

Profile

Frederik Barkhof: building bridges between disciplines



The early academic journey of Frederik Barkhof was a winding one. As a child he was fascinated by the engineering of buildings and bridges, but then crossed over to study dentistry—"which was a mistake" (a bridge too far, presumably). He next stopped to study at the intersection between philosophy and medicine, until he landed at VU University (Amsterdam, the Netherlands) where he received his MD in 1988. Combining his love of engineering and medicine, Barkhof is now a neuroradiology professor who shares his expertise with both VU University Medical Centre and University College London (UCL, London, UK) and brings decades of experience and knowledge, particularly in MRI techniques, to translating novel imaging techniques from engineering technology to clinical applications. Using MRI and PET, his principal research is in diagnosis and therapeutic management of white matter disease and neurodegeneration, predominately in multiple sclerosis and dementia.

"Radiology is technologically driven and, with one foot in [the Department of Medical Physics and] Biomedical Engineering at UCL and the other in [the Department of] Neurology, I can enjoy being part of the whole process", he says. "In retrospect, I see my years as a keen amateur photographer, when I was always with a camera, developing film in the dark rooms of my local youth club, as an influential factor in my interest in radiology", Barkhof explains. "When I entered medicine I wasn't even aware of such a thing as radiology, I was drawn to neurology, but my internship was broad." He decided to self-report to radiology and it was there he met neurologist and psychiatrist Jacob Valk, who had just purchased one of the first MRI scanners in the Netherlands. "I was lucky", he says, which appears to be a common concession in young aspiring doctors. When asked whether there was more than just luck involved, Barkhof points out that for him, luck is "seeing and then grabbing opportunities—not everyone has them but some just don't take them". Then it is all about hard work, but very exciting hard work; "nothing was known at that stage, it was incredible that we could now see what was previously only visible at autopsy or during operations", he says. It was a highly inspiring and liberal environment, which allowed Barkhof to set out his own path towards independent research.

Since then, Barkhof has become a highly revered researcher. For him MRI is not simply a means to diagnose, but a valuable instrument to study brain anatomy, physiology, and disease mechanisms, and

to develop drug therapies. Recognising the crucial role MRI has in early and accurate diagnosis and prognosis, Barkhof was heavily involved in developing diagnostic criteria for multiple sclerosis, which are being used globally, and serial MRI protocols and analysis techniques to monitor treatment in multiple sclerosis and Alzheimer's disease. "MRI lacks the details of the microscope, but the advantage is the overview, and its translational capabilities: it is a bridge between pathology and clinical manifestations of disease".

He is also an advocate for multidisciplinary collaborations and data sharing, as evidenced by his founding role in the European MAGNIMS study group and network, his leadership roles in AMYPAD and the imaging scientific advisory groups of EPAD, and by serving on several editorial boards for academic journals. "I am super honoured", he says, "to receive the John Dystel prize 2018 [for multiple sclerosis research] from the American Academy of Neurology and National MS Society. To be among those who have won is humbling"; Barkhof recalls the 1999 winner, late neurologist Ian McDonald, who was on the panel when Barkhof publically defended his thesis; "actually more of a show these days, still stressful, but also fun", he says.

A few questions were more difficult for Barkhof and, with his endearing laugh (almost a giggle), we decide to skip talking about "the future", but he does talk about what he is most proud of: his students who achieve independence and his book *Neuroimaging in Dementia*. He also enjoys the fact that his work is globally recognised because he then knows he has made good decisions. Of course, there is still so much to solve and he wants to be involved in solving it: "In [multiple sclerosis], we have good therapies, but we do not know the cause so we cannot cure it, and we think we know what causes dementia, but we still don't have efficient drugs".

Amazingly, Barkhof manages to get his vital 8 h sleep most nights—"without this I feel suboptimal". However, he describes his work life balance as "endangered". He can switch gears from work to home with his daily cycling, and he can turn off work mode when he is with his children, playing the piano, or cooking, and skiing for him is the ultimate relaxation. "Apparently I have slightly strange taste in music—electronic, experimental, emerging obscure musicians—but then I have had the pleasure of seeing Kraftwerk twice live", he says. Lucky man!

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