the prestigious **Outstanding Neurorehabilitation Clinican-Scientist** (ONCS) Award during the Annual Meeting of the American Society of Neurorehabililtaition held in San Diego, Ca. on November 1-2, 2018. The prize was awarded to professor Kwakkel in recognition of his research on mechanisms of neurological recovery in the brain, in relation to the return on functions and skills in patients with stroke.

Edgar Peters (Amsterdam UMC, location VUmc), was in 2018 awarded the **American Diabetes Association's 2018 Roger Pecoraro Award** for his scientific contribution and demonstration of an untiring commitment to improving the understanding of the detection, treatment and prevention of diabetic foot complications. Dr. Peters was given the award during the ADA's 78th Scientific Sessions, June 22-26, 2018, at the Orange County Convention Center in Orlando, Fl, USA. In connection with the award, dr. Peters delivered the Roger Pecoraro Award Lecture, *The Ghosts of Diabetic Foot Infection: Past, Present, and Yet to Come?*

Davide Iannuzzi (Faculty of Sciences, VU), was in 2018 awarded the **NWO Physics Valorization prize** of €250.000. Professor Iannuzzi won the prize for his research and the attention he gives to facilitate the valorization of other people's research.

Anne van der Made (Amsterdam UMC, location AMC) was awarded '**Best Oral Presentation**' at the **Dutch Sports Medicine conference** (SMWJC18) held in Ermelo, NL, at the end of November 2018. The presentation was a brief overview of Intramuscular tendon injury; which is not associated with an increased hamstring reinjury rate within 12 months after return to play, published in the **British Journal of Sports Medicine**.

Stephan van der Zwaard (FGB, VU) was during the 2nd AMS Annual Research meeting awarded the **Outstanding Paper Award 2018** for this paper *Critical determinants of combined sprint and endurance performance: an integrative analysis from muscle fiber to the human body*, co-authored by W. J. van der Laarse, G. Weide, F.W. Bloemers, M.J. Hofmijster, K.. Levels, D.A. Noordhof, J.J. de Koning, C.J. de Ruiter and R.T. Jaspers. The paper was published in the **FASEB Journal** in March 2018.

Davide Ianuzzi

Grants

Marjolein van der Krogt

A selection of AMS Grants

Tenure development / mid-career call:

Marjolein van der Krogt, Amsterdam UMC (location VUmc): Comprehensive neuromusculoskeletal modelling to predict the effect of impairments on gait in children with cerebral palsy, € 135.000

Jaap van Netten, Amsterdam UMC (location AMC): Biomechanical activity and adherence profiles of people with diabetes in a comprehensive load-capacity model of foot ulceration: towards personalised interventions for high-risk diabetes patients (DIALOAD), € 150.00

Tenure development / Clinical leadership:

Harald Thune Jørstad, Amsterdam UMC (location AMC): Elite sports: addressing the heart of the matter, € 70.000

Post-doc / Early career call:

Helga Haberfehlner, Amsterdam UMC (location VUmc) was granted € 72.700 for the project Objective assessment of dystonia and choreoathetosis in children and adolescent with dyskinetic cerebral palsy based on machine learning

Melissa Hooijmans, Amsterdam UMC (location AMC): Imaging of post-traumatic muscle fibrosis and its functional impact (fibrofit), € 75.000

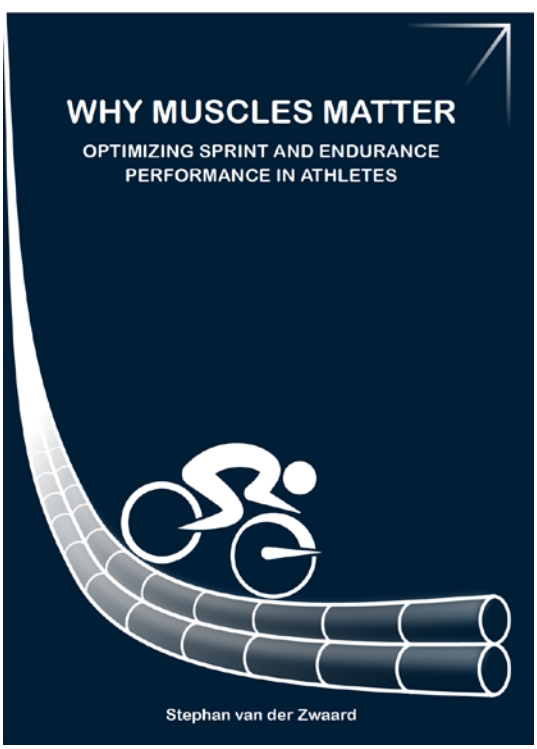
Roland Rössler, Amsterdam UMC (location VUmc): Finding the right balance: determining safe and healthy physical activity load, € 66.000

Ruud Wellenberg, Amsterdam UMC (location AMC) was awarded € 70.000 for the project Quantitative weight-bearing CT for musculoskeletal disorders

Ruud Wellenberg

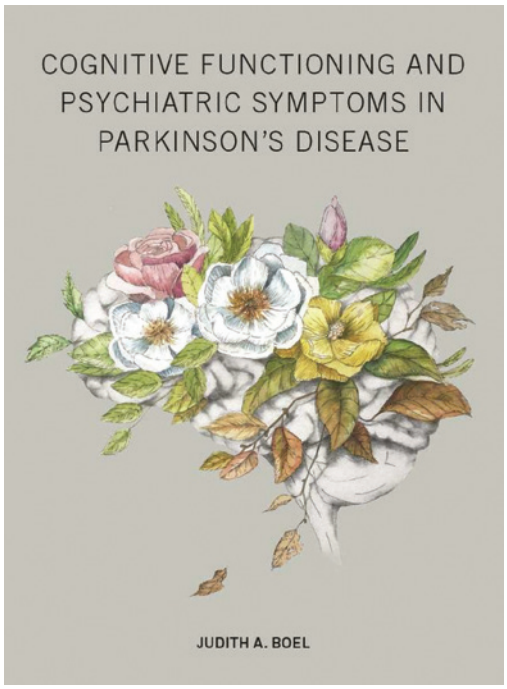
PhD Theses

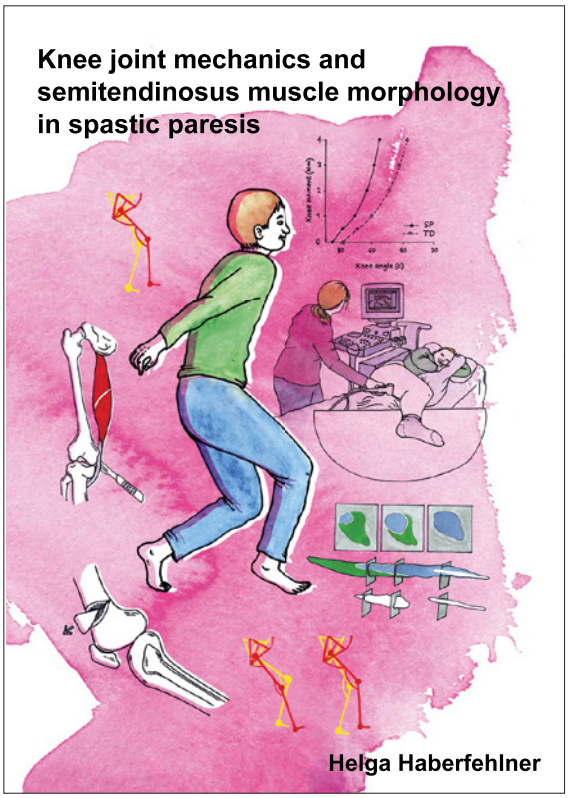
In 2018 54 researchers defended their PhD within the Institute of Amsterdam Movement Sciences. A selection of the PhD theses.

