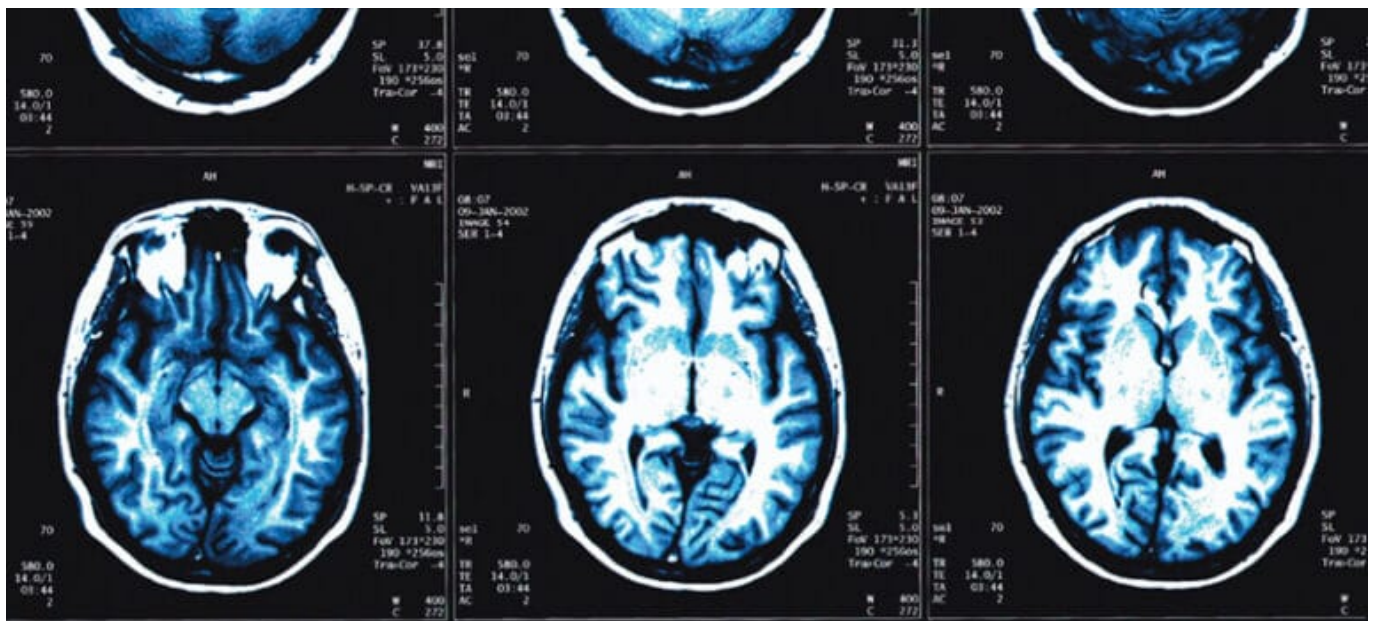


# A better look



**Frederik Barkhof, MD, has advanced the use of MRI to understand MS.**

by Mary E. King, PhD



**Frederik Barkhof, MD.**  
Photo courtesy of Frederik Barkhof

Frederik Barkhof, MD, has received the National Multiple Sclerosis Society and the American Academy of Neurology's 2018 John Dystel Prize for Multiple Sclerosis Research for his many

years of outstanding research in the field of MS, especially in advancing the understanding and clinical use of brain imaging. Dr. Barkhof is a professor of neuroradiology in the Department of Radiology and Nuclear Medicine, VU University Medical Center (Amsterdam, The Netherlands) and at the Institutes of Neurology and Healthcare Engineering, University College London (London, UK).

### **MRI provides the big picture**

Dr. Barkhof explains his interest in magnetic resonance imaging (MRI) and MS this way: “I want to better visualize and understand disease onset and mechanisms of progression to facilitate diagnosis and drug development. MRI is complementary to neuropathology; it has less resolution [of fine details] but a better overview with longitudinal observations. We sometimes refer to it as the ‘macroscope’ in contrast to a microscope’s view of the brain.”

## **The Dystel Prize**

The John Dystel Prize is awarded annually by the Society and the American Academy of Neurology. This prestigious honor was established by the late Oscar Dystel, a member of the Society’s National Board of Directors, and his late wife, Marion. They established this prize in 1994 prize in honor of their son John Jay Dystel, an attorney who died from complications of MS.

