Key note: [**David Mann**](https://research.vu.nl/en/persons/david-mann) (Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam): *All's (not) fair in love and sport: Classification to improve the fairness of sport for athletes with impairment*

Para sports provide tremendous opportunities for the social inclusion of people with impairment, but there is considerable controversy about the way those sports should be structured. In particular, a system is needed to ensure that Para athletes compete against others whose impairment results in a similar impact on their sport performance. The aim of this presentation is to examine Para sport classification as a means of ensuring that the winner is the best athlete rather than the one with the least impairment. We will discuss the benefits but also the potential pitfalls in a move towards evidence-based classification, and provide examples of new systems being introduced for use in the Paralympic Games. We will also discuss the degree to which congenital or acquired impairments might impact sport performance, and also strategies to try and account for individuals who try to ‘cheat’ by intentionally misrepresenting their level of impairment.

Luyten Frank P. Prof. Em. KU Leuven, BE; Med/Sci Director RegmedXB, Maastricht, NL: *Regenerative Medicine and Tissue Engineering: Towards a Functional Living Joint Replacement*

Joint surface defects are often symptomatic, in particular in the knee, and require proper management, either by a conservative approach with pain relief, education and physiotherapy or a surgical intervention followed by rehabilitation. The repair of full depth articular cartilage defects has been explored comprehensively, and today there are several clinically acceptable treatments including microfracture and a variety of cartilage grafting approaches. Treatment choices appear to depend on a number of factors including the patient profile, size and location of the lesion, patient and surgeon preferences. Importantly, a substantial number of the articular cartilage defects appear to stabilize over time and do not lead to an OA disease process. In contrast, there is convincing evidence in animal models and in humans, that when the joint surface defects penetrate into the underlying bone there is a very high rate of osteoarthritis (OA) over time. Hence, in these patients it is important to consider the entire osteochondral unit as a target for repair. The standard of care for these osteochondral defects is not universal but goes from a conservative approach to surgical repair procedures such as osteochondral autografts or allografts, with quite some limitations including limited integration and poor long term outcomes. To address this unmet clinical need we developed several regenerative tissue engineering strategies from bilayered constructs with a stable engineered cartilage patch on top of a subchondral bone forming device to more complex integral living osteochondral implants. We tested these in a rat model and some were tested subsequently for feasibility, safety and biological potency in the minipig model. A comprehensive analysis of 1 year outcomes identifies the performing implants with regard to regenerative potential. The best implants will be further investigated in an explorative clinical trial in well defined patients. Moreover, a next generation of more complex zonated implants is being pursued as a result of breakthroughs in organoid technologies. These microtissues can be used as building blocks for bottom-up 3D bioprinting of living joint implants. To produce scaled-up implants with a highly precise structure, integration of bioprinting technologies is needed. Moreover in order to cover a potential rising clinical demand, the entire manufacturing process, which is mostly manual today, will need to be automated allowing a clinically relevant throughput. Taken together we anticipate to manufacture affordable and accessible tissue engineered products for osteochondral joint defect regeneration, paving the way to the construction of a hemi- or even entire biological joint “prosthesis”, addressing a major socioeconomic challenge of the European ageing society.