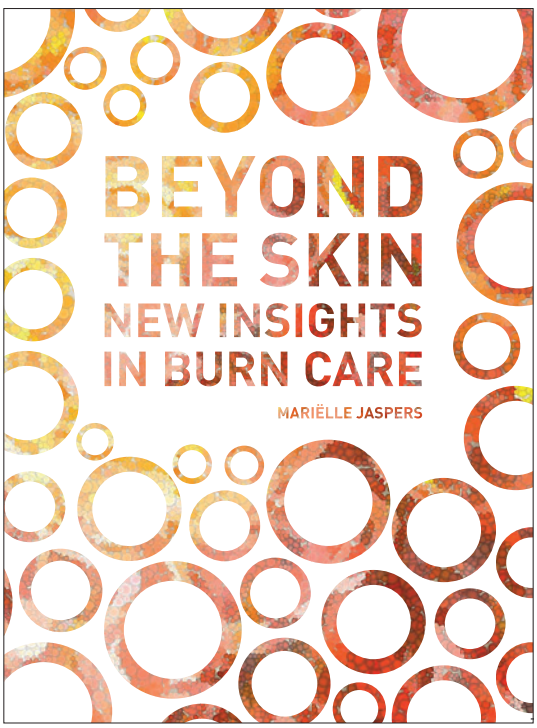


Time in Parkinson's disease:
Clinical and preclinical markers

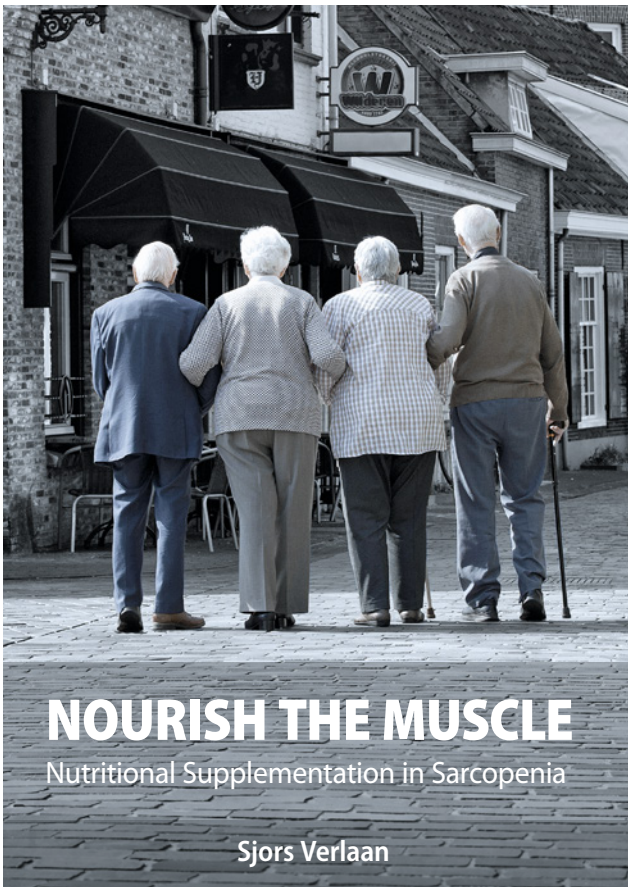
Encarna Micó Amigo

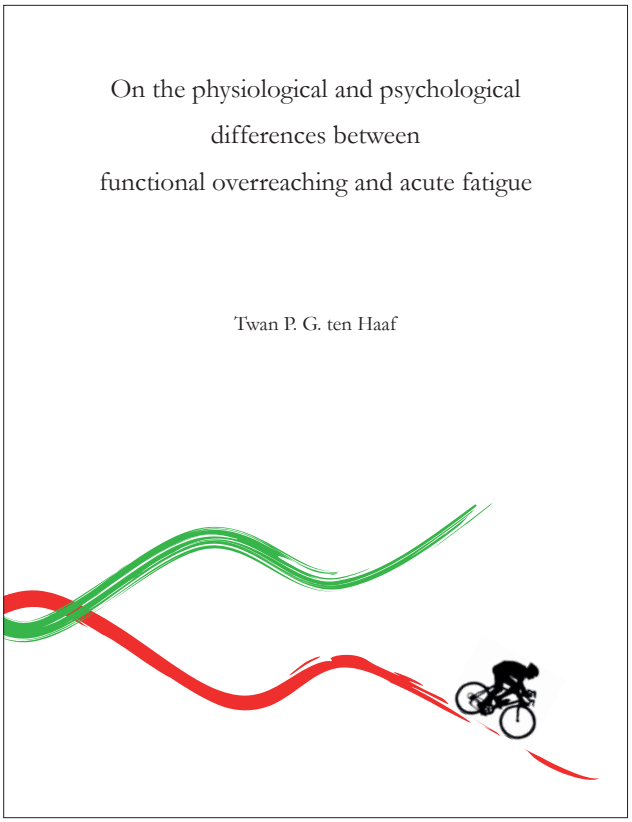

COGNITIVE FUNCTIONING AND
PSYCHIATRIC SYMPTOMS IN
PARKINSON'S DISEASE
JUDITH A. BOEL

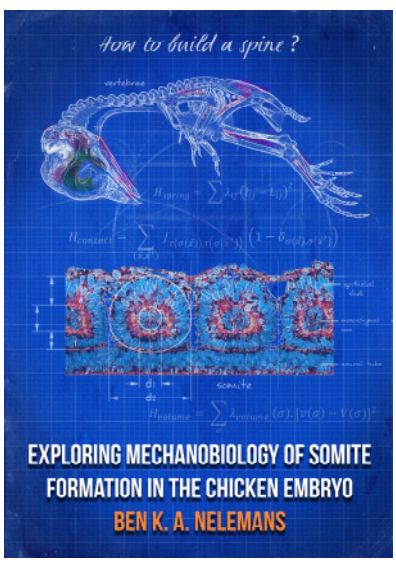

Knee joint mechanics and
semitendinosus muscle morphology
in spastic paresis
Helga Haberfehlner

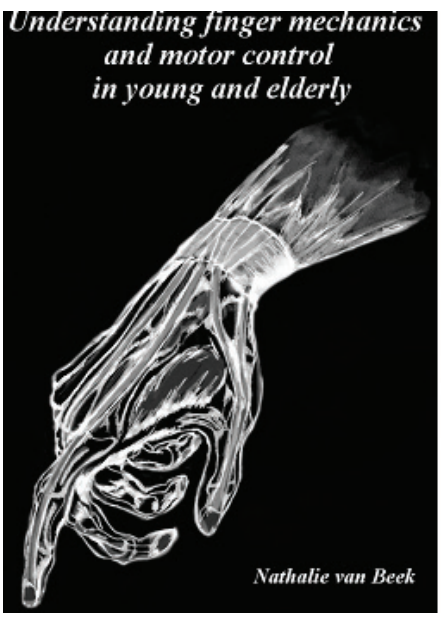

BEYOND
THE SKIN
NEW INSIGHTS
IN BURN CARE
MARIËLLE JASPERS

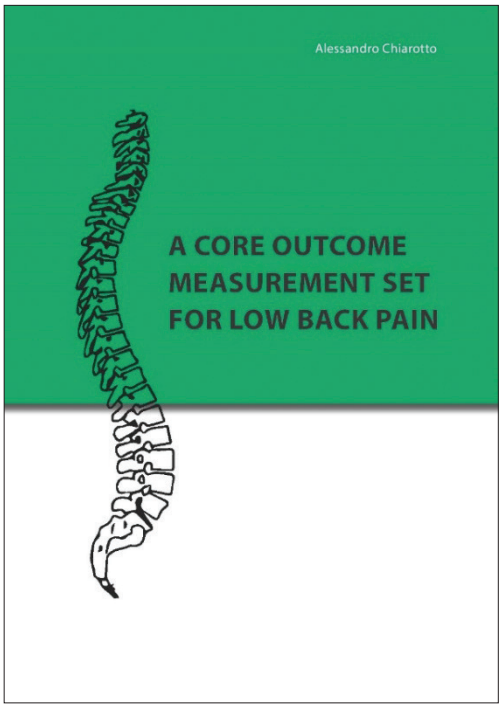

Gijs T.T. Helmerhorst
Pain Relief
after
Musculoskeletal Trauma

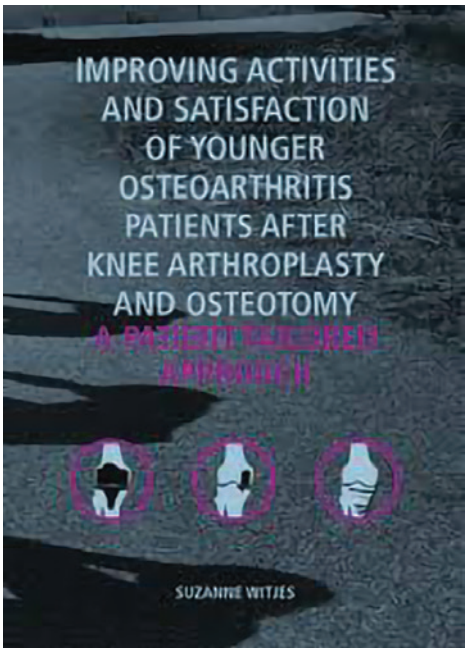

NOURISH THE MUSCLE
Nutritional Supplementation in Sarcopenia
Sjors Verlaan

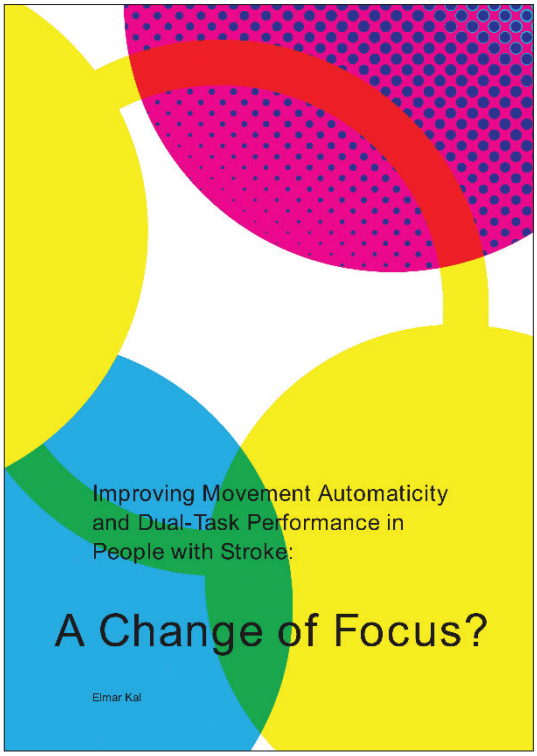

On the physiological and psychological
differences between
functional overreaching and acute fatigue
Twan P. G. ten Haaf

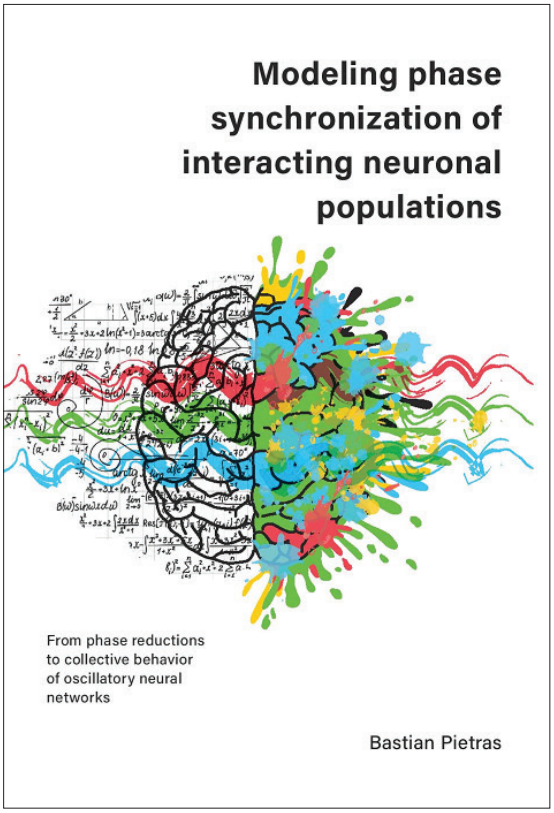

How to build a spine ?
EXPLORING MECHANOBIOLOGY OF SOMITE
FORMATION IN THE CHICKEN EMBRYO
BEN K. A. NELEMANS


Understanding finger mechanics
and motor control
in young and elderly
Nathalie van Beek


Alessandro Chiarotto
A CORE OUTCOME MEASUREMENT SET FOR LOW BACK PAIN


IMPROVING ACTIVITIES AND SATISFACTION OF YOUNGER OSTEOARTHRITIS PATIENTS AFTER KNEE ARTHROPLASTY AND OSTEOTOMY
SUZANNE WITJES


Improving Movement Automaticity and Dual-Task Performance in People with Stroke:
A Change of Focus?
Elmar Kal


Modeling phase synchronization of interacting neuronal populations
From phase reductions to collective behavior of oscillatory neural networks
Bastian Pietras

Appendix
Highlights

Grants

Main grants

Gino Kerkhoffs (Amsterdam UMC, location AMC) and collaborating partners were awarded a ZonMW grant of €512,500 for a project aimed at improved return to work participation for patients with a knee prosthesis.

