Summary of self-evaluation Amsterdam Movement Sciences 2017-2022

Research inspired by motion for "moving better, moving longer and moving again"

Quick facts

Established 01/2017. Researchers are employed by the respective academic partners, and the researchers are members based on their research expertise and interests.

Website:
www.amsterdamumc.org/movement-sciences

Structure

Five research Programs:

- Sports
- Musculoskeletal Health
- Tissue Function & Regeneration
- Ageing & Vitality
- Rehabilitation & Development

Organisation:
Two directors, one management team, and a small support office.

Participating academic partners:

- Amsterdam UMC, location AMC
- Amsterdam UMC, location VUmc
- Vrije Universiteit Amsterdam, Faculty of Behavioural and Movement Sciences and Faculty of the Sciences

In addition, there are associated members from Amsterdam University of Applied Sciences (HvA), Inholland University of Applied Sciences and ACTA (Academic Center for Dentistry Amsterdam).

Mission

Amsterdam Movement Sciences is dedicated to advancing physical and mental performance in both health and disease, aiming to contribute to well-being and societal participation based on a fundamental understanding of human movement.

Vision

All humans benefit from movement/physical activity without pain and physical or mental limitations. AMS takes on research questions concerning the human movement system, driven by a profound interest, clinical considerations, and societal perspectives. Through research, AMS contributes to the enhancement, preservation, and restoration of the human motor system, enabling optimal physical performance in daily life.

Accomplishments

Research quality

Number of publications increased alongside the score for Open Access publications. National collaborations remained steady, particularly strengthened between VUmc and FBMS, while international collaborations increased, possibly due to the expansion of research programs. All AMS research programs experienced publication growth, with values above 1 indicating significant expansion in their respective fields. 59-80% of publications were available in Open Access, all were among the top-10% most cited in their fields. Collaborative industry involvement ranged from 1% to 11%, with higher percentages in programs with more papers.

Valorisation and societal impact

AMS publications demonstrate notable relevance in clinical guidelines and hospitals, reflecting collaborative efforts in clinical research, with above-average relevance in policy documents and news articles, particularly regarding health and the COVID-19 pandemic. The valorisation process has evolved naturally, with AMS showing success in innovation through the establishment of four start-ups during the audit period, indicating positive strides in bringing research contributions to the market.

Affiliated to AMS are five knowledge centres (KCs). They are the linking pins between the researchers, clinicians/ coaches, and other stakeholders, such as health care providers, athletes, etc. The idea is that the KCs are in close contact with the stakeholders and bridge the gap between patients / health care providers/ athletes / coaches and academia and provide an interface in which new research results are directly shared with potential end-users. The centers also identify and address research questions that the practitioners encounter in their daily practice.

Future strategic actions

- Enhance focus on exercise and physical activity as key elements for healthy longevity
- Focus on consortia; team science with implications for talent development
- Research Infrastructure; maximizing potential in methodology and technology
- Enhancing institute visibility; targeted communication
- Connecting researchers, impact managers and business developers to facilitate valorisation

FACTSHEET

Key Numbers						
Output	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Scientific (Refereed) publications	824	802	769	831	826	1041
Non-refereed articles	n.a.	15	29	22	29	17
PhD theses	39	50	47	59	50	48
Professional publications	38	40	43	27	36	19
Books & Chapters	17	21	18	5	13	15
Total	**918**	**928**	**906**	**944**	**954**	**1140**

Start-up grants (NWO Take-off program)

- Sauvik das Gupta, VU Amsterdam, with the project Fitsurance BV;
- David Mann, VU Amsterdam with the project Virtual 3D room (VROOM);
- Richard Jaspers, VU Amsterdam with the project SoundTomics;
- Nilas van Woersem, VU Amsterdam with the project "The Intelligent Boxing Bag"; NextRound BV.

Personal Grant Laureates:

- VENI grant: Lynn Bar-On, (VUmc), The means
- towards etiology-driven treatment of joint hyper resistance in spastic Cerebral Palsy. VENI grant of €250.000, 2017.
- VIDI grant: Sjoerd Bruijn, (FBMS), Understanding stability of walking – active control towards a passively stable pattern?, VIDI grant of €800.000, 2017.
- VENI grant: Melissa Hooijmans, (AMC), Non-invasive MR platform to study muscle ageing during inmagnet exercise. VENI grant of €250.000, 2020.
- VIDI grant: Pim van Ooij (AMC), Less aortic motion in a diseased thoracic aorta. VIDI grant of €810.000, 202