Dr. Barkhof describes what he sees as the most important clinical outcome of his research so far. “My MRI criteria are used internationally [for] earlier diagnosis and treatment of patients suspected of MS.” This research has also allowed doctors to monitor the progression of specific changes in the brain during the course of MS. Researchers now apply these criteria to look more closely inside the brain at the effects of MS drugs under development, he continues.

Passionate about MS research, Dr. Barkhof says: “I have always been very visually oriented, and radiology allows you to see what causes disease. MRI allows you to see brain structure and function and its pathology well before symptoms occur. I also find the translation of MRI changes to genetics, pathology and future disability fascinating.”

Dr. Barkhof has made many contributions to MS research and clinical care, notes Bruce Bebo, PhD, executive vice president, research, for the Society. “He is the author of more than 900 papers as well as a number of books and has been named by Thompson-Reuters as one of the most influential scientists in the world.” Bebo also pointed out that Dr. Barkhof is a strong advocate for multidisciplinary collaborations and data sharing, as evidenced by his founding role in the European consortium known as MRI in Multiple Sclerosis (MAGNIMS).

# Searching for novel insights

Frederik Barkhof, MD, has advanced the use of MRI to understand MS.

## **1997-1998: Barkhof diagnostic criteria**

The value of MRI abnormalities for confirming MS diagnosis was first described in 1988, says Henry F. McFarland, MD, scientist emeritus, National Institute of Neurological Disorders and Stroke and National Institutes of Health. But “the next really significant step in developing coherent diagnostic criteria [occurred] in 1997,” when Dr. Barkhof and colleagues published a paper explaining the predictive value of certain imaging measurements that substantially increased the accuracy of [MS] diagnosis. This paper formed the basis for the now well-established “Barkhof Criteria” that are widely used in clinical practice, Dr. McFarland adds. David H. Miller, MD, emeritus professor of clinical neurology, Queen Square Multiple Sclerosis Center, London, adds that these criteria “have been a key step in reliably using MRI findings to enable an earlier and accurate diagnosis of MS.”

## **1997-2015: Design of MS clinical trials**

Dr. Barkhof was also instrumental in promoting the use of the number of active lesions from MRI studies as an outcome measure in early clinical trials of MS in a series of papers published from 1997 to 2015. “These papers represented some of the most important contributions leading to the use of MRI in clinical trials in MS,” Dr. McFarland says.

Dr. Miller adds: “Dr. Barkhof contributed crucially in the design of proof-of-concept trials in relapsing-remitting MS that have expedited the delivery of many of the disease modifying treatments now available for this form of the condition. His group has provided central MRI analysis in numerous clinical trials and his work has also given valuable insights for monitoring safety and efficacy of treatments in clinical practice.”

## **2016: Additional advances in MRI imaging in MS**

Dr. McFarland notes that, as one of the few scientists working in the field of imaging in MS who is trained specifically in radiology, Dr. Barkhof has “a unique ability to advance the power in MRI imaging by developing new imaging techniques ... and [identifying] the relationship between imaging measures and pathological changes in tissue.”

Dr. Barkhof was also senior author of a 2016 paper developed from a Magnetic Resonance Imaging in MS (MAGNIMS) workshop that not only reviewed the current diagnostic criteria for MS but also described the role of spinal cord imaging, along with diagnostic criteria for children and for primary progressive MS, according to Dr. McFarland.

## **2017: Contributions**

In a letter nominating Dr. Barkhof for the Dystel prize, Dr. Miller highlights Dr. Barkhof’s work in brain imaging. “Frederik Barkhof has made an enormous contribution to the field of MS research,” Dr. Miller wrote.

“He has developed and applied MRI methods that have improved the diagnosis of MS and facilitated disease monitoring in clinical trials, which in turn has brought forward new treatments for the condition. His continuous and continuing excellence in the application of cutting-edge imaging techniques has considerably advanced the monitoring and understanding of MS.”

### **2018 and beyond: Next steps**

As he looks to the future, Dr. Barkhof says that the Dystel prize motivates him to continue searching for novel insights and train the next generation of MS researchers.

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