Frans Nollet and **Merel Brehm** (both Amsterdam UMC, location AMC) were together awarded a ZonMw Grant of €397.916 in the first round of the Efficiency Program (Doelmatigheid) Goed Gebruik Hulpmiddelenzorg (GGH) for their research proposal *Personalized orthotic care to improve functioning in patients with neuromuscular diseases.* The PhD candidate Elza van Duijnhoven and the research assistant Jana Tuijtelaars have been contracted for the research project.

Edgar Davids (Amsterdam UMC, location VUmc) was given a grant of €325.000 by the Dutch Diabetes Fonds for the project *Determining the causative agent and optimal duration of antibiotic therapy in diabetic patients with foot osteomyelitis: BonE BiOPsy (BeBoP) trial.*

Erwin van Wegen (Amsterdam UMC, location VUmc) in collaboration with Odile van den Heuvel and Ires Ghielen, together received a grant of €300.000 for the project *Treatment of wearing-off related stress for people with Parkinson's Disease* co-financed by the Parkinson association and the Dutch Hersenstichting.

Hans Tol (Amsterdam UMC, location AMC) was in 2017 awarded a grant of €259.157 by the Dutch Arthritis Foundation for the project *Platelet Rich plasma Injection Management for Ankle osteoarthritis study (PRIMA): A multi-center, stratified, block-randomized, double-blind, placebo-controlled trial.*

Eli Brenner (FGB, VU) and collaborators Katja Fiehler, Justus-Liebig-University Gießen (D) and Simon Rushton, Cardiff University (GB), were together awarded a NWO-ORA grant of €250.000 for an ECR (Early Career Researcher) on the project *The Active Observer.*

Grants up to €249.000
Idsart Kingma, Jaap van Dieën and Michiel de Looze, (all FGB, VU) were together given a TNO financed grant of €218.000 for the project proposal

Industrial exoskeletons. The PhD candidate Ali Tabasi has been recruited on the project entitled *Sensing and control in industrial back-support exoskeletons, impact and validation.*

Joke Geytenbeek (Amsterdam UMC, location VUmc) was in 2017 awarded €213.947 for the project *Taalbegripsontwikkeling bij CP* by the Johanna Kinderfonds.

Gustav Strijkers (Amsterdam UMC, location AMC) was awarded an STW grant of €200.138 for the project *Comprehensive, High definition Accelerated Non-invasive Cardiac MRI for Early diagnosis of patients with symptomatic heart disease.* The grant will finance a PhD research project.

Hans Tol and **Guus Reurink** (both Amsterdam UMC, location AMC) were together awarded a ZonMw grant of €199.825 for the project *NL-Judo 9+: Translation, effectiveness and implementation of an injury prevention program.*

Gert Streekstra (Amsterdam UMC, location AMC), was in 2018 awarded a Life Sciences Health TKI grant of €199.200 for the project *Deep learning analysis of mechanical breast compression: narrowing the gap between what the surgeon feels and what the radiologist sees*. The grant will be used to finance an ERC (Early Career Researcher).

Annemieke Buizer and **Marjolein van der Krogt** (both Amsterdam UMC, location VUmc) were in 2017 awarded a grant of €175.000 for the project *MOVING CP: Maximizing Outcome using Virtual reality INteractive Gait analysis in children with Cerebral Palsy.* The project is co-funded by four clinical charity funds the Dutch Revalidatiefonds, Cornelia Stichting, JKF Kinderfonds and the Phelps Stichting voor Spastici.

Mathijs Hofmijster and **Maarten Bobbert** (both FGB, VU), were awarded a ZonMW Sport Data Valley grant of €160.534 which will be used for data science support.

Thomas Janssen (FGB, VU), was in 2017 awarded an ICU grant of €140.000 for the project *Towards evidence-based handcycling classification*. The PhD candidate Rafael Andrade Muchaxo has been recruited for the research project.

Richard Jaspers (FGB, VU) was awarded €120.000 by Ipsen Innovation SAS for the project *Physiological and structural characterization of muscles of the Glrbspa mouse model for spasticity* for the collaborative research into a mouse model for spasticity.

Merel Brehm and **Frans Nollet** (both Amsterdam UMC, location AMC) were together awarded a collaborative grant by Fior & GEntz and OIM of a total of €107.350 for the project *Gait and user experiences of the NeuroTronic stance-control knee-ankle-foot orthosis (SC-KAFO): a comparative evaluation to the E-MAG Active SC-KAFO*. The PhD candidate Bart Raijmakers has been employed on the research project.

John van der Kamp (FGB, VU) was awarded a grant of €100.000 by NWO (the Netherlands Organisation for Scientific Research) for a research project aimed at the differentiation between explicit and implicit learning methods during PE for children with special needs.

Eric Voorn, Frans Nollet, Merel Brehm and **Fieke Koopman** (all Amsterdam UMC, location AMC) were in 2018 awarded the Postpolio Health International Research Grant of $ (USD) 100.000 for the project *B-FiT! A guideline to individualized exercise in post-polio syndrome.*

David Mann and **Geert Savelsbergh** (both FGB, VU) were awarded a grant of €80.000 by the KNVB (Royal Netherlands Football Association) for the research project *On field gaze behavior in football referees.* The aim of the PhD project is to enhance the referees' on-field performance, and PhD candidate Tammie van Biemen has been recruited for the project.

Hein Daanen (FGB, VU) was awarded a ZonMW grant of €92.000 for the project *Beat the Heat* which aims to minimize athletes' decreased performance due to the hot and humid climate in Tokyo, Japan, during the Olympic and Paralympic games there in 2020. The project is a collaboration between the University of applied sciences of Arnhem and Nijmegen, the TU Delft, and NOC*NSF (Dutch Olympic Committee / Dutch Sports Federation).

Raoul Oudejans (FGB, VU), was within his appointment as principle lecturer *Learning and Performing in Sport* within the Sport and Movement realm at Amsterdam University of Applied Sciences (HvA) given a grant of €300.000 by SIA RAAK (Taskforce for Applied Research (SIA) and Funding for projects at Universities of Applied Sciences in collaboration with professionals working in the public sector). The grant was awarded for the ERC / postdoc project *Training for Excellence (T4X): Research into Innovative Training Methods in Sport, Music and Dance,* a collaboration with Janine Stubbe (Codarts Rotterdam, Michiel Schuijer (Conservatorium of Amsterdam) and Niek van Ulzen (HvA). The VU part of the grant is 30k€.

AMS Financed and Related Grants

In 2018 AMS held two rounds of Innovation calls to stimulate the collaboration between the researchers of AMC and VUmc. The prioritized projects are listed below:

Tenure development / mid-career call:

- **Marjolein van der Krogt**, Amsterdam UMC (location VUmc): *Comprehensive neuromusculoskeletal modelling to predict the effect of impairments on gait in children with cerebral palsy*, €135.000;

- **Jaap van Netten**, Amsterdam UMC (location AMC): *Biomechanical, activity and adherence profiles of people with diabetes in a comprehensive load-capacity model of foot ulceration: towards personalised interventions for high-risk diabetes patients (DIALOAD),* €150.00;

Tenure development / Clinical leadership:

- **Harald Thune Jørstad**, Amsterdam UMC (location AMC): *Elite sports: addressing the heart of the matter*, € 70.000;

Post-doc / Early career call:

- **Helga Haberfehlner**, Amsterdam UMC (location VUmc) was granted €72.700 for the project *Objective assessment of dystonia and choreoathetosis in children and adolescent with dyskinetic cerebral palsy based on machine learning*;

- **Melissa Hooijmans**, Amsterdam UMC (location AMC): *Imaging of post-traumatic muscle fibrosis and its functional impact (fibrofit)*, € 75.000;

- **Roland Rössler,** Amsterdam UMC (location VUmc): *Finding the right balance: determining safe and healthy physical activity load*, € 66.000;

- **Ruud Wellenberg** Amsterdam UMC (location AMC) was awarded €70.000 for the project *Quantitative weight-bearing CT for musculoskeletal disorders.*

Grant applications:

- **Alessandro Chiarotto**, Amsterdam UMC (location VUmc): *Developing a new method to assess the perceived importance of the effects of health interventions for patients with musculoskeletal and rheumatic conditions*, € 24.500;

- **Erwin van Wegen**, Amsterdam UMC (location VUmc): *Do-iT Parkinson; Effects of Dose and type of exercise Training on exercise-induced neuroplasticity in human Parkinson's disease*, € 25.000.