AMS membership base	2017	2018	2019	2020	2021	2022
Scientific core staff	84	93	87	96	106	104
Other scientific staff	166	162	161	175	193	124
PhD candidates	236	280	271	353	328	332
Total	**486**	**535**	**519**	**624**	**627**	**560**

Management team:

- Prof. Dr. Richard Jaspers (Director), Faculty of Behavioural and Movement Sciences, VU Amsterdam
- Prof. Dr. Mario Maas (Director), Amsterdam UMC, location AMC
- Prof. Dr. Evert Verhagen, Amsterdam UMC, location VUmc
- Dr. Wendy Scholten Peeters, Faculty of Behavioural and Movement Sciences, VU Amsterdam
- Dr. Nathalie Bravenboer, Amsterdam UMC, location VUmc
- Prof. Dr. Carel Meskers, Amsterdam UMC, location VUmc
- Prof. Dr. Sicco Bus, Amsterdam UMC, location AMC
- Dr. Erwin van Wegen, Amsterdam UMC, location VUmc
- Dr. Melissa Hooijmans, Amsterdam UMC, location AMC
- PhD candidate: Marijke de Leeuwerk, Amsterdam UMC, location VUmc
- Communication officer: Drs. Mirjam Gouweloos
- Research support officers: MSc. Maria-Luiza di Carlo Riato, MA. Solveig Lund

Translational research cases

Sports

In the SHOTPROS project, an initiative supported by the EU H2020 project, the researchers investigated the use of virtual reality. This project focused on the training of police officers, aiming to enhance their decision-making abilities and apt responses in high-stress situations. Within the framework of the consortium, several educational institutions worked in tandem with six law enforcement agencies (LEAs) from five European countries.

Musculoskeletal health

in the OCTOPUS project a group of researchers, clinicians (physical therapists, rheumatologists, dieticians) and patients collaborated to develop and evaluate a new treatment approach for people with knee osteoarthritis. This treatment approach was a stratification into subgroups which subsequently received subgroup-specific exercise therapy (instead of a 'one-size-fits-all' treatment) from a physical therapist, and which was supplemented with a dietary intervention from a dietician in one subgroup. This stratification was based on previous (fundamental) research to identify homogeneous subgroups from the heterogeneous patient population. Although the new, stratified approach was not found to be superior in terms of clinical and cost effectiveness compared to usual physical therapy, this project had great impact in terms of scientific output and implications for clinical practice.

Tissue Function & Regeneration

Broken-bone-in-a-box: The collaboration with University of Twente resulted in two grants to develop a (broken)-bone-on-chip device. This device can be used to investigate (individualized) treatment to enhance fracture repair. This device will also be incorporated in the education of master students from both UT (creative technology) and Amsterdam UMC (Research Master Personalized Medicine). The broken-bone-in-a-box is a collaboration between Amsterdam UMC departments of clinical chemistry (Dr. Bravenboer), Traumatology (Prof. Bloemers), Maxillofacial surgery (Prof. Schulten) and ACTA Dept. of Oral Cell Biology (Prof. Bakker and Prof. Klein-Nulend).

Ageing & Vitality

Patients with long-COVID suffer from extreme fatigue, muscle soreness and muscle-related complaints. Physical exercise causes a deterioration of the complaints (post-exertional malaise). These complaints can persist days to weeks. In a collaboration between the Internal Medicine department (Prof. van der Vucht) and the Laboratory for Myology (Dr. Wüst, VU Amsterdam-FBMS) a translational research line has been established aiming to uncover the pathophysiology of these post-Covid19 associated complaints. To this end, measures of whole-body physical performance are assessed and related to phenotypical and molecular characteristics to understand the basic mechanisms underlying the observed muscle complaints and discover therapeutic targets. Recently, this research has been expanded to patients with chronic fatigue syndrome. A total of > 1M€ has been award from different funding agencies.

Rehabilitation & Development

Precision orthotics: the PROOF-AFO study demonstrated that individually optimizing the bending stiffness of an ankle-foot-orthosis (AFO) doubles the effect on walking energy cost reduction, compared to AFOs provided in clinical practice for people with calf muscle weakness. To facilitate implementation of the concept of precision orthotics in clinical practice, ongoing studies aim to establish and validate a simulation framework for predicting optimal AnkleFoot Orthosis (AFO) stiffness. Additionally, efforts are directed towards the design of an innovative wearable AFO, enabling real-time adjustments in stiffness. This facilitates efficient optimization procedures for personalized patient care.