Feasibility Studies / Pilot projects:

- **Onno Baur,** Amsterdam UMC (location AMC): *Making dynamic imaging of the ankle possible*, € 49.500;

- **Heleen Beckerman,** Amsterdam UMC (location VUmc): *Cardiorespiratory fitness in newly diagnosed patients with Relapsing Remitting Multiple Sclerosis compared to matched healthy controls: already lagging behind from the start?* € 50.000;

- **Renate de Jongh,** Amsterdam UMC (location VUmc): *A feasibility and pilot study of non-invasive diagnostic techniques in renal osteodystrophy: 18F-fluoride positron emission tomography and serum non-oxidized PTH*, € 50.000;

- **Eric Voorn,** Amsterdam UMC (location AMC): *The development of an easily applicable measurement tool for systematic prescription and evaluation of aerobic training in adults and children with slowly progressive neuromuscular diseases*, € 50.000;

PhD candidate and MA student (travel) grants:

- **Robin Blom,** Amsterdam UMC (location AMC), was awarded €5.000 as a contribution to his research visit to Flinders Medical Centre (FMC), Department of Orthopedic and Trauma surgery, Adelaide, Australia for the project *Three-dimensional Quantification of Operative Reduction for Posterior Malleolar Fragments in Rotational Type Ankle Fractures to Improve the Long-term Clinical Outcome*;

- **Mareille Post,** Amsterdam UMC (location VUmc), was awarded €3.000 for the project *Safety and effectiveness evaluation of pre-bended rods in patients with adolescent idiopathic scoliosis*, to visit Le Centre Médico-Chirurgical de Réadaptation (CMCR) des Massues Lyon, France;

- **Sabine Schootemeijer** (RMA student FGB, VU) was awarded €3.000 for the project *The sensitivity to change of daily-life gait quality characteristics in older adults* as a contribution to visit the Falls, Balance and Injury Research Centre at NeuroScience Research Australia (NeuRA), Sydney, Australia;

- **Jetske Viveen,** Amsterdam UMC (location AMC), was granted €5.000 as a contribution to her research visit to Flinders Medical Centre (FMC), Department of Orthopedic and Trauma surgery, Adelaide, Australia for the project *Three-dimensional Microstructure of the Proximal Radius*;

- **Guido Weide** (FGB, VU) was awarded €5.000 for the project *Knowledge transfer from a VUmc developed 3D-ultrasound approach to measure invivo morphometry of skeletal muscle at AMC.*

- **Babette Zwaard** (RMA Student FGB, VU), was awarded €3.000 for the project *The evaluation of gait and dynamic balance performance before and after Gamma Knife Thalamotomy in patients with severe Essential Tremor.*

AMS Investment Grant
The budget available for investments in AMS departments of Amsterdam UMC, location VUmc, was in 2018 increased from €16.000 to €38.000. A call was set out among the AMS community, and the winning application was submitted by **Richard Jaspers** with the aim to purchase the nano intender S-Chiaro-ST Optics 11 inducing a Dynamic module. In addition to the AMS contribution, additional finances were given by VUmc and FGB. The device, which assesses mechanical properties of tissues and cells, will contribute to obtain insight in the optimal physical properties for cell adaption and tissue regeneration, and will be used for various PhD projects and is also available to other interested researchers.

H2LS (Human Health and Life Sciences) Grant
In the fall of 2018, VU University Amsterdam set out a H2LS (Human Health and Life Sciences) call to further stimulate the collaboration between researchers from VU University Amsterdam and Amsterdam UMC. Dr. **Huub Maas** (FGB, VU) were, in collaboration with prof.dr.ir. **Theo Smit**, dr. **Hans Tol**, prof.dr**. Gino Kerkhoffs** (all Amsterdam UMC, location AMC) awarded €25.000 for the proposal *Loading the tendon: injury and repair.* The grant will enable the purchase of an Ebers bioreactor for research into why achilles tendon injuries arise and to identify the optimal treatment method for these injuries. The project is a collaboration with NOC*NSF, which made a generous financial contribution to the purchase of the bioreactor. The project will strengthen the translational research in this field and stimulate future collaboration. The bioreactor will be placed in the Laboratory for Myology of the Department of Human Movement Sciences at VU Amsterdam.

Awards

International Scientific Awards

Gert Kwakkel (Amsterdam UMC, location VUmc), was awarded the prestigious Outstanding Neurorehabilitation Clinican-Scientist (ONCS) Award during the Annual Meeting of the American Society of neurorehabililtaition held in San Diego, Ca. on November 1-2, 2018. The prize was awarded to professor Kwakkel in recognition of his research on mechanisms of neurological recovery in the brain, in relation to the return on functions and skills in patients with stroke.

Edgar Peters (Amsterdam UMC, location VUmc), was in 2018 awarded the American Diabetes Association's 2018 Roger Pecoraro Award for his scientific contribution and demonstration of an untiring commitment to improving the understanding of the detection, treatment and prevention of diabetic foot complications. Dr. Peters was given the award during the ADA's 78th Scientific Sessions, June 22-26, 2018, at the Orange County Convention Center in Orlando, Fl, USA. In connection with the award, dr. Peters delivered the Roger Pecoraro Award Lecture, *The Ghosts of Diabetic Foot Infection: Past, Present, and Yet to Come?* on Saturday, June 23.

At the annual meeting of ANZSSFR (Australian and New Zealand Society for Sarcopenia and Frailty Research) in Dunedin New Zealand in November 2018, **Janine van Ancum** (FGB, VU) won the Clinical Translational Research poster prize for the for her poster presentation *Gait speed assessed by a 4-meter walk test is not representative of daily-life gait*.

Eva van Delft (Amsterdam UMC, location VUmc) was awarded the ECTES (European Society for Trauma and Emergency Surgery) congress grant of €1000 to attend the 19th European Congress of Trauma & Emergency Surgery taking place from May 6 – 8, 2018, in Valencia, Spain.

Annoek Louwers (Amsterdam UMC, location AMC), was awarded the European Academy of Rehabilitation Medicine prize of 2018 for her PhD thesis *Effective use of the Assisting Hand in Adolescents with Cerebral Palsy*, which she defended at University of Amsterdam on April 19, 2018.

Juultje Sommers (Amsterdam UMC, location AMC), was one of three winners with her pitch on her research project *Body Weight Supported Treadmill Training Promotes Very Early Ambulation in Patients in the Intentise vare Unit: A Feasibility Study*, which she presented at the 21st European Congress of Physical And Rehabilitation Medicine (ESPRM 2018) in Vilnius, Lithuania on May 2, 2018.

National Awards (Scientific and Societal)

Professor **Davide Iannuzzi** (Faculty of Sciences, VU) was in 2018 announced as the winner of the NWO Physics Valorization Prize 2018. Professor Iannuzzi was awarded the prize for the valorization of his

own research, and the attention his gives to facilitate the valorization of fellow scientists' work. The prize of €250.000 will be awarded in a ceremony in January 2019, during the annual physics conference Physics@Veldhoven.

Gino Kerkhoffs and **Mario Maas** (both Amsterdam UMC, location AMC), together with **Evert Verhagen** (Amsterdam UMC, location VUmc) were in the spring of 2018 given a mark of appreciation by TeamNL for their substantial contribution to the development and performance of Dutch top athletes. They were given the token of appreciation for their contribution in medical care and the expertise they offer Dutch top athletes, and were awarded the virtual badge High Performance Partner of TeamNL. As a result of the care offered by professor Kerkhoffs, Maas, Verhagen and other sports specialists and consultants, the Netherlands is a front runner in the area of sports- and movement care.

Hanneke de Vries, Irene Bultink and others (all Amsterdam UMC, location VUmc), and members of the multidisciplinary VUmc team SLE and pregnancy, were in 2018 awarded the VUmc "Profielprijs 2018", for their work with pregnant SLE patients, prior to, during and after pregnancy.

Mattijs Alsem (Amsterdam UMC, location AMC), who defended his thesis at Utrecht University on July 10, 2018, was in November 2018 awarded the PhD Award Rehabilitation Medicine Prize during the annual Dutch Congress of Rehabilitation Medicine in Groningen, the Netherlands. Mattijs won the award for this thesis *Family needs and the role of information in paediatric rehabilitation care*.

Eline Flux (Amsterdam UMC, location VUmc), was during the AMS PhD day in October 2018, awarded the prize for the best AMS PhD project presentation of the year. Eline won the prize for her presentation *Reflexioning: down-conditioning of stretch reflexes in patients with spinal cord injury and cerebral palsy*.

At the Dutch congress of Physiotherapy held in 's Hertogenbosch in December 2018, **Sven Geelen** (Amsterdam UMC, location AMC), was runner up for his pitch and poster entitled *Greatly reduced physical activity of clinical patients internal medicine and surgery*.

AiOS **Evelien Jansen** (Amsterdam UMC, location AMC), in December 2018, won the A^2 Award at the MMV congress with her story Slack Fish. The A^2 Award is a prize initiated by De Jonge Specialist and the Academy for Medical Specialists, with the aim to put the spotlight on AiOS. In accordance with the theme of the MMV congress 2018 Educating is networking, the assignment was to write a short inspiring story about what motivates you during your work or in your education. Evelien shared the story about her special encounter with a paraplegic patient at the congress.

Anne van der Made (Amsterdam UMC, location AMC) was awarded 'Best Oral Presentation' at the Dutch Sports Medicine conference (SMWJC18) held in Ermelo, NL, at the end of November 2018. The presentation was a brief overview of Intramuscular tendon injury is not associated with an increased hamstring reinjury rate within 12 months after return to play, published in the British Journal of Sports Medicine.

Stephan van der Zwaard (FGB, VU) was during the 2nd AMS Annual Research meeting awarded the Outstanding Paper Award 2018 for this paper *Critical determinants of combined sprint and endurance performance: an integrative analysis from muscle fiber to the human body*, co-authored by W. J. van der Laarse, G. Weide, F.W. Bloemers, M.J. Hofmijster, K.. Levels, D.A. Noordhof, J.J. de Koning, C.J. de Ruiter and R.T. Jaspers. The paper was published in the FASEB Journal in March 2018.

Appointed AMS Professors and Principal Lecturers at Amsterdam University of Applied Sciences

Bianca Buurman-van Es (AMC) appointed UvA professor of *Acute Geriatrics.* On June 22, 2018, she gave her inaugural lecture *Van symptoombestrijding naar duurzame acute ouderenzorg.*

Aart Nederveen (AMC), appointed UvA professor of *Applied Magnetic Resonance (MR) Physics,* on June 6, 2018 gave his inaugural lecture entitled *You can't see what you don't see.*

Evert Verhagen (VUmc) was appointed to the VU URC (University Research Chair) of Epidemiology of Physical Activity, Sports and Health, and gave his inaugural lecture entitled *Citius, Altius, Fortius: on the future of physical activity, sports and health* on May 7, 2018. In connection with the inauguration there was an international symposium with the title *From the Playground to the Olympics – Health and Safety in Sports.*

Martin van der Esch was appointed Associate professor (Lector) of *Interdisciplinary care for chronic joint disorders* (Interdisciplinaire zorg voor chronische gewrichtsaandoeningen) at Amsterdam University of Applied Sciences (HvA), and gave his inaugural lecture on December 4, 2018.

Other Highlights

The Lancet published a viewpoint series called *Low Back Pain a call for action,* where it called for low back pain to be put on World's Health Agenda in a series of three papers published in the spring of 2018, by a group of low back pain experts. The approach to curing low back pain differs widely throughout the world, and in the series the experts, among them **Maurits van Tulder** (Faculty of Science, VU) called for a more conservative approach with exercise one of the key solutions as opposed to surgery, which is widely used in the US.

Katinka van der Kooij (Behaviour and Movement Sciences, VU), was in 2019 appointed member of the Amsterdam Young Academy (AYA). The AYA was set up in 2018, and the members of AYA will be selected each year by the deans of faculties of University of Amsterdam and Vrije Universiteit Amsterdam. The aim of the academy is to provide an independent platform to exchange critical perspectives, promote cross-disciplinary exchange of ideas and collaboration, and to strengthen the Universities' engagement with the city of Amsterdam and society.

Bastian Pietras (Behaviour and Movement Sciences, VU), was on December 20, 2018 awarded the distinction 'Cum Laude' (with honours) for thes defence of his dissertation *Modeling phase synchronization of interacting neuronal populations: From phase reductions to collective behavior of oscillatory neural networks.* On his project, Bastian Pietras was supervised by professor A. Daffertshofer, professor A. Stefanovska and professor P.V.E. McClintock. The project was financed by an EU-Horizon 2020 Marie Skłodowska-Curie Innovative Training Network grant, part of the COSMOS project.

AMS in 2018 issued **two innovation calls,** where a total of €1.500.000 was available for various research projects. Talented researchers from Amsterdam UMC, both locations, were granted projects in the field of Tenure Develoment / Mid career; Tenure Development / Clinical Leadership; Post Doc/Early Career, Grant applications, Feasibility studies / pilot projects; as well as PhD candidate and MSc Student grants. Read more about the projects granted in the section 'grants overview'.

AMS Research Meetings and Institute Activities

Annual Research Meeting

The 2nd AMS Annual Research Meeting was held on February 16, in Amsterdam ArenA congrescenter. The event took place during the Olympic Games in PyeongChang, South Korea, and as sports runs in our researchers' blood, sports was part of the theme at the meeting. The whole community of researchers watched the women's ice speed skating together, and for the scientific part, **Professor Marco Sandri** (U. of Padova, Italy) gave the key note *Exercise, mitochondria and protesostasis: a cross road for health ageing.* A representative from the Dutch Health Council, dr.ir. **Rianne Weggemans,** gave the key note lecture on the *Dutch Physical Activity Guidelines.* There was a well-visited poster session and the winners of the AMS Innovation call presented their work. For the whole community of AMS researchers a thoroughly successful meeting.

Program and Expert Meetings

The **RaMBaM** (**R**egeneration **a**nd **M**echanobiology of **B**one **a**nd **M**uscle) **meetings** were organized for a third year in a row, focusing on the way physical and chemical cues modulate cell fate and adaption, and how changes in cell or tissue mechanics contribute to development, physiology and disease. The organisers of the RaMBaM meetings are Dr. A.D. Bakker, (ACTA), Dr. N. Bravenboer (VUmc), Dr. R.T. Jaspers (FGB, VU) and prof.dr. J. Klein Nulend (ACTA). The meetings were organized on a selection of topics; prof.dr. Paul van Zuijlen talked about *The Skin Dissected;* dr. P.A. Nolte talked about *Orthopaedics keeps moving*, and prof.dr. D. Wismeijer presented *Where are we going to in Oral Implantology?* The RaMBaM meetings are well visited by a varied group of senior and junior researchers, and always generate broad discussion and stimulate new insights.

In December 2018 the research program Sports and Work held a research symposium entitled *Healthy Sports Performance.* The symposium was organized by program leaders **Evert Verhagen** (Amsterdam UMC, location VUmc) was and **Geert Savelsbergh** (FGB, VU)**.** The speakers at the symposium were Joao Brito who gave the talk *Performance and Health two sides of the same medal* and the presentation by sports physician Kasper Janssen who stressed the importance of sleep to maximize performance . In addition there were several PhD pitches and speed dates for all participants.

On August 28, the **3rd RM (Research Master) Graduation Congress** took place in the Auditorium of the O|2 building at VU University. There were

more than 110 participants at the congress, and 14 research master students presented the results of their one year research projects within the various departments associated with AMS. Dr. **Annemieke Buizer** and Prof.dr. **Jeroen Geurts** (both Amsterdam UMC, location VUmc) were keynote speakers at the congress, which has become one of the leading Movement Science congresses in the Netherlands.

Activities Organized for and by PhD Candidates

The AMS PhD committee organized a series of activities for PhD candidates within the institute, with the aim to support PhD candidates in their work, and to further to links between PhD candidates from the various participating partners. In April 2018 there was a get together for newly started PhD candidates, to inform them of the institute activates, and the ins- and outs of being a PhD candidate in Amsterdam.

On October 26, the 2nd PhD day was held to great success. The day started with a presentation for newly started PhD candidates, and at 9:30 am the whole PhD community joined. The day was filled with interesting presentations, amongst others by professor Mario Maas, and several PhD candidates. In the afternoon the prize for the best PhD project presentation was awarded to Eline Flux of Amsterdam UMC, location VUmc. Following the presentations, the PhDs rounded off with a rowing workshop led by a Dutch International rower, which was highly appreciated, and concluded with a social get together.

The PhD committee had the following members in 2018:

- **Sabrina Chettouf,** Movement Sciences, FGB
- **Mireille Folkerts,** Movement Sciences, FGB
- **Lisa Klous,** Movement Sciences, FGB
- **Rik Kraan,** Radiology, AMC
- **Christine Rustenburg,** Orthopaedic Surgery, AMC
- **Wouter Schallig,** Rehabilitation Medicine, VUmc
- **Niels Waterval,** Rehabilitation Medicine, AMC

The Science Transmission Meetings, organized by FGB PhD candidates Nick Kluft and Margit Hanssen, and open to all AMS PhD candidates. These meetings are monthly lunch occurrences that offer a wide selection of topics and aim to challenge the young scientists to look beyond his or her own field of work. Topics that were on the agenda in 2018 were *Thinking Bayesian, VU 3D model; Open Science Framework; Abusing P and Successful PhD.*

Activities Organized for and by PD / ECR (Early Career Researchers)

The Early Career Researchers within AMS is a small, but important group of researchers. In 2018 they set up a network of AMS ECR researchers, and they have been together or several occations, including as a separate ECR group during the PhD day in October 2019. The committee in 2018 had the following members:

- Lynn Bar-On, Rehabilitation Medicine, Amsterdam UMC, location VUmc;
- Joske Nauta, Public and Occupational Health, Amsterdam UMC, location VUmc;
- Eric Voorn, Rehabilitation Medicine, Amsterdam UMC, location AMC.

CWO (Committee Wetenschappelijk Onderzoek / Science Committee)

The new CWO (Science Committee) that was installed at the end of 2017, and is chaired by prof. dr. Willem F. Lems had its first meetings in 2018. The main task of the CWO is to judge scientific protocols and advise on research proposals. As of January 2018 the committee has members from both Amsterdam UMC locations (i.e. locations AMC and VUmc). Within VUmc, all proposals must be submitted to, and approved by a CWO before being submitted to the METC (Medisch-Etische Toetsings Committee). This is not compulsory within AMC, although AMS members have been offered the opportunity to submit protocols to the CWO, as a service to improve the quality of the protocols. The process of submitting research protocols either via the CWO or directly to the METC will be aligned in 2019 or 2020, depending on the recommendations of a pilot project at Amsterdam UMC.

In 2018 the committee judged 16 research protocols before submission to the METC: 14 protocols were approved directly, and the remaining 2 were approved in the second round, after improvements by the investigators.

In addition to judging submitted research protocols, the committee also has the task of judging research proposals in AMS financed proposal rounds. The CWO members judge the

proposals on their scientific quality and the quality of the candidates and/or team of researchers. The committee offers its recommendations to the AMS Management Team, who makes the final decision. In 2018 the CWO judged 29 research proposals submitted by staff, spread over two proposal rounds. A total of €887.700 was granted for various research projects within the institute.

CWO Committee members in 2018:

- Prof. dr. Willem Lems (Chair), Department of Rheumatology, Amsterdam UMC, location VUmc;
- Dr. Peter Bisschop, Department of Internal Medicine / Endocrinology, Amsterdam UMC, location AMC;
- Dr. Nathalie Bravenboer Department of Clinical Chemistry, Amsterdam UMC, location VUmc;
- Dr.ir. Josien Douw van den Noort, Department of Radiology and Nuclear Medicine, Amsterdam UMC, location AMC;
- Dr. Renate de Jongh, Department of Internal Medicine / Endocrinology, Amsterdam UMC, location VUmc;
- (Dr. ir. Jan Harm Koolstra, ACTA, back up CWO member);
- Dr. Huub Maas, Department of Human Movement Sciences, FGB, VU;
- Dr. Jaap van Netten, Department of Rehabilitation Medicine, Amsterdam UMC, location AMC;
- Prof.dr. Barend van Royen, Department of Orthopaedics, Amsterdam UMC, location AMC;
- Prof.dr. Evert Verhagen, Department of Public and Occupational Health, Amsterdam UMC, location VUmc;
- Dr. Erwin van Wegen, Department of Rehabilitation Medicine, Amsterdam UMC, location VUmc;
- Dr. Janneke Wilschut, Department of Epidemiology and Biostatistics, Amsterdam UMC, location VUmc;
- Solveig Lund MA, secretary to the committee, Amsterdam Movement Sciences.

Societal Impact

Professional Impact

See also the list of Scientific and Societal Awards.

Sicco Bus and **Jaap van Netten** (both Amsterdam UMC, location AMC) are members of the editorial board of the International Working Group for the Diabetic Foot (IWGDF). The International Guidelines on the Diabetic Foot will be completed and presented in May 2019 during the International Symposium on the Diabetic Foot in the Hague, which is held once every four years. The IWGDF produces international, multidisciplinary, evidence-based guidance documents to inform health professionals all over the world on the prevention and management of diabetic foot disease.

Erwin van Wegen and **Gert Kwakkel** (both Amsterdam UMC, location VUmc), were members of the Stroke Recovery and Rehabilitation Round Table (SRRR), an international working group of neuro-recovery researchers to build consensus on how to develop, conduct and report stroke research on the key priority areas of pre-clinical recovery research, biomarkers of recovery, intervention development, monitoring and reporting and measurement in clinical tirals. The round table meeting took place in Montreal, Canada in November 2018.

Merel Brehm (Amsterdam UMC, location AMC) was advisor to the guideline that in 2018 was authorized by the Nederlandse Vereniging van Revalidatieartsen: *Richtlijn operative behandelingen van voet-, hand- en heupproblemen bij HMSN (hereditaire motorische en sensoriche neruopathie).* The guideline was an initiative of Spierziekten Nederland and the Nederlandse Vereniging van Revalidatieartsen (VRA).

Joost Dekker (Amsterdam UMC, location VUmc), chaired the committee that developed the *Multidisciplinary recommendations for diagnosis and treatment of foot problems in people with rheumatoid arthritis*. The recommendations were published in the Journal of Foot and Ankle Research, 2018;11:37.

The department of **Human Movement Sciences,** VU, organized the Science Network for physiotherapists in musculoskeletal care, headed by professor **Michiel Coppieters**, appointed to the chair of Musculoskeletal Physiotherapy. The network aims to professionalize Dutch physiotherapy, with evidence based practice and scientific research.

Vana Hutter and **Raoul Oudejans** of FGB, VU, were important partners in the postgraduate

training *Praktijkopleiding Psychologie in de Sport.* The postgraduate training aims to professionalize sports coaches in the Netherlands and is the only accredited training in the Netherlands which gives the title *Sportpsycholoog VSPN.* The training offers its participants evidence based training in the field of mental training, mentoring and advice in sports.

Joke Geytenbeek (Amsterdam UMC, location VUmc) was a member of the scientific board for Speech Pathology in the Netherlands. In 2018 the C-BiLLT (Computer-Based instrument for Low motor Language Testing) course was implemented in the Netherlands, with the aim to improve the assessment of language comprehension in non-speaking persons with (severe motor) impairments. This has given patients and their families the possibility to communicate and has improved their quality of life.

Melvyn Roerdink (FGB, VU) has been appointed member of the management team of D-LAB Amsterdam (Demonstrator Lab). The lab aims to explore the industrial and market value of scientific innovations developed by Human Movement Scientists and students.

As a member of the European League Against Rheumatism (EULAR) Task Forces, Professor **Ronald van Vollenhoven** (Amsterdam UMC, location AMC), elaborated the recommendations for the treatment of Rheumatoid arthritis. The recommendations are currently in progress and will be presented in 2019. As part of EULAR Prof. van Vollenhoven further worked on the recommendations for Systemic Lupus Erythematousus (SLE), which are, submitted for publication, and Lupus Nephritis which will be presented in June 2019.

Professor **Ronald van Vollenhoven** (Amsterdam UMC, location AMC) directed a clinical trial that established that *ustekinumab* is effective in the treatment of SLE (Van Vollenhoven et al, Lancet, 2018). For now, this medication is available "off-label", and a confirmatory trial is underway. If successful, this would represent a important breakthrough for the treatment of this chronic autoimmune disease, where the options are limited.

The researchers within the Medical Imaging Quantification Center (MIQC), dr.ir. **Josien Douw – van den Noort** and dr.ir. **Chiel den Harder**, in collaboration with the PIs prof.dr**. Mario Maas**, prof.dr.ir. **Aart Nederveen** and prof.dr.ir. **Gustav Strijkers,**

all from Amsterdam UMC, location AMC, together implement research-methods, -techniques and -results into the clinical practice of radiology. In 2018 several techniques were implemented that have led to improved diagnostics and treatment evaluation in patients. The MIQC researchers developed a pipeline for a semi-quantitative automatic analysis of Dynamic Contrast Enhanced MRI (DCE MRI) for children with Juvenile Idiopathic Arthirtis (JIA) to assess the disease activity and effectiveness of medication. The results are now sent directly to the digital Picture Archiving and Communication System (PACS) and are used by the radiologists to set the diagnosis. The MIQC researchers also developed a whole-body MRI scan protocol that is now implemented and used in the clinical practice of radiology and gives MR water and fat images for the diagnosis in patients with myositis.

Civil Society Impact

See also the list of Societal Awards.

Marieke van der Schaaf together with **Juultje Sommers** (both Amsterdam UMC, location AMC) organized the third edition of the POST ICU Challenge charity run to improve awareness of PICS (Post Intensive Care Syndrome). The run took place in May 2018, and 90(!) participants had signed up for the run, which was a memorable day for all participants with extraordinary personal stories and meetings.

In October 2018, the meeting entitled *Zorg voor Leven met (Post)Polio* was held in Flint theater Amersfoort on the occasion of World Polio Day and the 30th anniversary of the Polio patient group, part of the Dutch Union of Muscle Diseases (Spierziekten Nederland). The event was organized by Rotary, Amsterdam UMC, Spierziekten Nederland, RIVM and the Prinses Beatrix Muscle Fund. The event, targeting polio survivors, Rotary members and other interested parties, was well visited. During the event, that was opened by ds. Gremdaat, the progress of the WHO world wide polio eradication program was presented, and the late effects of polio, the post-polio syndrome, was discussed. A funding campaign for Post-polio research by the Prinses Beatrix Muscle Fund was launched at the event. **Frans Nollet** (Amsterdam UMC, location AMC) was one of the distinguished speakers.

In 2018 Dr. **Annemieke Buizer** (Amsterdam UMC, location VUmc) was appointed coordinator of the newly established Netherlands CP (Cerebral Palsy) Register. The centre is a combined screening and treatment registry, available to practitioners and researcher with the aim that children with CP will benefit from improved, tailored care. The centre is a collaboration with the patient association BOSK and is part financed by ZonMw, Innovatiefonds Zorgverzekeraars, the Dutch Revalidatiefonds, Dioraphte, and fondsenwerf-actie September.

Several members of Amsterdam UMC, location AMC presented at the annual Spierziektecongres organized by the Dutch Association of Muscle Diseases (Spierziekten Nederland). **Merel Brehm, Fieke Koopman, Niels Waterval** and **Bart Raijmakers** were speakers at a symposium entitled *Enkel voet orthesen bij neuromusculaire* aandoeningen and during the post-polio working group meeting orthopedic aspects were discussed by **Matthias Schafroth** and **Frans Nollet**. Around 1500 people suffering from a variety of muscle diseases attended the meeting in Veldhoven in September 2018.

Andrea Maier (FGB, VU), **Marijke Trappenburg** and **Carel Meskers** (both Amsterdam UMC, location VUmc) in 2018 organized a series of lectures on Healthy Ageing for the elderly. In the series they informed the public about what the individual can do for healthy ageing and the role of movement and nutrition therein. The sessions proved very popular and were well visited by the target audience. This was done as part of the EU financed research project Physical Activity and Nutrition INfluences In ageing (PANINI).

PhD candidate **Sauvik das Gupta** (FGB, VU) and fellow entrepreneurs and students at FGB, were in December 2018 awarded a NWO Take-Off Phase-1 Grant of €40.00 for the project FITSURANCE. The project aims to contribute to reduce overall health costs by offering employers the opportunity to monitor employees' activities through a mobile application, and offer the said employees health check-ups and personalized physical activity and dietary advice, with the aim to reduce sick leave and costs for health insurance. The project focuses on preventing diseases rather than curing them, and encourages a healthy, productive and cheerful workforce.

Research Results

We are proud to present the output by Amsterdam Movement Sciences associated researchers.

Output	2017	2018
PhD Theses*	39	50
Scientific (refereed) publications	824	802
Non-refereed publications	n.a.	15
Professional publications	38	40
Books & book chapters	17	21
Total	918	946

* Defended at either University of Amsterdam or Vrije Universiteit Amsterdam.

It is interesting to see that of the 802 scientific refereed publications, 6,5% were collaborative projects between researchers from different AMS partners. This is a good start, and is expected to increase as the collaboration between the various partners and departments take off, spurred on by the innovation calls financed by AMS.

Key Publications

1. Smith, RL, Soeters, MR, Wüst, RCI & Houtkooper, RH 2018, 'Metabolic Flexibility as an Adaptation to Energy Resources and Requirements in Health and Disease', Endocrine Reviews, vol. 39, no. 4, pp. 489-517. https://doi.org/10.1210/er.2017-00211 (WoS IF 15.54).

2. Busch-Westbroek, TE, Delpeut, K, Balm, R, Bus, SA, Schepers, T, Peters, EJ, Smithuis, FF, Maas, M & Nieuwdorp, M 2018, 'Effect of Single Dose of RANKL Antibody Treatment on Acute Charcot Neuro-osteoarthropathy of the Foot', Diabetes care, vol. 41, no. 3, pp. e21-e22. https://doi.org/10.2337/dc17-1517 (WoS IF 13.40).

3. van Dijk, M, Dijk, FJ, Hartog, A, van Norren, K, Verlaan, S, van Helvoort, A, Jaspers, RT & Luiking, Y 2018, 'Reduced dietary intake of micronutrients with antioxidant properties negatively impacts muscle health in aged mice', Journal of Cachexia, Sarcopenia and Muscle, vol. 9, no. 1, pp. 146-159. https://doi.org/10.1002/jcsm.12237 (WoS IF 12.51).

4. Kerkman, JN, Daffertshofer, A, Gollo, LL, Breakspear, M & Boonstra, TW 2018, 'Network structure of the human musculoskeletal system shapes neural interactions on multiple time scales', Science advances, vol. 4, no. 6, eaat0497. https://doi.org/10.1126/sciadv.aat0497 (WoS IF 11.51).

5. Mol, A, Reijnierse, EM, Bui Hoang, PTS, van Wezel, RJA, Meskers, CGM & Maier, AB 2018, 'Orthostatic hypotension and physical functioning in older adults: A systematic review and meta-analysis', Ageing Research Reviews, vol. 48, pp. 122-144. https://doi.org/10.1016/j.arr.2018.10.007 (WoS IF 8.97).

6. op 't Veld, RC, van den Boomen, OI, Lundvig, DMS, Bronkhorst, EM, Kouwer, PHJ, Jansen, JA, Middelkoop, E, von den Hoff, JW, Rowan, AE & Wagener, FADTG 2018, 'Thermosensitive biomimetic polyisocyanopeptide hydrogels may facilitate wound repair', Biomaterials, vol. 181, pp. 392-401. https://doi.org/10.1016/j.biomaterials.2018.07.038 (WoS IF 8.81).

7. Vuurberg, G, Hoorntje, A, Wink, LM, van der Doelen, BFW, van den Bekerom, MP, Dekker, R, van Dijk, CN, Krips, R, Loogman, MCM, Ridderikhof, ML, Smithuis, FF, Stufkens, SAS, Verhagen, EALM, de Bie, RA & Kerkhoffs, GMMJ 2018, 'Diagnosis, treatment and prevention of ankle sprains: Update of an evidence-based clinical guideline', British journal of sports medicine, vol. 52, no. 15, pp. 956. https://doi.org/10.1136/bjsports-2017-098106 (WoS IF 7.87).

8. Pluim, BM, Clarsen, B & Verhagen, E 2018, 'Injury rates in recreational tennis players do not differ between different playing surfaces', British Journal of Sports Medicine, vol. 52, no. 9, pp. 611-615. https://doi.org/10.1136/bjsports-2016-097050 (WoS IF 7.87).

9. Daanen, HAM, Racinais, S & Périard, JD 2018, 'Heat Acclimation Decay and Re-Induction: A Systematic Review and Meta-Analysis', Sports Medicine, pp. 1-22. https://doi.org/10.1007/s40279-017-0808-x (WoS IF 7.07).

10. Thompson, C, Schabrun, S, Romero, R, Bialocerkowski, A, van Dieen, J & Marshall, P 2018, 'Factors Contributing to Chronic Ankle Instability: A Systematic Review and Meta-Analysis of Systematic Reviews', Sports Medicine, vol. 48, no. 1, pp. 189-205. https://doi.org/10.1007/s40279-017-0781-4 (WoS IF 7.07).

Dissertations

Dissertations defended at one of the partner universities in 2018, and supervised by at least one AMS member.

1. Boel, JA 2018, 'Cognitive functioning and psychiatric symptoms in parkinson's disease', University of Amsterdam: Faculty of Social and Behavioural Sciences, Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: Bernardus A. Schmand, Rob M. A. de Bie, Co-supervisors: Gert J. Geurtsen, Rick R. Schuurman.

2. Bolster, EAM 2018, 'Clinical exercise testing in pediatric rehabilitation', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: V. de Groot, Co-supervisors: A.J. Dallmeijer, A.C.J. Balemans.

3. Cayami, FK 2018, 'Hypomyelination with tooth and bone involvement: New insights: Brain MR imaging and in vitro models', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: M.S. van der Knaap, Co-supervisors: N.I. Wolf, D. Micha.

4. Chiarotto, A 2018, 'A core outcome measurement set for low back pain', PhD, Vrije Universiteit Amsterdam. Supervisors: R.W.J.G. Ostelo, M. Boers, Co-supervisor: C.B. Terwee.

5. Cools Paulino Pereira, NR 2018, 'Surgical decision-making for spine metastatic disease', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: C. N. van Dijk, Co-supervisor: J. A. M. Bramer.

6. de Leeuw, PAJ 2018, 'Ankle arthroscopy under the scope', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: C. N. van Dijk, Co-supervisor: L. Blankevoort.

7. de Witte, AMH 2018, 'Mobility Performance in Wheelchair Basketball', PhD, Vrije Universiteit Amsterdam. Supervisors: H.E.J. Veeger, L.H.V. van der Woude, Co-supervisors: M.J.M. Hoozemans, M.A.M. Berger.

8. Dingemans, SA 2018, 'Complications, current practice and controversies in lower extremity fracture surgery', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: J. C. Goslings, Co-supervisor: T. Schepers.

9. Emanuel, K. 2018, 'Towards quantitative functional measures for intervertebral disc degeneration', Doctor of Philosophy, Vrije Universiteit Amsterdam, Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: T.H. Smit, Co-supervisor: I. Kingma.

10. Haberfehlner, H 2018, 'Knee joint mechanics and semitendinosus muscle morphology in spastic paresis', PhD, Vrije Universiteit Amsterdam. Supervisor: J.G. Becher, Co-supervisors: R.G. Jaspers, A. Buizer, H. Maas.

11. Hageman, MGJS 2018, 'Decision-making in orthopaedic surgery', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: C. N. van Dijk, D. C. Ring.

12. Haghiralsadat, B 2018, 'Design and Preparation of siRNA and Doxorubicin Loaded Nano-liposomes for Targeted Treatment of Osteosarcoma', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisors: T Forouzanfar, G Amoabediny, Co-supervisors: MN Helder, B Zandieh Doulabi, Mohammad Hasan Sheikhha.

13. Helmerhorst, GTT 2018, 'Pain relief after musculoskeletal trauma', University of Amsterdam. Thesis - Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: G. M. M. J. Kerkhoffs, D. C. Ring, Co-supervisor:P. Kloen.

14. Horbach, SER 2018, 'Management of vascular malformations: Diagnosis, treatment strategies & outcome measurement', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: C. M. A. M. van der Horst, P. I. Spuls.

15. Jansen, SM 2018, 'Quantitative perfusion diagnostics in esophageal cancer surgery', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: A. G. J. M. van Leeuwen, M. I. van Berge Henegouwen, Co-supervisors: S. S. Gisbertz, S. D. Strackee.

16. Janssen, SJ 2018, 'Surgical decision-making for long bone metastases', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: C. N. van Dijk, Co-supervisor: J. A. M. Bramer.

17. Jaspers, MEH 2018, 'Beyond the skin: new insights in burn care', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisors: P.P.M. van Zuijlen, E. Middelkoop.

18. Kal, EC 2018, 'Improving Movement Automaticity and Dual-Task Performance in People with Stroke: A Change of Focus?', PhD, Vrije Universiteit Amsterdam. Supervisors: E.J.A. Scherder, C.A.M. van Bennekom, Co-supervisors: J. van der Kamp, H. Houdijk.

19. Kok, AC 2018, 'Improving imaging and treatment of talar osteochondral defects', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: G. M. M. J. Kerkhoffs, C. N. van Dijk, Co-supervisor: G. J. M. Tuijthoff.

20. Koolen, PGL 2018, 'Strategies to Optimize Outcomes after DIEP Flap Breast Reconstruction', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: M.J.P.F. Ritt, Co-supervisors: S.J. Lin, H.A.H. Winters.

21. Kox, LS 2018, 'Wrist overuse in young athletes: Exploring diagnostic strategies', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: M. Maas, M. H. W. Frings Dresen, Co-supervisors: G. M. M. J. Kerkhoffs, P. P. F. M. Kuijer.

22. Leegwater, NC 2018, 'Continuous-flow cryocompression therapy after hip fracture surgery', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam Supervisor: B.J. van Royen, Co-supervisors: P.A. Nolte, F.W. Bloemers.

23. Louwers, AM 2018, 'Effective use of the assisting hand in adolescents with cerebral palsy', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: F. Nollet, Co-supervisors: J.A.J.M. Beelen, L. Krumlinde-Sundholm.

24. Marck, RE 2018, 'On Platelets and Burns', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: E. Middelkoop, Supervisor: R. Breederveld.

25. Mico Amigo, ME 2018, 'Time in Parkinson's disease: Clinical and preclinical markers', PhD, Vrije Universiteit Amsterdam. Supervisor: J.H. van Dieen, Co-supervisor: I. Kingma.

26. Mirakhorlo, M 2018, 'Understanding Finger Motor Control In Young And Elderly', PhD, Vrije Universiteit Amsterdam. Supervisors: H.E.J. Veeger, I. Jonkers, Co-supervisors: H. Maas, D.F. Stegeman.

27. Monsuur, HN 2018, 'Understanding endothelial cell behavior for regenerative medicine strategies', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: S. Gibbs, Co-supervisors: L.J. van den Broek, P. Koolwijk.

28. Mulders, MAM 2018, 'Distal radius fractures: Value based diagnosis, treatment and outcome', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: J. C. Goslings, Co-supervisor: N. W. L. Schep.

29. Muller, B 2018, 'Anterior cruciate ligament injury and surgery: A more objective take', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: C. N. van Dijk, Co-supervisors: F. H. Fu, J. J. Irrgang.

30. Negenborn, VL 2018, 'Clinical results and patient-reported outcomes in breast reconstructive surgery', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: M.J.P.F. Ritt, Supervisors: M.G. Mullender, M.P. van den Tol, N.M.A. Krekel.

31. Nelemans, BKA 2018, 'How to build a spine? Exploring mechanobiology of somite formation in the chicken embryo', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: T.H. Smit.

32. Nosewicz, TL 2018, 'Acute and chronic aspects of hindfoot trauma', University of Amsterdam. Thesis - Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: J. C. Goslings, C. N. van Dijk, Co-supervisor: T. Schepers.

33. Paul, CPL 2018, 'Intervertebral disc degeneration: Studies in the loaded disc culture system', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: T. H. Smit, Co-supervisors: M. N. Helder, M. G. Mullender.

34. Persoon, S 2018, 'Physical exercise in patients treated with hematopoietic stem cell transplantation', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: M. J. Kersten, M. J. M. Chin A Paw, Co-supervisors: L. M. Buffart, F. Nollet.

35. Pietras, B 2018, 'Modeling phase synchronization of interacting neuronal populations: From phase reductions to collective behavior of oscillatory neural networks', PhD, Vrije Universiteit Amsterdam. Supervisors: A. Daffertshofer, A. Stefanovska, P.V.E. McClintock.

36. Richards, RE 2018, 'Gait Retraining with Real-time Biofeedback for Reducing the Knee Adduction Moment in People with Medial Knee Osteoarthritis', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisors: J. Harlaar, J. Dekker, Co-supervisors: J.C. van den Noort, M. van der Esch.

37. Ridwan-Pramana, A 2018, 'PMMA in cranioplasty: Another approach', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: T. Forouzanfar, Co-supervisors: JJWA van Loon, JEH Wolff.

38. Satuvuori, E 2018, 'Spike train distances and neuronal coding', PhD, Vrije Universiteit Amsterdam. Supervisors: A. Daffertshofer, R. Livi, Co-supervisor: T. Kreuz.

39. Schmitz, MS 2018, 'Mechanical micromanipulation and time lapse imaging of early chick embryos: New experimental tools', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: T.H. Smit.

40. Somford, MP 2018, 'Eponymous terms in orthopedic surgery', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: D. Eygendaal, C. N. van Dijk, Co-supervisor: F. F. A. Ijpma.

41. ten Haaf, TPG 2018, 'On the physiological and psychological differences between functional overreaching and acute fatigue', PhD, Vrije Universiteit Amsterdam. Supervisor: H.A.M. Daanen, Co-supervisor: J.J. de Koning.

42. van Asten, SAV 2018, 'Diagnosing and monitoring diabetic foot osteomyelitis', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisors: Y.M. Smulders, L.A. Lavery, Co-supervisor: E.J.G. Peters.

43. van Beek, N 2018, 'Understanding finger mechanics and motor control in young and elderly', PhD, Vrije Universiteit Amsterdam. Supervisors: D.F. Stegeman, H.E.J. Veeger, Co-Supervisors: I. Jonkers, H. Maas.

44. van der Zwaard, S 2018, 'Why muscles matter: Optimizing sprint and endurance performance in athletes', PhD, Vrije Universiteit Amsterdam. Supervisor: H.A.M. Daanen, Co-supervisors: R.T. Jaspers, C.J. de Ruiter, J.J. de Koning.

45. van Maarseveen, MJJ 2018, 'Reading the game: How to measure and improve tactical skills in team sports', PhD, Vrije Universiteit Amsterdam. Supervisor: G.J.P. Savelsbergh, Co-supervisor: R.R.D. Oudejans.

46. van Vulpen, LF 2018, 'Functional power-training in young children with cerebral palsy', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: J.G. Becher, Co-supervisors: A.J. Dallmeijer, S. de Groot.

47. Verlaan, G 2018, 'Nourish the Muscle: Nutritional Supplementation in Sarcopenia', PhD, Vrije Universiteit Amsterdam. Supervisor: A.B. Maier, Supervisor: T. Cederholm.

48. Wellenberg, RHH 2018, 'Reducing metal artefacts and radiation dose in musculoskeletal CT imaging', University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisors: M. Maas, C. H. Slump, Co-supervisors: M. F. Boomsma, G. J. Streekstra.

49. Winters, C 2018, 'Reactive neurobiological recovery after ischaemic stroke? Prognosis & intervention', Doctor of Philosophy, Vrije Universiteit Amsterdam. Thesis - Research VU University Amsterdam, graduation VU University Amsterdam. Supervisor: G. Kwakkel, Co-supervisor: E.E.H. van Wegen.

50. Witjes, S 2018, 'Improving activities and satisfaction of younger osteoarthritis patients after knee arthroplasty and osteotomy: A patient tailored approach', Doctor of Philosophy, University of Amsterdam. Thesis: Research University of Amsterdam, graduation University of Amsterdam. Supervisor: G. M. M. J. Kerkhoffs, Co-supervisors: R. C. I. van Geenen, P. P. F. M. Kuijer.

External Dissertations (supervised by an AMS member, thesis defended at other university)

1. Alsem, MW 2018, 'Family needs and the role of information in paediatric rehabilitation care', Doctor of Philosophy, Utrecht University. Thesis: Research external, graduation external. Supervisors: J. M. A. Visser-Meily, M. J. Jongmans, Co-supervisors: M. Ketelaars, M. Verhoef.

2. Mentzel, TQ 2018, 'Capturing the Cacophony of Movement: Assessment, epidemiology and treatment of movement disorders in patients with psychotic disorders', PhD, Maastricht. Supervisors: P.N. van Harten, HA.M. Daanen.

3. Nelissen, JL 2018, 'MR imaging and elastography of deformation-induced skeletal muscle damage', Technical University, Eindhoven: Department of Biomedical Engineering. Thesis: Research external, graduation external. Supervisors: G. J. Strijkers, K. Nicolaij, Co-supervisor: A. J. Nederveen.

4. Roeles, S 2018, 'The development of a reactive gait assessment; toward identifying risk for falls in older adults'. U. of Strathclyde. Supervisor: P.J. Rowe, C. Childs, Co-supervisor: M.A.G.M. Pijnappels.

AMS Membership Base

AMS has a large and varied group of researchers as members. Below is an overview of the members' various department and partner faculties.

AMS membership base	Scientific Core staff [1]	Other Scientific Staff [2]	Visiting Fellows [3]	PhD candidates (Internal) [4]	PhD candidates (External) [5]	PhD candidates (total) [6]	Total
VU							
FGB/Human Movement Sciences	45	26	19,5	47	70	117	207,5
Fac. Of Sciences / Health Sciences / Physics and Astronomy	5			1		1	6
Total VU	**50**	**26**	**19,5**	**48**	**70**	**118**	**213,5**
VUmc							
Clinical Chemistry		2,5		1		1	3,5
Clinical Genetics		1				0	1
Dermatology	0,5	0	2	0,5	1	1,5	4
Epidemiology and Biostatistics	1	0,5	0,5		1	1	3
Gastroenterology and Hepatology		1	1			0	2
General Practice and Elderly Care Medicine	0	0,5				0	0,5
Internal Medicine	2	7,5	2	0	0	0	11,5
Molecular Cell Biology	0,5		0,5	0,5	0	0,5	1,5
Neurosurgery		2				0	2
Obstetrics and Gynaecology		0,5	0,5			0	1
Oral and Maxillofiacial Surgery / Oral Pathology	5	7	6	1	2	3	21
Orthopaedic Surgery	0	8,5	2	0	0	0	10,5
Pediatrics	1					0	1
Plastic, Reconstructive and Hand Surgery	2	6,5	3,5	1	1	2	14
Public and Occupational Health	2	1	1	0	6	6	10
Radiology and Nuclear Medicine	1	1				0	2
Rehabilitation Medicine	5	11	4	10	2	12	32
Rheumatology	1	1				0	2
Surgery	0	2	0	0	0	0	2
Sum total Amsterdam UMC, location Vumc	**21**	**53,5**	**23**	**14**	**13**	**27**	**124,5**
ACTA[7]	8	3					11

AMS membership base	Scientific Core staff [1]	Other Scientific Staff [2]	Visiting Fellows [3]	PhD candidates (Internal) [4]	PhD candidates (External) [5]	PhD candidates (total) [6]	Total
Amsterdam UMC, location AMC							
Adult Psychiatry				1	0	1	1
Biomedical Engineering and Physics	2,5	1		5	0	5	8,5
Cardiology		1				0	1
Clin. Epid.Biost. Bioinf. (KEBB)				1		1	1
Clinical Immunology and Rheumatology	1			2	0	2	3
Clinical methods & Publ. Health				1		1	1
Emergency Department				2	0	2	2
Endocrinology		1		0	0	0	1
Fac. Of Health				1		1	1
Foot and Ankle Research				1		1	1
General Practice / Familiy Medicine				1	0	1	1
Geriatrics	0,5	5		3	0	3	8,5
Graduate School only				0	0	0	0
Innovation and Research				1		1	1
Intentive Care				1		1	1
Internal Medicine				5	0	5	5
Laboratory Genetic Metabolic Diseases		1		0	0	0	1
Medical Biology	1			0	0	0	1
Medical Psychology		2		1	0	1	3
Neurology				2		2	2
Nursing	0,5			2	0	2	2,5
Obstetrics and Gynaecology				1		1	1
Orthopaedic Surgery	2	5		36	0	36	43
Plastic, Reconstructive and Hand Surgery	1	3		7	0	7	11
Radiology and Nuclear Medicine	2,5	1		12	0	12	15,5
Rehabilitation Medicine	3	11		22	0	22	36
School of Physiotherapy				1		1	1
Sports Science				1		1	1
Surgery		2		15	0	15	17
Vascular Medicine				2	0	2	2
Not registered with department		4		8		8	12
Total AMC members	**14**	**37**	**0**	**135**	**0**	**135**	**186**
AMS members	**93**	**119,5**	**42,5**	**197**	**83**	**280**	**535**

Notes

1 Scientific core staff: Professors, Associate professors and Assistant professor
2 Researchers, (Senior, Postdoc and Junior; other scientific staff; Medical staff doing research
3 Visiting Fellows: visiting researchers; visitors professors; holders of endowed chairs
4 PhD candidates (Standard/employed)
5 PhD candidates (Not employed)
6 PhD-Candidates (all catergories)
7 Personal memberships